Village of Paw Paw
Drinking Water State Revolving Fund
Project Plan

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Prepared By

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1.0 INTRODUCTION

This Drinking Water State Revolving Fund (DWSRF) project plan is being submitted to fund replacement of lead service lines to improve water quality for properties with this pipe material currently in place, replacement of aging water mains, water valve replacements, and improvements to the Water Tower. This integrated asset management approach will improve the level of service for users of all utility networks and presents long-term cost savings.

The Village of Paw Paw owns and operates its municipal water supply system. Areas outside the Village boundaries that are also served by the Village system include small sections of Paw Paw Township. All areas served by Paw Paw's water supply systems are located within Van Buren County. The Village of Paw Paw, along with the adjoining township, obtain their raw water from three (3) groundwater wells located southwest of the Village. The water is then treated and distributed to the system for domestic use and fire protection needs.

The condition of the system and a list of projects needed to improve or maintain the system were laid out in two recent reports developed by Abonmarche. These reports include the most recent Drinking Water Reliability Study (DWRS) and Drinking Water Asset Management Report (DWAMR). A copy of these reports can be found in **Appendix A and Appendix B respectively**.

The purpose of this report is to utilize the findings of those reports and other observational findings to outline the system's needs and apply for financial assistance to help cost-effectively fund those projects. The report intends to discuss these needs in the context of the state of the existing system and the impacts the proposed projects will have on the system as a whole and the greater community at large.

2.0 PROJECT BACKGROUND

2.1 DELINEATION OF STUDY AREA

The Study Area, which is shown in **Figure 1**, consists of land within the Village of Paw Paw and portions of the adjacent Paw Paw Township and Waverly Township. The Village is located in east-central Van Buren County at the intersection of Interstate 94 and M-40, approximately 20 miles west of downtown Kalamazoo. The Village is situated between Antwerp Township to the east and Paw Paw Township to the west. The East and West Branches of the Paw Paw River join to form the South Branch in the Village, just above the bridge at Michigan Avenue at the southern end of Maple Lake.

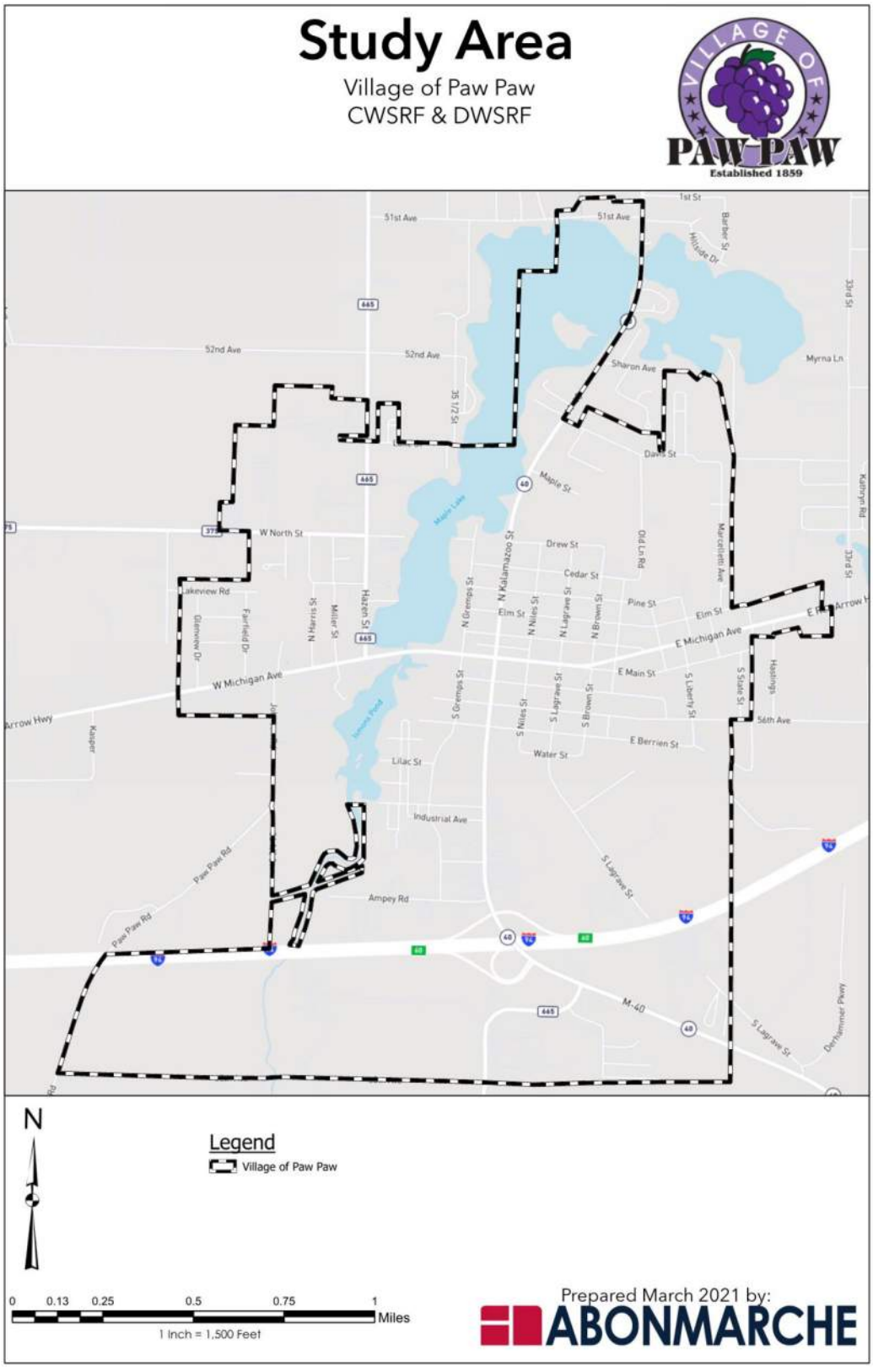

Figure 1: Study Area Map

2.2 LAND USE

The existing land use in the Study Area primarily includes residential, commercial, industrial, and recreational uses, as indicated in **Figure 2**. The existing Paw Paw Village Zoning Ordinance is up-to-date and consistent with current development trends and issues.

The Village encompasses a total area of approximately 2.89 square miles and is primarily laid out on a north-south orthogonal grid system. Commercial land uses have developed along the Village's two main corridors: M-40/Kalamazoo Street and Red Arrow Highway/Michigan Avenue and the proximity of I-94 has fueled an expansion of commercial uses outward from the downtown to the Village boundaries. There are also commercial areas in the townships at the east and west entrances to the Village on Red Arrow Highway/Michigan Avenue. Most residential development is located adjacent to downtown to the north, south, and east. These neighborhoods are characterized by older homes on small lots and many share property lines with commercial and industrial uses. A mixture of older, cottage-style homes, as well as new lakefront homes, can be found on the shores of Maple Lake. Newer, subdivision-style residential development is located on the north side of Michigan Avenue, west of Maple Lake. Industrial land uses are located west of Kalamazoo Street near Factory Street and Industrial Avenue.

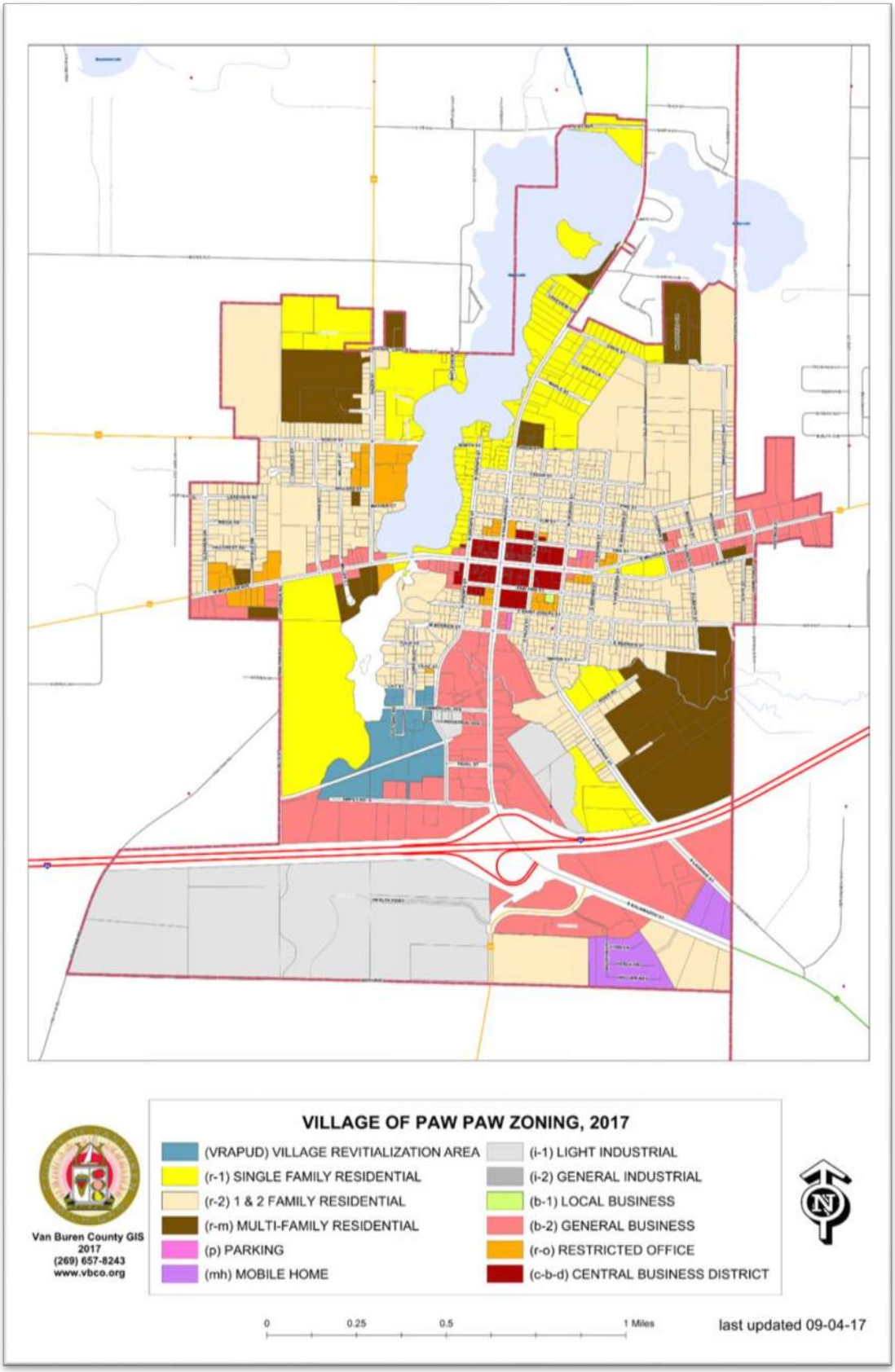

Figure 2: Village of Paw Paw Land Use Map

2.3 PARKS AND RECREATIONAL FACILITIES

The Village has fifteen public parks and recreational areas within the Village limits. Several recreational activities are available at the various facilities. **Table 1** below is a current and complete listing of all outdoor recreational facilities owned or operated by the Village.

Table 1: Parks and Recreational Facilities

Park	Location	Area (acres)	Type
Sunset Park	North end of Maple Lake, boat launch, and picnic grounds	4.5	Mini-Park
South Shore Park/Lake Front Park	Along Michigan Avenue, Amphitheatre and bathrooms	1.3	Mini-Park
Hazen Street Park	Southwest end of Maple Lake	0.1	Natural Resource Area
La Cantina Basin, Lions Island, Briggs Pond	North of Michigan Avenue at the confluence of East and West/South branches of the Paw Paw River	27.4	Natural Resource Area
Maple Lake/Maple Island	Man-made Island off N. Kalamazoo Street/M-40 near North end of Maple Lake	5	Community Park
Tyler Field	Former school athletic field now a multi-use park with ball field, football/soccer field, Kids Paradise adventure playground, etc.	10	Community Park with regional use
Harris/Miller Street Park	Between Harris and Miller Streets	1.2	Community Park
Rotary Canoe/Kayak Launch Site	Downstream and on the East side of the hydro dam	0.4	Mini-Park
Courtyard Park	Downtown Paw Paw along Michigan Avenue, South side of 200 block	0.7	Mini-Park
Four Prairies Open Space	Greenway between Lake Blvd. and Lilac Lane	2.6	Greenway
Maple City Veteran's Memorial Park	Located at the junction of East Main Street, East Michigan Avenue, and Brown Street.	0.1	Mini-Park
Paw Paw Middle School *	Activity and green space with ball fields	59.5	School Park
Upper/Lower Elementary School	Activity playground and green space	38.1	School Park

A map displaying the locations of parks in the Village is shown below in **Figure 3.**

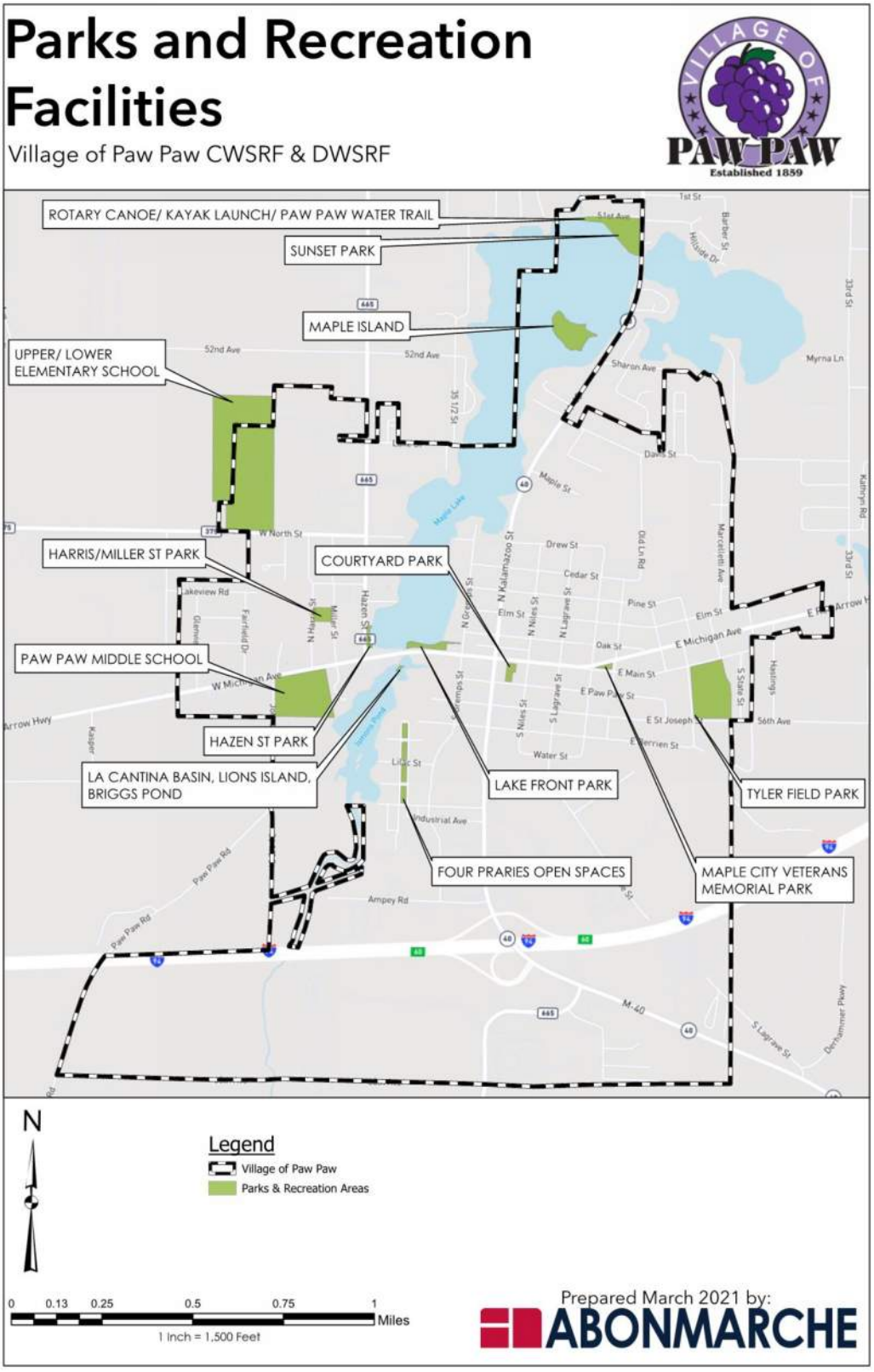

Figure 3 - Parks and Recreation Facilities

2.4 POPULATION PROJECTIONS

Population projections for the Village of Paw Paw were compiled with data from the US Census Bureau and the Southwest Michigan Planning Commission. It is not expected that the Village will expand its physical limits in the near future. The projections shown have been calculated based upon the population projections created by MDOT for the areas that are located within the Village of Paw Paw. This data is presented in greater detail in **Appendix C**, however, a snapshot is provided in **Table 2.** The population is expected to grow slightly over the next 15 years.

Table 2: Population Projections

Population	Census Data*			Projected Data**		
	2010	2015	2019	2025	2030	2035
Projected Population	3,534	3,417	3,366	3,857	3,966	4,050

* - Based on 2010 US Census and Annual Estimates

** - Projected Population is based on Regional Economic Model, Inc. (REMI) Source: MDOT, Bureau of Transportation Planning, Statewide Model Unit Based on reported projections, the population for the Village of Paw Paw served by the water system is estimated to be 3,508 in 2035, not appreciably different than it is today.

2.5 WATER DEMAND

A water reliability study was performed in the Village of Paw Paw in 2015. As of the 2014 fiscal year, the average daily water consumption for the Village was 0.357 million gallons per day (MGD) and the maximum daily water consumption was 0.698 MGD. **Table 3** shows the breakdown of daily water consumption as of 2014 as well as projections of daily water consumption values for the years 2025 and 2035. According to data from the US Census Bureau, the population of the Village of Paw Paw in 2014 was 3,405. This breaks down to a consumption level of 105 gallons per person per day (GPPD). The per capita water consumption for the Village of Paw Paw in 2014 was within the average range of water consumption levels for a community of that size (average consumption level calculated to be around 100 – 120 GPPD).

Table 3: Water Demand Summary (2014)

	2014	2025 (Projected)	2035 (Projected)
Average Daily Demand (mgd)	0.357	0.404	0.425
Maximum Daily Demand (mgd)	0.698	0.791	0.830

The current top 20 consumers in the water network system can be seen below in **Table 4**.

Table 4 - Top 20 Water Consumers

Consumer	Consumption (gallons)	Average (gpd)
ST. JULIAN WINERY	7,213,800	19,764
VAN BUREN COUNTY	7,051,000	19,318
LAKEVIEW COMMUNITY HOSPITAL	4,248,400	11,639
VAN BUREN COUNTY	3,367,000	9,225
THE CLOTHES BASKET	2,638,000	7,227
PAW PAW VENTURE, LLC	2,359,000	6,463
MAPLE LAKE ASSISTED LIVING, LLC	1,749,000	4,791
KNOUSE FOODS	1,462,000	4,005
COMFORT INN	1,264,000	3.463
WOODFIELD	1,208,000	3,652
WOODFIELD	1,094,000	2,997
COPPER GRILL	992,000	2,717
WOODFIELD	918,000	2,515
WAL-MART STORES EAST	851,000	2,331
PNC BANK	819,700	2,245
WOODFIELD	802,000	2,197
U S POST OFFICE	794,700	2,177
VINEYARD APARTMENTS	786,000	2,153
SPARTAN STORES – MS#8	751,000	2,057
BAYMONT HOTEL	742,900	2,035

2.6 EXISTING FACILITIES

A map displaying the locations of the Village's wells, water mains, and water storage tank is shown below in **Figure 4.**

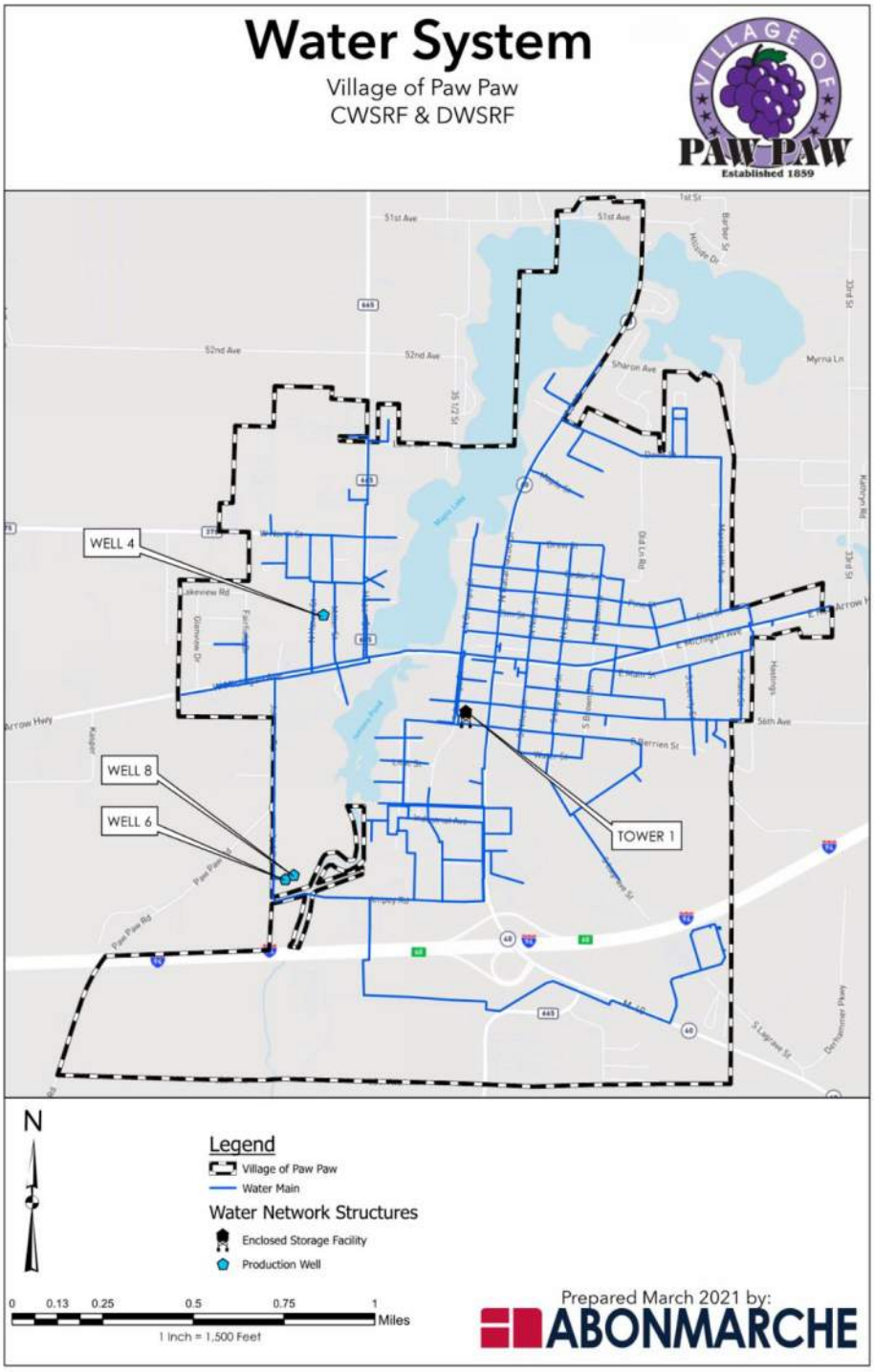

Figure 4: Village of Paw Paw Existing Facilities

2.6.1 WATER SUPPLY SYSTEM

The Village of Paw Paw maintains a bacterially safe water supply system, with chlorine and phosphate additions at each well, approved by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) to service the Village. The Village has been satisfactorily collecting and submitting monthly bacteriological samples for analysis and monthly operation reports.

The wells are inspected regularly by Peerless-Midwest, Inc. These reports can be found in **Appendix D**. It is recommended that the pumps be overhauled every five years. The wells have had their pumps and motors removed, inspected, oiled, and installed in working condition. Routine maintenance helps keep the pumps running efficiently and helps minimize costly repairs. The most recent inspection indicated that Wells No. 6 & 8 are operating satisfactorily. Normal budgetary amounts for replacement/inspection/maintenance should be continued. Well No. 4 is on standby status.

Standby power is available to Well No. 6 and Well No. 8 with an existing generator on site. The backup power generator has a power rating of 275 KVA and is exercised once a week by the Public Works Department. A portable generator for Well No. 4 is shared with the sewer lift station and is tested weekly on the lift station.

As of 2007, the Village has an approved Wellhead Protection Program (WHPP) consistent with Part 28 Wellhead Protection Grant Assistance Rules administered by EGLE and has been very active with public participation. The Village of Paw Paw 2011 Water System Review (EGLE) indicated that there are three known major sources of contamination located about 1,350 feet east of Wells No. 6 & 8; Plastic Rubber: VOC plume in deeper aquifer moving northwest; Paw Paw Plating: VOC plum in shallow aquifer moving northeast; Duo Tang: VOC plume in shallow and deeper aquifer moving northwest. Additionally, a Village sewage lift station is located 400 feet south and 100 feet east of Wells No. 6 & 8.

Water supply is treated with chlorine for disinfection and phosphate for iron sequestering and corrosion control. Water Quality Reports are created annually and made available to the public via the Village's website. Water Quality Reports for 2010-2014, 2018, and 2019 can be found in the water reliability study in **Appendix A**.

2.6.2 WATER DISTRIBUTION AND STORAGE

The existing water distribution system includes over 20 miles of 2" through 16" water mains and water services to each user. The mains adjacent to the wells are 16" and main transmission lines are 8-12" in size. Many of the residential areas are served by 4-8" mains. A significant portion of the Village (16.7%) is serviced by mains 2" and 4" in diameter, inadequate for maintaining proper flows and pressures within these stretches.

One elevated storage tank with a 500,000-gallon capacity is located in the downtown area of the Village. A breakdown of the existing water main lengths and sizes is given in **Table 5** below. A map of the existing main layout can be seen in **Appendix E.**

Table 5: Existing Water Distribution System

Water Main Diameter (inches)	Approximate Length of Water Main (LF)	% of Total (%)
2	7,187	5.6%
4	14,236	11.1%
6	24,261	19.0%
8	42,647	33.4%
10	14,563	11.4%
12	24,576	19.2%
16	390	0.3%
Total	127,860	100.0%

2.6.2.1 Distribution System

In April of 2015, the Village of Paw Paw Department of Public Works performed flow tests for the water distribution system. Details can be found in the reliability study in **Appendix A**. The test results show acceptable static and residual pressures but revealed some areas with inadequate flow rates. This is a result of undersized mains restricting water quantity. Substandard water main size causes poor flow and inadequate pressures which can lead to water quality issues. For adequate flow, a minimum main diameter of 8" is recommended.

Improperly looped water mains are a cause of reduced pressures, water quality issues, and increased maintenance needs in the water distribution system. While the system is generally well-looped, dead ends have been identified at the following locations:

- North Street, east and west sides
- West end of George Court
- South end of Miller Court
- North end of Hazen Street
- North end of Cherry Street
- East and west ends of Lilac Street
- East and west ends of Tulip Street
- West end of Lily Street
- West end of St. Joseph Street
- East end of E. Michigan Avenue
- West end of W. Michigan Avenue
- North end of Gremps Street
- East end of Maple Street

- East end of Birch Lane
- West end of Lakeview Terrace
- North end of Kalamazoo Street (M-40)
- East end of Mather Court

2.6.2.2 Storage System

The Village relies on a 500,000-gallon single pedestal elevated storage tank with a head range of 37.5 feet. The ISO recommends that a storage tank is provided with a volume sufficient to provide average maximum daily demand and recommended fire flow for the duration of fire listed by ISO. The typical fire duration is two to four hours. The size of the storage tank would be calculated as seen below in **Table 6**.

Table 6: Required Fire Flow Capacity

20-year (2035) Maximum Daily Demand	499 gpm	499 gpm
Fire Flow -- Commercial	2,500 gpm	2,500 gpm
Total Flow	3,000 gpm	3,000 gpm
Duration	120 minutes (2 hr)	240 minutes (4 hr)
Total Capacity Required	360,000 gallons	720,000 gallons

Without any assistance from the wells, the tank has the ability to provide over two and a half hours of commercial fire flow. Therefore, the current storage capacity is adequate.

With assistance from the wells at firm capacity (1,490 gpm), and the water tower is assumed to be half full (250,000 gallons), the Village can fight a commercial fire for approximately 3 and a half hours.

2.6.3 WATER SERVICE LINES

The Village has an estimated 1,120 lead or galvanized water service lines. By EGLE mandate, these lead service lines must be completely replaced at an average rate of 5% a year for 20 years. Lead Service Line Replacement (LSLR) will most likely take place at a faster rate than this, but still on a basis that the Village can afford.

The Village intends to replace 600 lead water services with Booker funds and another 175 through the DWSRF loan. These 175 services are those that remain outside of the services replaced as part of the distribution projects.

2.6.4 WATER METERS

The Village has 1,772 meters in the water distribution system that measure water usage for residential, commercial, industrial, municipal, and tax-exempt customers.

All meters are read and billed monthly. Meter readings are taken electronically with a handheld device by a Village of Paw Paw water department employee. The data is then downloaded and

a computer program, BS&A Software System, prepares each water bill. Sewage billing usage is also based on the quantity of water usage. However, some clients have garden meters that record water usage only. The garden meter usage is added to the water billing usage and not the sewer usage billing.

2.6.5 FIRE HYDRANTS

A Map of the existing hydrant network can be seen in **Appendix F**. Using data collected from flow testing, hydrant condition is separated into the four classifications as follows:

- Class AA (1500 gpm or more)
- Class A (1000 – 1400 gpm)
- Class B (500 – 999 gpm)
- Class C (Less than 499 gpm)

Of the Village's hydrants, approximately 17% are Class AA, 63% are Class A, and 20% are Class B.

2.7 SUMMARY OF PROJECT NEEDS

2.7.1 COMPLIANCE WITH DRINKING WATER STANDARDS

The Village's water supply system complies with all drinking water standards. Water quality reports certifying compliance can be found in **Appendix G.**

2.7.2 PROJECTED NEEDS FOR THE NEXT 20 YEARS

Based on the findings of a water reliability study and asset management plan, a 20-year Capital Improvement Plan was developed to address the short-term and long-term needs of the water distribution system in the Village. The sections below outline the scope of the proposed short-term and long-term projects, as well as the project cost considerations.

2.7.2.1 SHORT TERM CIP

The Short-Term Capital Improvement Program (CIP) includes a variety of projects to improve the water storage, supply, and distribution network within the Village of Paw Paw. The distribution network can be improved by a series of projects that replaces mains that are undersized and nearing the end of their useful life. Miscellaneous repairs to the water tower will improve the quality and reliability of the Village's water storage system while lengthening its service life. These needs are addressed in the Village's most recent Drinking Water Reliability Study (DWRS) and Drinking Water Asset Management Plan (DWAMP). A copy of these reports can be seen in **Appendix A and Appendix B**, respectively. **These reports have been approved by EGLE and are currently on file with the department.**

In accordance with EGLE's Lead and Copper rule, all lead and galvanized water service lines in the Village system must be replaced. It is intended that many of these replacements will take place well before the 20-year mandate.

2.7.2.2 LONG TERM CIP

The Long-Term CIP involves a series of projects to improve the water supply, reliability, and storage for a 20-year period. This includes a series of mains nearing the end of their useful life in a 10-20 year timeframe. Additionally, work to continue maintenance and upkeep of the water tower is also included. These projects can also be found in the attached DWAMP.

3.0 ANALYSIS OF ALTERNATIVES

Alternatives to accomplish the capital improvement projects identified above were developed and evaluated based on their ability to meet the scope of the project while remaining within financial, regulatory, and technical constraints. The alternatives analysis presented below is a component of most federal and state funding applications and is required to justify the selected alternative.

Project objectives include:

- Ensure reliable water service to the customers.
- Rehabilitate/repair high-priority areas of existing water distribution network infrastructure.
- Provide facilities capable of providing consistent, reliable service and continued compliance with regulatory and permit requirements.
- Minimize financial burden to the water distribution system users.
- Minimize environmental impact during construction of the improvements project.
- Minimize the environmental impact of water distribution and storage systems.

To meet these project objectives, five alternatives have been identified:

- No action
- Optimization of existing water distribution network
- Regional Alternative
- Cast in Place Pipe (CIPP Lining)
- Reconstruction

The alternatives are described in detail in the following subsections. Each alternative was initially screened based on effectiveness, constructability, and financial requirements. Feasible alternatives were then subjected to a comprehensive evaluation with attention to detailed economic, technical, environmental, and public concerns.

3.1 NO-ACTION

Alternative 1 includes continuing to operate the water distribution network in its current condition. This would eliminate upfront capital costs to the Village, however, it does not address the documented shortfalls in the Village's water supply system. In the future, additional maintenance and replacement costs for emergency or EGLE-mandated repairs could be required causing significant disruption of service to water customers. No further analysis is presented on this alternative.

3.2 OPTIMIZE EXISTING INFRASTRUCTURE

Alternative 2 involves the optimization of existing water distribution infrastructure within the Village. This is not a reasonable alternative because it would not address the documented shortfalls in the system. The current near and long-term plans address the condition of such infrastructure that cannot be improved via system optimization.

3.3 REGIONAL ALTERNATIVE

Alternative 3 involves connecting the Village to the City of Kalamazoo's water distribution network. This alternative does not address the need to update deteriorating components within the Village's water distribution network and will not be analyzed further.

3.4 CAST IN PLACE PIPE (CIPP) SLIP LINING

Alternative 4 involves using CIPP to slip line the water mains in need to repair leaks or restore structural integrity. This method of pipe repair is not seen as feasible for ductile iron water main, especially water main of a deficient diameter. Re-lining these pipes would decrease the available diameter of the pipes, further decreasing the reliability of the water distribution system. This alternative was not analyzed further.

3.5 RECONSTRUCTION

Alternative 5 involves the replacement of water mains and service lines throughout the Village that are operating near or past the end of their useful lives. This is the only way to ensure a safe and reliable water supply to residents and businesses, especially those serviced by lead or galvanized service connections. As far as LSLs are concerned this is the only option allowed by EGLE under the current laws, regulations, and guidelines. **This is the selected alternative for all water main and service line-related work being proposed.**

A recent inspection report by Dixon Engineering in 2015 recommended various measures be taken to improve the condition of the storage tank. These recommendations include recoating, repainting, and replacement of various components. This report is summarized in the Asset Management Plan in Appendix B. **This is the selected alternative for water storage.**

4.0 PRINCIPAL ALTERNATIVES

4.1 MONETARY EVALUATION

A detailed breakdown of project costs is included in **Appendix H** for Alternative 5 for the distribution and water tower improvements. Alternative 1 (No Action) had the lowest estimated projected cost for both types of work, but as discussed previously, this option does not address any of the problems identified and simply puts them off for a longer period.

4.2 ENVIRONMENTAL EVALUATION

All alternatives have similar environmental impacts that are primarily due to the short-term impacts of construction. Even if the "No Action" alternative is chosen for a particular scope of work, these environmental construction impacts will still occur at a later point when the

infrastructure slated to be replaced fails and needs to be replaced. These impacts are discussed in greater detail later in this project plan document.

4.3 MITIGATION

With all of the alternatives for various scopes of work requiring construction either now or in the future, construction-related mitigation measures will be required for all alternatives. These construction-related mitigation measures are discussed later in this project plan document.

4.4 IMPLEMENTABILITY AND PUBLIC PARTICIPATION

The public was given a chance to review and comment on this project plan, including all of the alternatives that were considered. Additionally, a formal public hearing will be held after the comment period to ensure further opportunity for public participation. Other neighboring communities had the same access as local citizens.

The Village in its collection of ordinances does have the authority to implement the project plan. With the new proposed improvements mainly consisting of replacement of existing features to serve the same function on the same footprint, there are no foreseen site-related hardships related to the project's implementation.

Concerns related to financial burden are expected to be remediated by funding the project through low-interest loans from DWSRF. With this work needing to be done to ensure proper upkeep of essential reliable water supply systems, the cost related to this project is unavoidable.

4.5 CONTAMINATION

According to EGLE's Environmental Mapper, there are no sites of environmental contamination immediately adjacent to a proposed project that is listed in the 5 year CIP plan. All mains and service lines being replaced are expected to occupy the same corridors they occupy currently and should not expose the Village's water supply system to any new areas of contamination.

4.6 NEW/INCREASED WATER WITHDRAWALS

Given that the population and land use in the Village are not expected to change much in the short and long term, no additional or increased water withdrawals are expected to take place anytime soon.

5.0 SELECTED ALTERNATIVE

5.1 DESIGN PARAMETER

Design parameters, other than statutory rules and regulations set forth by EGLE, will consist of designing the proposed improvements to ensure the necessary capacity as determined by previous studies. Piping recommendations for the proposed improvements are in line with national guidelines and recommendations for water main sizing.

Descriptions for each project can be found in both the Water Reliability Study in **Appendix A** and the Asset Management Plan in **Appendix B.**

5.2 MAPS

A map showing the proposed project locations can be seen in **Figure 5** below and in **Appendix I.**

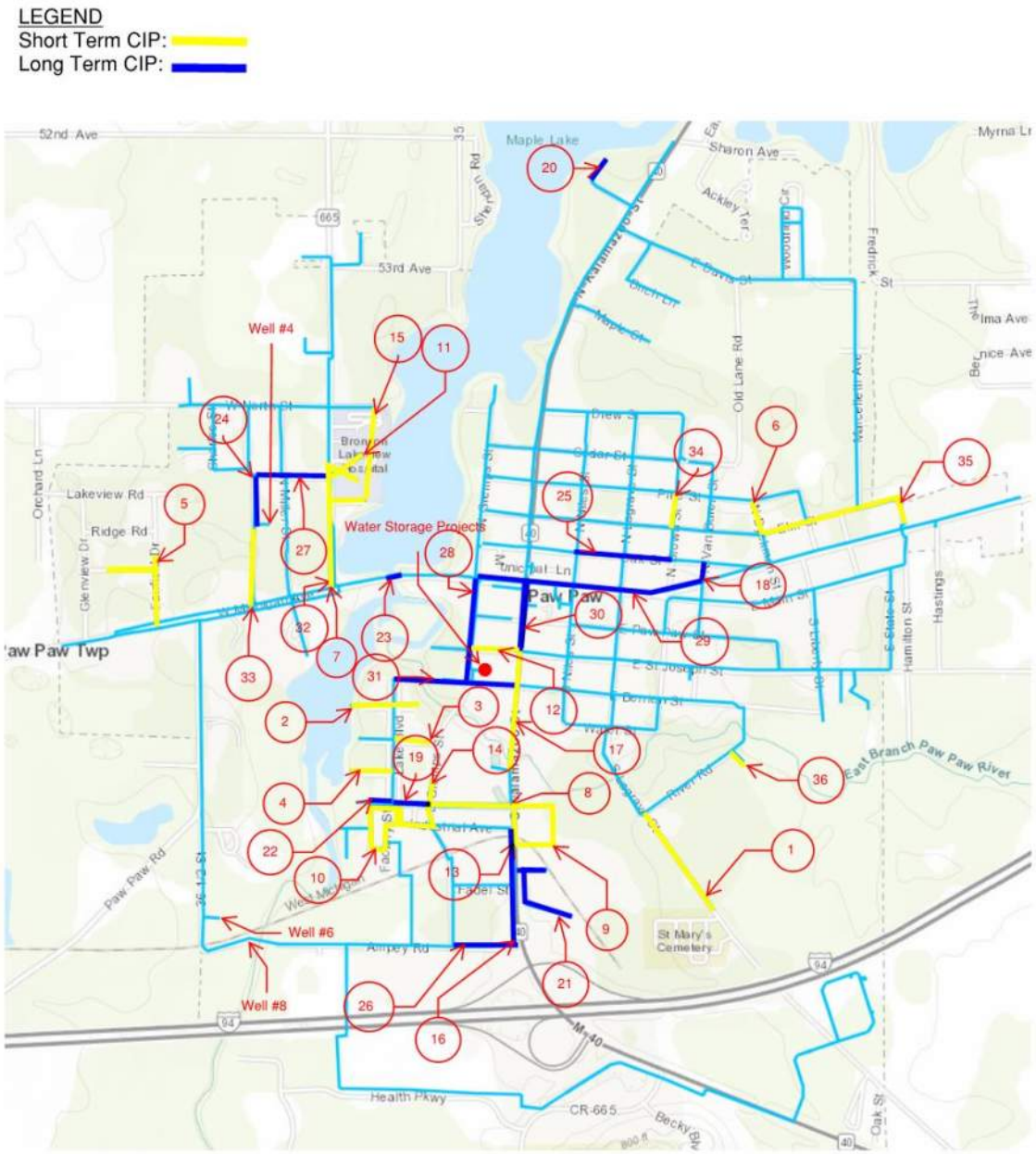

Figure 5: Project Location Map

5.3 SCHEDULE FOR DESIGN AND CONSTRUCTION

The proposed projects will be undertaken in two phases to occur throughout future construction seasons. Due to the location and nature of the work, projects have been "packaged" together based on project type and location to provide efficiencies in construction contracting and implementation.

Table 7: Anticipated Project Construction Schedule

Description	Activity	Time Frame
Submit DWSRF Project Plan	Planning	June 2021
Project Plan on PPL	Funding	October 2021
Short Term CIP:	Design	Fall 2021- Spring 2022
	Construction	Summer 2022 - Summer 2023
Long Term CIP:	Design	Future
	Construction	Future

5.4 COST ESTIMATE

Cost estimates for the various projects can be seen below in **Tables 8 through 13.** Detailed cost estimates can be found in **Appendix H.** These cost estimates were developed from parts of the Village's 2014 Water Reliability Study and the 2017 Asset Management Plan. As such, it was necessary to update the estimates to reflect more current unit prices. Where applicable, Michigan Engineers' Resource Library (MERL) was used to determine updated unit prices for MDOT items. Where MERL could not be used, unit prices were multiplied by an appropriate factor to establish an updated cost.

5.4.1 SHORT TERM PROPOSED IMPROVEMENTS

Table 8: Distribution System Improvements

#	Project Description	Estimated Cost
1	S. Lagrave Street (1,175 ft. of water main upsizing)	$ 470,898
2	Tulip Street (680 ft. of water main upsizing)	$ 269,985
3	Lilac Street (350 ft. of water main upsizing)	$ 165,105
4	Lily Street (420 ft. of water main upsizing)	$ 152,748
5	Hillcrest Road/Fairfield Drive (460 ft./660 ft. of water main upsizing)	$ 494,625
6	N. Dyckman Street (315 ft. of water main upsizing)	$ 140,963
7	Hazen Street/Mather Court (1,410 ft/360 ft. of water main upsizing)	$ 555,233
8	Commercial Avenue (S. Gremps Street to Kalamazoo Street)	$ 398,275
9	Business Park (East of Kalamazoo Street – Across from Industrial Avenue)	$ 478,885
10	Duo Tang Industrial Loop	$ 486,950
11	Bronson Hospital Service	$ 141,470
12	St. Joseph Street (480 ft. of water main upsizing, Gremps Street to Kalamazoo Street)	$ 226,603
13	Kalamazoo Street (380 ft. of water main upsizing, Industrial Avenue to Commercial Avenue)	$ 136,933
14	Gremps Street (1,040 ft. water main upsizing, North of Industrial Avenue, Industrial Avenue between Gremps Street and Lake Boulevard)	$ 476,405
15	Bronson Hospital	$ 264,175
16	S. Kalamazoo Street (Industrial Avenue to Fadel Street)	$ 309,775
17	S. Kalamazoo Street (St Joseph Street to Warner Vineyards)	$ 568,200
Total - Distribution System Costs		**$ 5,737,225**

Table 9: Water Storage Improvements

#	Project Description	Estimated Cost
2	Dry Interior Partial Repaint	$ 8,750
3	Pit Piping Repaint	$ 5,000
4	Install Cathodic Protection System	$ 25,000
5	Weld Cathodic Covers	$ 2,500
6	Install Overflow Flap Gate	$ 2,500
7	Replace Wet Interior Roof Hatch	$ 3,750
8	Replace Access Tube Roof Hatch	$ 3,750
9	Replace Condensate Platform Hatch	$ 2,500
10	Install a Frost Free Roof Vent	$ 6,250
11	Replace Condensate Drain Line	$ 2,500
12	SCADA System Improvements	$ 1,875
13	SCADA Radio Modem Replacement	$ 1,188
Total – Water Storage Improvements		**$ 65,563**

Table 10: Lead Service Line Replacements

#	Project Description	Estimated Cost
1	600 LSLRs ($5000 each)	$ 3,000,000

5.4.2 LONG TERM PROPOSED IMPROVEMENTS

Table 11: Long Term Distribution System Improvements

#	Location Description	Est. Construction Cost
18	N. Van Buren Street (Oak Street to W. Michigan Avenue)	$ 84,935
19	Commercial Avenue (Lake Boulevard East to Gremps Street)	$ 161,480
20	Lakeview Terrace (Corner to Dead End)	$ 114,000
21	Business Park (East of Kalamazoo Street to Across from Fadel Street	$ 389,120
22	Commercial Avenue (Duo Tang Road to Lake Boulevard East)	$ 128,215
23	W. Michigan Avenue (Paw Paw River Crossing)	$ 118,215
24	N. Harris Street (Midblock to W. Willard Street)	$ 222,885
25	Oak Street (N. Niles Street to N. Brown Street)	$ 368,195
26	Ampey Road (Old S. Gremps Street to S. Kalamazoo)	$ 425,540
27	W. Willard Street (N. Harris Street to Hazen Street)	$ 348,215
28	S. Gremps Street (Midblock to E. Michigan Avenue)	$ 444,375
29	E. Michigan Avenue (S. Gremps Street to N. Van Buren Street)	$ 1,222,735
30	S. Kalamazoo Street (Michigan Avenue to Warner Vineyards)	$ 420,620
31	E. Berrien Street (Lake Boulevard to S. Kalamazoo Street)	$ 510,300
32	Hazen Street (W. Willard Street to W. Michigan Avenue)	$ 733,125
33	Harris Street (750 ft. of water main upsizing)	$ 325,228
34	Brown Street (350 feet of water main upsizing, Elm Street to Pine Street)	$ 129,905
35	Elm Street (1,615 feet of water main upsizing, Dyckman Street to Hamilton Street)	$ 635,828
36	River Road (350 feet of water main upsizing)	$ 133,910
Total – Long Term Distribution System Improvements		**$ 6,916,660**

#	Project Description	Estimated Cost
1	175 LSLRs ($5000 Each)	$ 875,000

Table 12: Long Term Water Supply Improvements

#	Project Description	Estimated Cost
1	SCADA System Improvements	$ 19,125
2	SCADA Radio Modem Replacement	$ 3,687
3	Well Improvements	$ 56,250
4	Pump Overhaul: Pump #4	$ 25,000
5	SCADA Central DPS System Upgrade	$ 38,125
6	SCADA Central DPS System Upgrade	$ 38,125
7	Pump Overhaul: Pump #6	$ 31,250
8	Pump Overhaul: Pump #6	$ 31,250
9	Pump Overhaul: Pump #8	$ 31,250
10	Pump Overhaul: Pump #8	$ 31,250
11	Roof Replacement: Pump House for Pump #4	$ 25,000
12	Roof Replacement: Pump House for Pump #6 and #8	$ 25,000
Total – Water Supply Improvements		**$ 355,313**

Table 13: Long Term Water Storage Improvements

#	Project Description	Estimated Cost
1	Exterior Overcoat	$ 75,000
2	Install Painter's Railing	$ 5,000
3	Install Fall Prevention on the Dry Interior Ladders	$ 3,000
4	Install Fall Prevention on the Wet Interior Ladders	$ 1,000
5	SCADA System Improvements	$ 6,375
6	SCADA Radio Modem Replacement	$ 1,187
Total – Water Storage Improvements		**$ 90,050**

5.5 USER COSTS

If DWSRF funds are obtained for these projects in the form of a 40-year loan at an interest rate of 1.875% (based on 2021 published interest rates), user rates will need to be adjusted to cover the additional debt service to cover principal and interest payments based on the following data:

Project Cost: $8,802,788
Interest Rate: 1.875
Term: 40 Years

The Village would be required to generate an additional $26,232 monthly to repay the DWSRF loan. With 1,772 users in the system, this would equate to a monthly increase of $14.81 per user.

This analysis assumes the Village would obtain the loan money for all proposed projects as part of a single phase of construction with no loan forgiveness. However, it is expected that the Village will receive $3 million in loan forgiveness for Lead Service Line Replacements and possibly more loan forgiveness on the distribution system improvements. This would result in rate adjustments of between $8 and $11.50 per month.

5.6 DISADVANTAGED COMMUNITY

The Village of Paw Paw has disadvantaged community status as determined by the most recent filings with EGLE.

5.7 ABILITY TO IMPLEMENT THE SELECTED ALTERNATIVE

The Village of Paw Paw owns and operates its water supply and distribution system. Their existing ordinances provide the necessary authority to implement the selected alternative and make the necessary changes to their rate structure to repay construction loans or bonds associated with the proposed work.

6.0 ENVIRONMENTAL EVALUATION

6.1 HISTORICAL/ARCHAEOLOGICAL/TRIBAL RESOURCES

There are currently seven (7) historic sites within the Village that are listed on the National Register of Historic Places. **Table 14** lists the sites, the location and the date the site was put on the State's Register of Historic Places, and the date a marker was placed on the site.

Table 14: Paw Paw Historic Sites

Site Name	Location	Historic Designation
Van Buren County Courthouse (Paw Paw Village Hall)	111 East Michigan Avenue	National Register - 08/21/1972
Barnum-Harrison House	West Red Arrow Highway (1 3/4 miles west of *Paw Paw)*	State Register 1981
Paw Paw Public (Carnegie) Library	129 S. Kalamazoo Street	State Register - 06/06/2002
Paw Paw Water Works Pumping Station	706 S. Kalamazoo St.	State Register 1981
St. Mark's Episcopal Church	609 E. Michigan Ave.	State Register 1987
Territorial Road	Old-US 12, west of the State Police post	Marker Erected - 07/29/1959 State Register - 09/17/1957
Van Buren County Courthouse Complex	Paw Paw Street	National Register - 08/09/1979 State Register - 1977

6.2 WATER QUALITY

Surface and groundwater are not expected to be impacted during or after the construction of the proposed alternatives. Long-term effects of the selected alternative would include the decreased risk of health issues related to poor water quality.

6.3 LAND/WATER INTERFACE

The project is not expected to have an adverse hydrological effect on the surrounding area. A majority of the Village is categorized as Zone A by the Federal Emergency Management Agency (FEMA). Zone A consists of areas with a 1% annual chance of flooding and a 26% chance of flooding over 30 years. **Figure 6** below shows the floodplain map for the Village of Paw Paw. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.

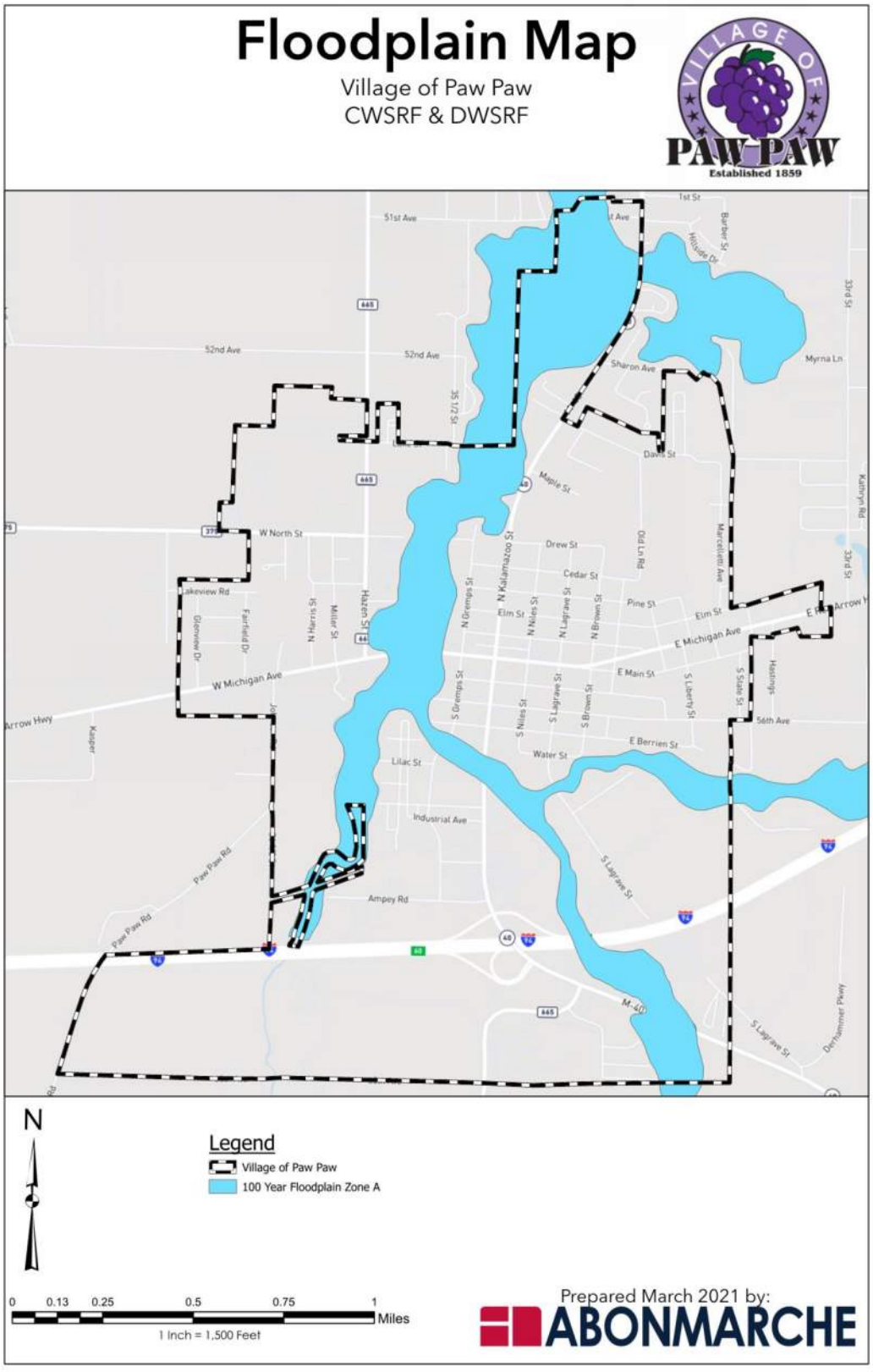

Figure 6: Village of Paw Paw Floodplain Map

6.4 TOPOGRAPHY, GEOLOGY, AND SOILS

Paw Paw's topography is relatively flat with minor slope variations near the river and Maple Lake. The area south of I-94 between County Road 665 and M-40 is the highest elevation and the area north of Maple Lake on the southwest corner of 51st Avenue and M-40 is the lowest.

According to the Soil Survey of Van Buren County, Michigan, as compiled by the United States Department of Agriculture/Soil Conservation Service, the soils and topographic conditions of Paw Paw, are primarily, "Nearly level to hilly, somewhat excessively drained and well-drained, sandy and loamy soils on outwash plains and moraines."

More specifically, the Village's predominant soil classification consists of Pewamo silt clay loam, which has a surface layer that consists of very dark gray silty clay loam about 11 inches thick. The subsoil is about 25 inches thick. It is mottled and firm. The upper part is dark gray silty clay loam, and the lower part is grayish brown silty clay. The substratum to a depth of about 60 inches is dark grayish brown and dark gray, mottled clay loam. In some places, the subsoil has less clay, and in other places it is stratified. Permeability is moderately slow. Available water capacity is high. Surface runoff is very slow or ponded. The seasonal high water table is near or above the surface in winter and spring. A map displaying the Village's soil composition can be seen below in **Figure 7.**

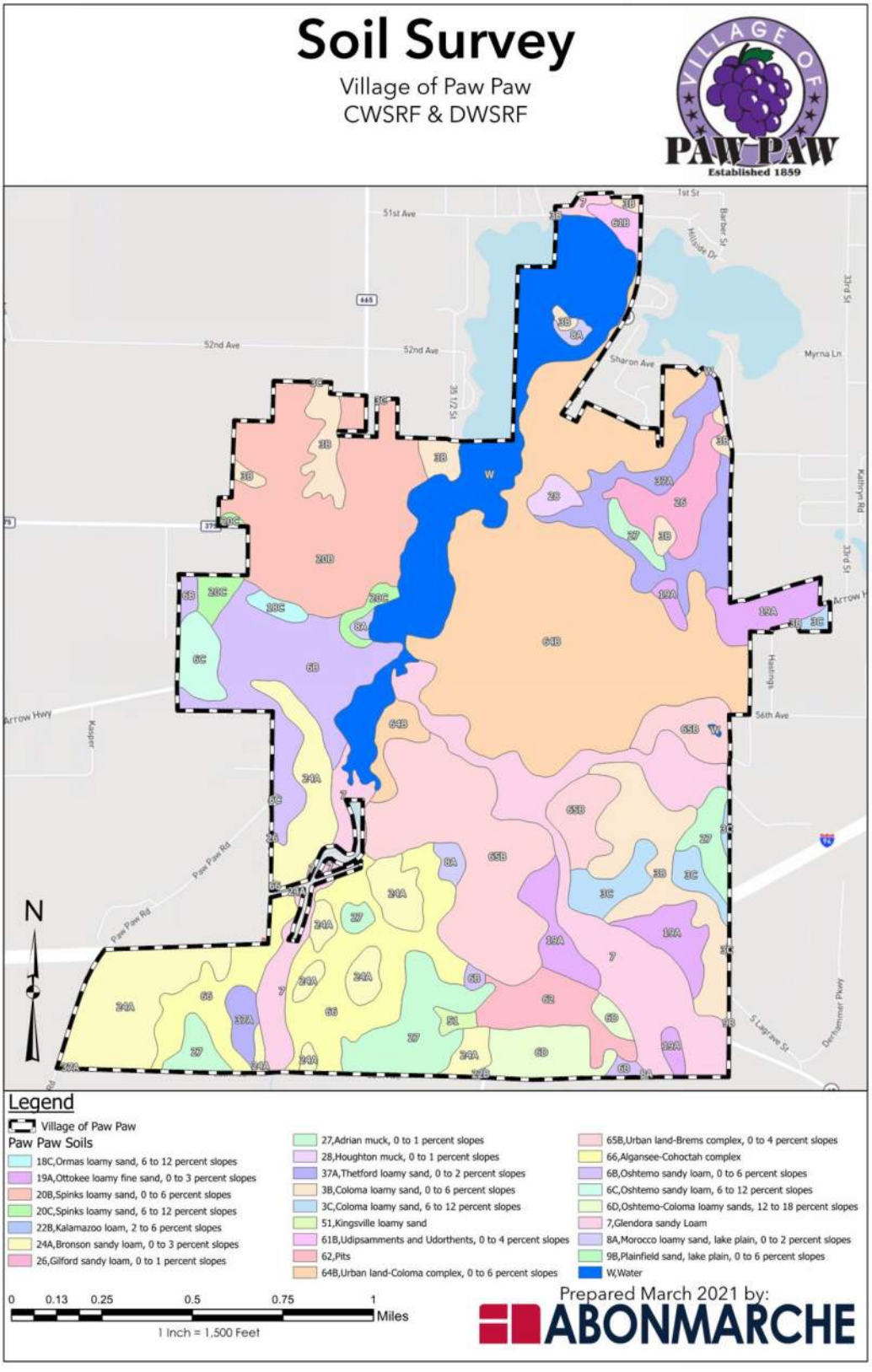

Figure 7: Village of Paw Paw Soil Survey

6.5 WETLANDS

Wetlands are present in the Village and shown on a map below. The majority of wetlands in the Village are adjacent to the Paw Paw River and Maple Lake. The Village has approximately 185 acres of wetlands and 249 acres of wetland-type soils, as defined by the National Wetlands Inventory. These areas are important habitats for a diverse array of plants and animals that are key to watershed health, in addition to contributing to the beauty of the area. The area occupied by the WWTF is located in a wetland area as defined by EGLE's Final Wetland Inventory. A map of the wetlands in and around Paw Paw can be seen below in **Figure 8.**

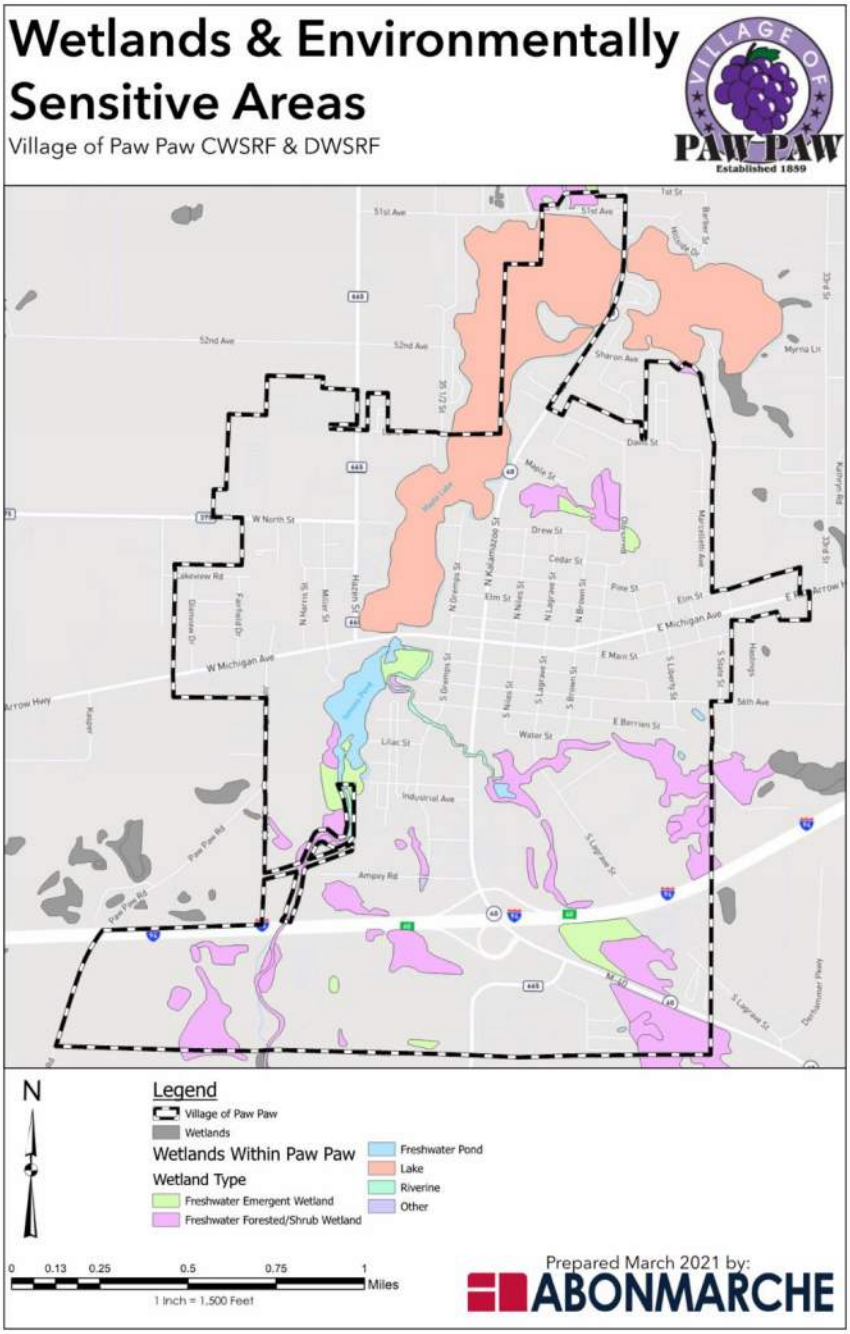

Figure 8: Wetlands and Environmentally Sensitive Areas

6.6 ENDANGERED SPECIES

Currently, there are six species listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) in Van Buren County. Endangered or threatened designated species are protected under the Endangered Species Act. The projects proposed within this Plan take place within already developed areas and are not expected to impact any habitat. Where tree trimming or removal is necessary, this work should be scheduled to mitigate impacts on threatened or endangered species (Indiana Bat). **Table 16** on the following page indicates the species listed as endangered or threatened in Van Buren County.

Table 15: Threatened and Endangered Species in Van Buren County, MI

Species	Status	Habitat
Indiana Bat (*Myotis sodalis)*	Endangered	Summer habitat includes small to medium river and stream corridors with well-developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests. Caves and mines as hibernacula.
Rufa Red Knot (*Calidris canutus rufa)*	Threatened	Coastal areas and large wetland complexes
Eastern Massasauga (*Sistrurus catenatus)*	Threatened	Forested wetlands and adjacent upland area
Mitchell's satyr (*Neonympha mitchellii mitchellii)*	Endangered	Fens; wetlands characterized by calcareous soils which are fed by carbonate-rich water from seeps and springs
Pitcher's Thistle (*Cirsium pitcher)*	Endangered	Stabilized dunes and blowout areas
Northern long-eared bat (*Myotis septentrionalis)*	Threatened	Hibernates in caves and mines – swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.

6.7 AGRICULTURAL LAND

Situated in northwest Van Buren County, Paw Paw is located among some of the most productive agricultural lands in the state. The area is renowned for its production of field crops, namely grapes which are used in wines, juices, and jams. Agricultural production represents a major land use in Van Buren County and it plays a significant role in the Paw Paw economy.

6.8 SOCIAL/ECONOMIC IMPACT

Direct beneficial impacts to the cultural/social environment of the Village will result from the project plan improvements. The construction activities of implementing the project plan will create jobs and therefore contribute in a positive way to the local economy.

Short-term adverse impacts will include inconvenience to residents impacted by construction activity as the result of the recommended project plan improvements.

The "no-action" alternative would not require the commitment of any monetary resources, nor would it solve the water distribution issues in the Village. The overall adverse impacts of the "no

action" alternative on the social and economic environments outweigh the monetary benefits derived by zero capital expenditures, and the minor cultural impacts resulting from the construction of updated infrastructure. Therefore, it is concluded that the "no action" plan is not a viable or acceptable alternative.

6.9 CONSTRUCTION/OPERATIONAL IMPACT

Adverse impacts upon sensitive environmental areas will be either non-existent or minimal. Construction of work will take place within floodplain areas, however, there will be no changes to grade elevations that would impact floodplain boundaries. There are no historical or archeological sites anticipated to be disturbed within the proposed plan area.

Minor impacts will include the increase in noise and dust at the construction sites, along with emissions from both gasoline and diesel engines. Impacts resulting from construction practices will cease or be repaired after the selected projects. During the period of construction, the adverse impacts can be significantly reduced through proper soil erosion control procedures, air pollution control equipment, noise barriers, mufflers, efficient construction methods, and limitations to the allowed hours of work.

The projects would cause a lack of road access along the given parts of each street where active construction is taking place. While temporary measures could be utilized to maintain as much access as possible, getting to businesses in active work zones could be difficult at times.

6.10 INDIRECT IMPACTS

Indirect impacts are the result of the development and operation of the proposed project. The proposed construction will result in impacts to development trends, water quality, and environmental trade-offs.

The project plan will eliminate shore-up defects and deficiencies in the water supply system. Repair and/or replacement of distribution and storage infrastructure minimizes the effects of unforeseen stoppages in service that can be detrimental to the public health and welfare in the short term overall water reliability in the long term that could result from failure of this infrastructure. The mitigation of these risks will have a long-term beneficial impact on the water reliability within the Study Area.

The proposed alternative will also provide an increase in system efficiency by eliminating areas of constricted flow and could allow for some future development. The new growth could lead to a higher-density residential pattern and an increase in population. The increased capacity within the system would also create the potential for industry. Most new industries would typically be small manufacturing which prefers to locate in small rural settings with water, sewers, utilities, and good transportation systems. Some benefits of industrial development include an improved economic base, the provision of local jobs, and a reduction of local unemployment.

7.0 MITIGATION MEASURES

The projects will be constructed in already developed areas and right-of-ways.

The primary adverse impacts are related to the construction work required for lead service replacement. These impacts can be minimized through efficient and cost-effective design and construction practices, soil erosion control procedures, air pollution control equipment, noise control, and mufflers. The project will also be segmented to allow a balanced construction cycle to minimize inconvenience to the community as a whole.

Efficient, cost-effective design of the project plan will result in more construction per dollar cost, as well as provide a lower maintenance cost system than that which is in place now.

Soil erosion control procedures, such as the use of silt fence, erosion control blanket, watering, and the immediate seeding of disturbed areas with help to control erosion caused by rainfall and wind.

Air pollution can be minimized by proper maintenance through proper muffling of equipment and by limiting construction to acceptable times during the daytime hours.

Any work within wetland areas would be mitigated by prohibiting the disposal of spoils within the wetland (and requiring disposal off-site), specifying the use of construction mats/wash down areas, scheduling work for drier seasons, etc.

The following measures could be taken to avoid, eliminate, or mitigate potential adverse impacts on the environment:

- Traffic Control – Flaggers, Warning Signs, Barricades, Cones, etc.
- Dust Control – Calcium Chloride and Water.
- Noise Control – Designate Work Hours, Mufflers, No Work on Weekend or Holidays.
- Soil Erosion and Sedimentation Control – Seeding, Sodding, Rip Rap, Erosion-Control Blankets, Silt Fence, etc.
- Restoration – Pavement, Gravel, Topsoil, Seed, Fertilizer, Mulch, Sod.

8.0 PUBLIC PARTICIPATION

8.1 PUBLIC MEETING

No public meeting was held to discuss the plan before the formal public hearing. Abonmarche has been working closely with staff to develop the contents of the plan. Village council members and the general public will have the required 30 days to review the project plans and submit questions to Abonmarche and Village Staff before the formal public hearing.

8.2 PUBLIC HEARING ADVERTISEMENT

A public hearing was scheduled for May 24, 2021, and an advertisement was posted in the local newspaper on April 22, 2021. Advertisements and links to electronic copies of the report were provided online at www.pawpaw.net. Documents can also be found in the Bid Room on http://www.abonmarche.com Hard copies are located at Village Hall and the Paw Paw District Library. A copy of the advertisement along with an affidavit of advertising is included in **Appendix J**.

8.3 PUBLIC HEARING TRANSCRIPT OR RECORDING

The transcript of the Public Hearing along with the sign-in sheet and adopted resolution accepting the Plan is included in **Appendix J**.

8.4 COMMENTS RECEIVED AND ANSWERED

8.5 ADOPTION OF THE PROJECT PLAN

On July xx, 2021, the Village Council members present voted x-x to approve Resolution xx-xx adopting the Final SRF Project Plan for Water System Improvements and Designating an Authorized Project Representative.

A copy of the resolution is included in **Appendix K**.

APPENDIX A:

WATER RELIABILITY STUDY

WATER SYSTEM RELIABILITY STUDY

December 2015

Prepared for:

Village of Paw Paw
michigan

111 E. Michigan Ave
Paw Paw, Michigan 49079

Prepared by:

ABONMARCHE
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Table of Contents

SECTION 1 – EXECUTIVE SUMMARY

1. The Village of Paw Paw, Michigan owns and operates a Community Water System, Water Supply Serial Number WSSN 5210.

2. The Village maintains a bacterially safe water supply system. The wells are inspected annually by Peerless-Midwest, Inc. and are appropriately maintained on a regular basis.

3. The Village of Paw Paw must fulfill the requirements of Part 12 of the Administrative Rules of Act 399, PA 1976 (Michigan Safe Drinking Water Act). A Reliability Study is required every five years unless this requirement is waived by the MDEQ. The following is a summary of the items required for the Reliability Study. Data is based on Village of Paw Paw Monthly Operating Reports from January 2009- August 2015.

Table 1-A: Demand Summary

	Present (2014)	5-Year Projection	20-Year Projection
Average Daily Demand (mgd)	0.357	0.361	0.368
Maximum Daily Demand (mgd)	0.698	0.706	0.719
Maximum Hourly Demand (mgal)[a]	1.429	1.445	1.472

[a]factor of 4.0 used

4. The Village is required to provide firm capacity from an approved groundwater supply and finished water storage in excess of the established normal waterworks system requirements. Firm capacity is defined as the flow with the largest producing well out of service. The Village capacity is as follows:

Table 1-B: Capacity Summary

Projected Maximum Daily Demand	0.719 mgd (499 gpm)
Firm Capacity (Well #8 in service)	2.14 mgd (1,490 gpm)
Percent of Firm Capacity	33.6%
Fire Flow -- Commercial	2,500 gpm
Total Flow	2,999 gpm
Fire Duration	120 minutes (2 hrs)
Total Storage Capacity Required	359,880 gallons
Total Storage Capacity Provided	500,000 gallons

The MDEQ recommends additional capacity be considered when demands exceed 80% of firm capacity. Therefore, the Village has adequate supply and storage capacity to meet projected demands. Capacity is also available to sustain additional growth.

5. There are1,105 meters in the village system that measure water usage for residential, commercial, industrial, and governmental customers. There are 863 residential meters, 188 commercial meters, 4 industrial meters, 5 municipal meters, and 45 other (tax exempt) meters.

6. The existing distribution system can adequately handle existing and projected average and maximum daily flows.

7. The Village currently maintains an aging distribution system adequate for normal (non-emergency) system conditions with areas of undersized mains limiting firefighting capabilities. A total of 12% of the system is served with 4" mains which do not meet current standards for fire flow.

8. Upgrading some mains in the downtown area would improve firefighting capabilities in the commercial district.

SECTION 2 – INTRODUCTION

The purpose of this Water System Study for the Village of Paw Paw is to meet the MDEQ requirements for completing a Reliability Study, update the Water Atlas to aid crews in the field, complete a computer analysis of the water system to determine required improvement areas, determine the impact due to expansion of the system, determine a proposed improvement plan, provide cost estimates to aid in prioritizing improvements, and investigate user rates.

The study area is defined as the service area for the water system. A map of the distribution system is located in Appendix A and a map of the existing system with hydrant classifications is located in Appendix B. Larger versions of all maps are included in the side pockets.

SECTION 3 – WATER SUPPLY

Existing Supply System

The Village currently maintains a bacterially safe water supply system, with chlorine and phosphate additions at each well, approved by MDEQ to service the Village. The

Village has been satisfactorily collecting and submitting monthly bacteriological samples for analysis and monthly operation reports.

A summary of existing well information is provided below. Village of Paw Paw Well Logs can be found in Appendix C:

Table 3-A: Existing Water Supply Well Data

	#4	#6	#8
Well Diameter	12"	12"	12"
Well Depth	110 ft.	178 ft.	160 ft.
Screen I.D.	12"	12"	12"
Type	Cook	WW SST	COOK SST
Current Static Level*	--	5'	6'
Current Pumping Level*	--	22.5'	20'
Current Pressure*	--	66 psi	66 psi
Current Specific Capacity*	--	89.7 GPM/ft	106.4 GPM/ft
Year Drilled	1961	1991	1992
Capacity Rating (gpm)	--	1570	1490
Latest Test	--	April 2014	April 2014
Location	Well Field	Well Field	Well Field
HP	50	100	100
Volts	460	460	460
Phase[a]	3	3	3

*2014 Peerless Midwest Inc. Report (at pump's rated flow)

The wells are inspected regularly by Peerless-Midwest, Inc. (Appendix D). It is recommended that the pumps be overhauled every five years. The most recent inspection was completed in April 2015. The wells have had their pumps and motors removed, inspected, oiled, and installed in working condition. Routine maintenance helps keep the pumps running efficiently and helps minimize costly repairs. The most recent inspection indicated that Wells No. 6 & 8 are operating satisfactorily. Normal budgetary amounts for replacement / inspection / maintenance should be continued. Well No. 4 is on stand-by status. Monthly Pumpage Data is for 2009-August 2015 is attached as Appendix E.

Standby power is available to Well No. 6 and Well No. 8 with an existing generator on site. The back-up power generator has a power rating of 275 KVA and is exercised once a week by the Village of Paw Paw Public Works Department. A portable generator for Well No. 4 is shared with the sewer lift station and is tested weekly on the lift station.

As of 2007, the Village has an approved Wellhead Protection Program (WHPP) consistent with Part 28 Wellhead Protection Grant Assistance Rules administered by the DEQ, and has been very active with public participation. The Village of Paw Paw 2011 Water System Review (DEQ) indicated that there are three known major sources of contamination located about 1,350 feet east of Wells No. 6 & 8; Plastic Rubber: VOC plume in deeper aquifer moving northwest; Paw Paw Plating: VOC plum in shallow aquifer moving northeast; Duo Tang: VOC plume in shallow and deeper aquifer moving northwest. Additionally, a Village sewage lift station is located 400 ft. south and 100 ft. east of Wells No. 6 & 8. A map of private wells in the Village and Paw Paw Township can be found in Appendix F.

Water supply is treated with chlorine for disinfection and phosphate for iron sequestering and corrosion control. Water Quality Reports are created annually and made available to the public via the Village's website. Water Quality Reports for 2010-2014 can be found in Appendix G.

Project Demands / Reliability Study

Water demand, simply stated, is the amount of water consumed over a given period of time. Demand is often expressed on a per person (per capita) basis over a period of one day, and can be further defined in terms of average daily, maximum daily, and maximum hourly per capita demand.

The **average daily per capita demand** is calculated by dividing the total water consumed by the community over a period of time (usually a month or a year) by the number of persons served and the number of days in the time period.

The **maximum daily per capita demand** can be determined by reviewing monthly well pumping records for the highest single day's consumption for the period. This consumption is divided by the number of persons served to arrive at the maximum daily demand.

The **maximum hourly demand** cannot normally be determined from pumping or meter records because most readings are taken at 24 hour intervals. Consequently, the maximum hourly demand is determined by multiplying the projected average daily demand by a factor ranging from 4 to 8. We have used a factor of 4.0 in our analysis.

Table 3-B: Production History

Production History (2014)			
Month	**Total Flow (MGal)**	**Avg. Daily Demand (MGD)**	**Max. Daily Demand (MGD)**
January	10.926	0.352	0.439
February	10.854	0.388	0.496
March	12.769	0.412	0.545
April	9.891	0.330	0.452
May	10.250	0.331	0.698
June	10.967	0.366	0.431
July	11.543	0.372	0.500
August	12.190	0.393	0.447
September	11.295	0.376	0.549
October	11.19	0.361	0.382
November	9.02	0.301	0.379
December	9.469	0.305	0.382

Population Data

The study and service area population 5-year and 20-year projections through 2020 and 2035, respectively, were developed from U.S. Bureau of Census data. Table 3-C represents the population trend for the Village of Paw Paw.

Table 3-C: Population Projections

Census		Current	Projected			
2000	2010	2014	2020	2025	2030	2035
3,363	3,534	3,405	3,443	3,482	3,509	3,508

Sources: 2010 US Census Bureau Data, 2012 Comprehensive Economic Development Strategy for SW Michigan (SWMPC)

Based on reported projections, the population for the Village of Paw Paw served by the water system is estimated to be 3,508 in 2035, not appreciably different than it is today.

Total water usage for the Village of Paw Paw averaged 0.357 mgd for the 2014 Fiscal Year. The current population census data for the Village indicated 3,405 residents. Therefore, the average per capita consumption was 105 gppd, within what is considered average for a community the size of Paw Paw. Average consumption for a Village this size is estimated to be between 100-120 gppd. The current pumping rates reflect a reduced demand compared to those recorded in 2003 when the demand was 140 gppd. Contour maps for both the Existing Demand and the Top 20 Consumers Demand, as identified below, can be found in Appendix H and I, respectively.

Table 3-D: Twenty Largest Water Customers for Year 2014

Consumer	Consumption (gallons)	Average (gpd)
VAN BUREN COUNTY	4,073,000	11,159
ST. JULIAN WINE COMPANY	3,435,000	9,411
VAN BUREN COUNTY	3,335,000	9,137
VAN BUREN COUNTY	2,995,000	8,205
THE CLOTHES BASKET	2,687,100	7,362
LAKEVIEW COMMUNITY HOSPITAL	2,359,000	6,463
KNOUSE FOODS	2,357,000	6,458
TAPPER CAR WASH	1,772,000	4,855
SHAMEE DEVELOPMENT CO L.L.C.	1,433,000	3,926
COMFORT INN	1,333,000	3,652
COPPER GRILL	1,145,000	3,137
PALKA, MARY	1,052,100	2,882
BROEDER, WILLIAM	1,044,700	2,862
SPORTSMAN TAVERN	990,200	2,713
MAHI LLC	960,000	2,630
MAPLE LAKE ASSISTED LIVING, L..LC.	914,900	2,507
TAPPER FORD LLC	843,000	2,310
MC DONALD CORPORATION	654,000	1,792
BRONSON PROPERTIES A/P	648,000	1,775
WENDY'S OF MICHIGAN	641,100	1,756
KNOUSE FOODS	638,000	1,748
LITTLE CAESAR'S PIZZA	619,300	1,697

SPARTAN STORES - MS#8	591,000	1,619
LYON APARTMENTS	584,000	1,600
BREWSTER'S AT THE DYCKMAN, L.L.C.	575,000	1,575

Without these users, the average flow would be approximately 74.5 gppd, consistent with normal residential usage.

Projection of Future Demand

In order to meet projected demands, flows must be predicted for the future. The average daily demand over the last year is approximately 0.357 mgd. Based upon the current permanent population of 3,405, the average per capital demand is 105 gppd. The population is expected to increase to 3,508 by the year 2030. Future flows are estimated as follows:

Table 3-E: Estimated Future Flows

Current	Population	Per Capita Demand (gppd)	Avg. Daily Demand
2015	3,405	105	0.357
2020	3,443	105	0.361
2025	3,508	105	0.368

In the future, Maximum Daily Demand, Maximum Hourly Demand, Peak Instantaneous Demand, and Fire Flow Demand are expected to increase similar to Average Daily Demand. Present data has been provided and is included in Apppendix F.

Firm Capacity

The Michigan Safe Drinking Water Act (Act 399, PA 1976) requires municipal systems to provide firm capacity. Firm capacity is defined as the ability to meet maximum demand with the largest pump out of service. As shown in Table 3-A the well field can provide 1,490 gpm (2.14 mgd) with the largest pump out of service. The present maximum daily demand is 0.698 mgd and the projected maximum daily demand is 0.719 mgd. The MDEQ recommends additional capacity be considered when demands exceed 80 % of firm capacity. Projected demands are 33.6% of firm capacity.

SECTION 4 – WATER DISTRIBUTION & STORAGE

The existing water distribution system includes over 20 miles of 2" through 16" watermains with water services to each user. The mains adjacent to the wells are 16" and main transmission lines are 8-12" in size. Many of the residential areas are served by 4-8" mains. A significant portion of the Village (16.7%) is serviced by mains 2"and 4" in diameter, inadequate for fire protection. The Village should strive to meet fire flow needs by the installation of no watermain less than 8" in diameter on all future construction projects.

One elevated storage tank with a 500,000 gallon capacity is located within the downtown area of the Village. A complete layout of the existing water system, including hydrant classifications, is shown in Appendix B and as a larger version in the pocket of this binder. A breakdown of the exiting watermain lengths and sizes is given below.

Table 4-A: Existing Water Distribution System

Water Main Diameter (inches)	Approximate Length of Water Main (LF)	% of Total (%)
2	7,187	5.6%
4	14,236	11.1%
6	24,261	19.0%
8	42,647	33.4%
10	14,563	11.4%
12	24,576	19.2%
16	390	0.3%
Total	127,860	100.0%

[a]Mains less than 8" in diameter do not meet MDEQ Standards for Fire Protection

Distribution System

In April, 2015 flow tests were performed by the Village of Paw Paw Department of Public Works. Details of their findings can be found in Appendix J. The ISO Criteria generally

requires a flow of 1,000 to 1,500 gpm in residential areas (1- and 2- family dwellings not exceeding two stories in height) and up to 2,500 gpm in commercial areas.
The minimum residual pressure at fire flow is commonly required, by the National Board of Fire Insurance Underwriters, to be 20 psi. The test results show acceptable static and residual pressures but revealed some areas with inadequate flow rates. This is a result of undersized mains and available hydrants in some commercial areas, restricting water quantity. Use of 4" mains and smaller for fire protection is discouraged by MDEQ. A contour map of pressure throughout the system can be found in Appendix K.

Table 4-B: Needed Fire Flow for One & Two Family Dwellings

Distance Between Buildings (Ft)	Needed Fire Flow (GPM)
More than 100	500
31 to 100	750
11 to 30	1,000
10 or Less	1,500

*Dwellings not to exceed two stories in height
Source: ISO Guide for Determination of Needed Fire Flow

Improper looping of watermains also causes reduced pressures, stagnant water and increased maintenance. The system is generally well looped, however, dead ends are located at the following locations (for area locations see maps in Appendix A):

- North Street, east and west sides
- West end of George Court
- South end of Miller Court
- North end of Hazen Street
- North end of Cherry Street
- East and west ends of Lilac Street
- East and west ends of Tulip Street
- West end of Lily Street
- West end of St. Joseph Street
- East end of E. Michigan Avenue
- West end of W. Michigan Avenue
- North end of Gremps Street
- East end of Maple Street
- East end of Birch Lane
- West end of Lakeview Terrace
- North end of Kalamazoo Street (M-40)
- East end of Mather Court

Dead end mains should be looped whenever possible however, some of these dead ends are required due to the configuration of the Village and service terminating at the Village limits. Other dead ends could be removed by closing loop with adjacent mains; improving circulation of water and increasing fire protection capabilities. Areas of potential looping include:

- North end of Hazen Street and North Street
- East end of Maple Street and East end of Birch Lane
- Lily, Lilac, and Tulip Streets

Adjacent hydrants can provide fire suppression for small water mains terminating at the end of short residential streets without requiring main upgrades. This may be adequate in the following areas:

- West end of George Court
- South end of Miller Court

The Village has an ongoing policy of eliminating all non-copper water services in conjunction with underground construction projects. This provides an opportunity to upgrade aging and inadequate services and is intended to reduce potential contamination from deteriorated pipes, fulfill flow demands, and avoid expensive emergency maintenance and replacements.

Storage System

Historically, insurance company affiliated associations have determined fire flow requirements using empirical formulas based upon the population of the community. With the increasing sophistication of water supply systems and firefighting equipment, new criteria are being adopted to more accurately determine fire flow needs.

Information regarding the single pedestal elevated storage tank includes:

Constructed—1969
Tank Capacity—500,000 gallons
Head Range—37.5 feet

The ISO recommends that a storage tank is provided with a volume sufficient to provide average maximum daily demand and recommended fire flow for the duration of fire listed by ISO. Typical fire duration is two to four hours. Therefore, the size of the storage tank would be calculated as follows.

Table 4-D: Required Fire Flow Capacity

20-year (2035) Maximum Daily Demand	499 gpm	499 gpm
Fire Flow -- Commercial	2,500 gpm	2,500 gpm
Total Flow	3,000 gpm	3,000 gpm
Duration	120 minutes (2 hr)	240 minutes (4hr)
Total Capacity Required	360,000 gallons	720,000 gallons

Without any assistance from the wells, the tank has the ability to provide over two and a half hours of commercial fire flow. Therefore, the current storage capacity is adequate.

With assistance from the wells at firm capacity (1,490 gpm), and the water tower assumed to be half full (250,000 gallons), the Village has the ability to fight a commercial fire for approximately 3 and a half hours.

Current firefighting capabilities include the following:

Engine 1201
2010 Spartan / Smeal Class A Pumper
1,250 GPM pump with 1,000 gallon capacity

Engine 1202
2000 Pierce Class A Pumper
1,250 GPM pump with 1,000 gallon capacity

Ladder 1203
2005 Spartan / Smeal 105' Aerial-Class A Pumper
1,500 GPM pump with 400 gallon capacity

Engine 1204
2002 Chevrolet 2500 HD 4WD Duramax Diesel Grass Rig / Draft Truck
650 GPM pump with 300 gallon capacity

Tanker 1205
1996 International / US Tanker Truck
500 GPM pump with 3,000 gallon capacity

Engine 1207
2012 Ford F-350 4WD Super Duty Grass Rig
200 GPM pump with 200 gallon capacity

Water Metering

The Village has 1,105 meters in the Village of Paw Paw system that measure water usage for residential, commercial, industrial, municipal, and tax exempt customers. Residential meters make up the majority of the billings with 863 meters. There are 188 commercial use meters, 45 tax exempt meters, 5 municipal, and 4 industrial.

All meters are read and billed monthly. Meter readings are taken electronically with a handheld device by a Village of Paw Paw water department employee. The data is then downloaded and a computer program, BS&A Software System, prepares each water bill. Sewage billing usage is also based on the quantity of water usage. However, some clients have garden meters which record water usage only. The garden meter usage is added to the water billing usage and not the sewer usage billing.

SECTION 5 – COMPUTER ANALYSIS

As part of the study, a computer analysis of the water system was completed using Bentley System's WaterGEMS V8i to aid in the determination of critical areas needing improvements. Several different conditions were placed on the system to simulate current and future scenarios, leading to the following conclusions:

A. The existing system can adequately handle existing, 5-year and 20-year future average daily flows.

B. The existing system can adequately handle existing, 5-year and 20-year future maximum daily demand

C. The existing system can adequately handle existing, 5-year and 20-year future peak instantaneous demand.

D. The existing, 5-year and 20-year system provides 35 psi normal operating pressure under existing conditions and under future proposed improvements detailed in Section 6.

E. The existing, 5-year and 20-year system provides a minimum of 20 psi operating pressure during fire flow conditions.

F. The existing, 5-year and 20-year system can adequately handle additional growth South of I94 along CR 665 and/or Health Pkwy.

G. The existing, 5-year and 20-year system can adequately handle the expected

increase in demand on M-40 and Commercial Ave for a new brewery.

H. The existing system can handle a fire flow of 1500 and 2000 gpm, at most hydrants, while maintaining a minimum 20 psi operating pressure.

I. The existing system cannot handle a three hour fire at 1500 gpm while maintaining a minimum 20 psi operating pressure and 1500 gpm available fire flow at hydrants.

SECTION 6 – PROPOSED IMPROVEMENT PLAN

Distribution System

Several factors may cause inadequate pressure and flow within the system. The water flow in a distribution system is a function of length, elevation, and internal status of the pipe. As noted above, several areas are served with the undersized lines. Larger transmission mains are necessary to provide adequate fire flows throughout the system. While this work is conducted, replacing and adding new valves will allow the system to be more easily isolated for repairs.

The following recommendations for the Village of Paw Paw water system were prepared with an emphasis on water distribution and supply. The improvement areas can be seen on the "Proposed Improvement Areas" map located within Appendix L. The corresponding WaterGems scenario labels are identified in bold before each improvement. The WaterGems output summaries can be found in Appendix M. Associated cost estimates can be found in Appendix N.

Group 1 (0-2 years) **Total: $1,429,700**

The Village will be undertaking a number of sewer improvements in 2016 as part of the SRF loan. Any 4" watermain or smaller within the project area should be upgraded at the same time to 8" to provide adequate fire flow.

G1-1 **$437,400**

Upsize approximately 2, 245 ft. of 4" watermain to 8" watermain along Gremps Street from Michigan Avenue to North Street and along Cedar Street between Gremps Street and Kalamazoo Street. This area directly overlaps with SRF project area.

G1-2 **$173,200**
Upsize approximately 700 ft. of 4" watermain to 8" watermain along LaGrave Street between Michigan Avenue and St. Joseph Street. This area directly overlaps with SRF project area.

G1-3 **$154,700**
Upsize approximately 700 ft. of 4" watermain to 8" watermain along Niles Street between Michigan Avenue and St. Joseph Street. This area directly overlaps with SRF project area.

G1-4 **$298,100**
Upsize approximately 1,405 ft. of 4" watermain to 8" watermain along Cedar Street between Kalamazoo Street and Brown Street. This area is adjacent to the SRF projects.

G1-5 **$366,300**
Upsize approximately 1,780 ft. of 4" watermain to 8" watermain along Niles Street from St.Joseph Street to Water Street, east on Water Street and north on LaGrave Street to St. Joseph Street. This area is adjacent to the SRF projects.

Group 2 (2-7 years) **Total: $743,300**
Additional areas with smaller mains should be replaced to provide better fire protection.

G2-1 **$231,700**
Upsize approximately 1,175 ft. of 2" watermain to 8" watermain along S. Lagrave Street

G2-2 **$140,700**
Upsize approximately 680 ft. of 2" watermain to 8" watermain along Tulip Street

G-3 **$83,600**
Upsize approximately 350 ft. of 2" watermain to 8" watermain along Lilac Street

G2-4 **$89,600**
Upsize approximately 420 ft. of 2" watermain to 8" watermain along Lily Street

G2-5 **$119,200**
Upsize approximately 460 ft. of 2" watermain to 8" watermain along Hillcrest Road and approximately 660 ft. of 2" watermain with 8" watermain along Fairfield Drive

G2-6 **$78,500**
Upsize approximately 315 ft. of 2" watermain with 8" watermain along N. Dyckman Street

Group 3 (7-12 years) **Total: $1,355,400**

G3-1 **$156,700**
Upsize approximately 750 ft. of 4" watermain to 8" watermain along Harris Street

G3-2 / G3-9 **$325,000**
Upsize approximately 1,410 ft. of 4" watermain to 8" watermain along Hazen Street and approximately 360 ft. of 2" watermain to 8" watermain along Mather Ct.

G3-3 **$66,700**
Upsize approximately 350 ft. of 4" watermain to 8" watermain along Brown Street between Elm Street and Pine Street

G3-4 **$316,100**
Upsize approximately 1,615 ft. of 4" watermain to 8" watermain along Elm Street between Dyckman Street and Hamilton Street

G3-5 **$112,200**
Upsize approximately 480 ft. of 4" watermain to 8" watermain along St. Joseph Street between Gremps Street to Kalamazoo Street

G3-6 **$84,000**
Upsize approximately 350 ft. of 4" watermain to 8" watermain off River Road

G3-7 **$87,800**
Upsize approximately 380 ft. of 4" watermain to 8" watermain on Kalamazoo Street between Industrial Avenue and Commercial Avenue

G3-8 **$206,900**

Upsize approximately 1,040 ft. of 4" watermain to 8" watermain on Cherry Street north of Industrial Avenue and along Industrial Avenue between Cherry Street and Lake Boulevard

SECTION 6 – USER RATE ANALYSIS

Residential, commercial, and industrial customers in the Village of Paw Paw are currently paying water rates based upon $2.75 per 1,000 gallons for residents and $4.125 per 1,000 gallons for non-residents, regardless of meter size or usage. Therefore, a typical residential water customer could be expected to pay $27.50 / month, assuming10,000 gallons per month usage.

The Village provides inflationary increases in the water Ready-to-Serve Fee (RTS) covering Debt Service and Operation and Maintenance of the system for all customers on a yearly basis. Water rates were last reviewed and modified in 2013 with rate increases reflected from 2014 through 2018. Water rates will be reviewed again in 2018, unless needed sooner to finance the recommended improvements. A rate increase of $6/month would likely fund a 30 year loan for the Group 1 improvements.

The Village currently does not have a large fund reserve readily available to undertake any comprehensive projects. It would be cost effective for the Village to tie watermain upgrades overlapping and adjacent to the upcoming 2016 SRF projects.

SECTION 7 – STAFF STRUCTURE

Efficiency within the village water distribution system is dependent on an adequate and qualified staffing structure. Below is an outline of the existing city staffing broken down by department.

Department of Public Services - Administration

NAME	TITLE	DOB	DOH	LICENSE(S)
John Small	Director	2/25/1966	8/24/1988	CDL, Storm Water A-J1, D2, S3
Janet Rohl	Administrative Asst.	10/20/1964	11/21/1983	

Department of Public Services - Water / Wastewater Laboratory

NAME	TITLE	DOB	DOH	LICENSE(S)
Robert Harvey	Water Treatment Supervisor	2/25/1956	5/1/2004	D-2, F-3, S-4; Municipal A, B, C, D, L2, L1; Industrial A-1b, A-1d, A-1f, A-1h, A-2b, A-2c, B-1b, B-2a, B-3b, C-1b, C-1A, c-3a
Douglas Noble, Jr.	Laboratory Tech.	1/13/1970	7/18/2006	S3, Municipal D

Department of Public Services - Electric Crew

NAME	TITLE	DOB	DOH	LICENSE(S)
Billy Crook	Crew Leader/Journey Lineman	9/26/1955	4/8/1996	CDL
Kennerth Springer	Journey Lineman	10/4/1962	7/18/2005	CDL, Master Electrician
Gordy Myers	Journey Lineman	10/25/1959	1/30/1995	CDL

Department of Public Services - Water / Sewer / Streets / Parks Crew

NAME	TITLE	DOB	DOH	LICENSE(S)
Rust Ritsema	Crew Leader, Public Works III	3/3/1959	3/19/2001	CDL
Michael Jordan	Public Works III	11/24/1977	5/21/2007	CDL
Gerald Schur	Public Works III	4/9/1956	8/25/2003	CDL, S-4
Juan Vasquez	Public Works III	11/18/1977	9/13/2004	CDL
Lori Middaugh	Public Works II	7/16/1955	1/30/1989	CDL
Patrick Richardson	Public Works II	10/21/1990	9/24/2012	CDL

Department of Public Services - Motor Pool

NAME	TITLE	DOB	DOH	LICENSE(S)
Gary Elferink	Supervisor	9/14/1969	11/24/2014	CDL, Master Mechanic
Bruce Hendrickson	Mechanic	10/25/1967	5/20/1987	CDL

Looking forward, the Village of Paw Paw should secure more staff with higher level certifications, whether that means encouraging existing younger staff to obtain licenses or supporting the hiring of additional staff. In particular, their current staffing structure

has a number of employees nearing retirement age. There is a need to obtain licenses with ample time for training from upper level staff for a smooth transition.

APPENDIX B:

ASSET MANAGEMENT PLAN

Village of Paw Paw

Water Asset Management Plan

December 2017

ABONMARCHE

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Introduction

The Michigan Department of Environmental Quality (MDEQ), through Michigan's Safe Drinking Water Act, has implemented the requirement that community water supplies servicing more than 1,000 people prepare and execute an Asset Management Plan (AMP) for their water system. The Village of Paw Paw with a population of 3,534 per the 2010 census meets the requirements for implementation of an AMP for their water infrastructure. The Village was notified of this requirement by the MDEQ in late 2016. The water supply system is operated under the Water Supply Serial Number WSSN 5210.

The goal of the AMP process is to provide the Village with a comprehensive understanding of the quantity and condition of their existing system to ensure proper measures are being taken to provide a safe and reliable supply of water to consumers. Asset Management Plans analyze life cycle costing to develop a long term plan that associates the needed funding to projects that will be done in the future that include repairing, replacing or rehabilitating particular assets. This ensures that the water system will deliver the desired level of service perpetually.

The AMP consists of five core components as described in the MDEQ document, "Asset Management Guidance for Water Systems" these include:

- Asset Inventory
- Level of Service
- Critical Assets
- Revenue Structure
- Capital Improvement Project Plan

This Water Asset Management Plan was structured to follow the format suggested in the MDEQ "Asset Management Guidance for Water Systems."

Mission Statement

The MDEQ requires that an AMP provide a mission statement to provide the municipality with a targeted goal and purpose in their planning process. The Mission Statement defines the asset management program. The following is the standard mission statement recommended by the MDEQ in lieu of a formal statement by the municipality. This statement provides a backing for the entire decision making process related to the AMP.

We commit to improving and maintaining the public health protection and performance of our drinking water supply and distribution system assets, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible.

Asset Management Team

The MDEQ also requires an Asset Management Team be established to oversee the asset management program. The team will also ensure that the mission statement is being fulfilled. When assembling an

Asset Management Team, it is important to consider current and past municipal staff (officials, board members, clerks, accountants, and engineers), current and past utility staff (operators and other service workers), and any other stakeholders that can help in assembling the information to develop this Asset Management Plan. Provided below in Table 1 is a summary of the current AMP Team. As the AMP is updated, these contacts may be updated and reviewed to determine if additional members are required or other changes are needed to best complete the stated goals of the AMP.

Table 1: Village of Paw Paw Water AMP Team

Member Role	*Current Member*
Village Manager	Sarah Moyer-Cale
Public Services Director	John Small
Water Treatment Supervisor	Robert Harvey

Asset Inventory

Introduction

The first core component of asset management is the asset inventory. The following questions are a guideline for developing an inventory:

- What do I own?
- Where is it?
- What condition is it in?
- What is its remaining useful life?
- What is its value?

Developing the initial inventory on what assets the Village owns can be one of the most difficult steps. The majority of the assets for a water system are underground and hidden from visual sight. Due to the pressurized nature of the water distribution system, internal inspection is not possible for the majority of the system. Where records are not available, it is difficult to determine what facilities are underground or ascertain their condition. To develop the initial inventory, as-built drawings, invoices, staff knowledge, visual observation, interviews with residents and consultants are all resources that can be used. Asset inventory is an ongoing process that should be updated when there are changes made to the water system. Fortunately, a Water System Reliability Study was conducted in 2015. This recent study, conducted by Abonmarche Consultants, Inc, provided updated maps and a plan for capacity/reliability based upgrades to the water system.

Water System Inventory

The first step in the asset management plan is to determine what assets are owned and maintained by the municipality. These assets for the water utility include not only the physical pipes that transport water to users but also water storage facilities, pumps, well houses and fire hydrants. A summary of owned water facilities can be seen below in Table 2.

Table 2: Summary of Water Assets

Asset	*Measure*
Water Distribution (Pipes)	129,645 Feet (24.5 miles)
Water Meters	1,105
Fire Hydrants	196
Water Tower	1 @ 500,000 Gallon Capacity
Wells	3 @ 12 Inch Dia.
Well Pumps	1 @ 750 GPM | 2 @ 1,500 GPM

The maintenance of these assets is critical to meeting the Village's goal of providing safe and reliable drinking water to its users. To complete an accurate and useful asset management plan it is important to gather as much data on the existing age and condition of all assets related to a utility. A more detailed summary of the above listed assets is provided in the following sections.

Long-Lived Assets

Distribution Piping – Long-Lived Assets

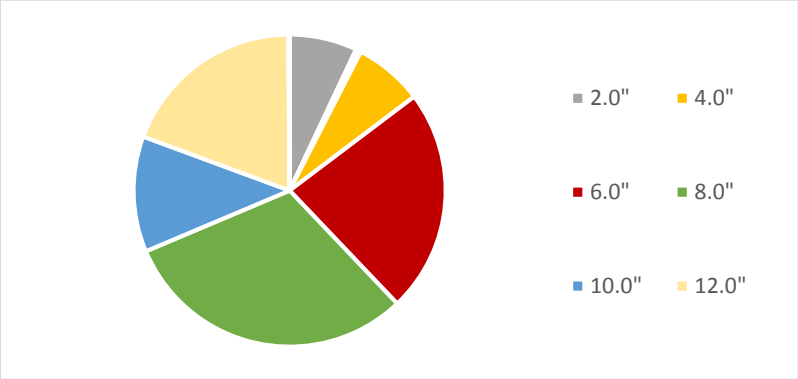
The current 10 State Standards for Water Works call for water main diameters of six (6) inches or greater in public systems that serve fire hydrants. However, most typical system and flow models show eight (8) inch water mains are a practical minimum diameter required to provide fire flows while maintaining minimum residual pressures in the system. A listing of all water main segments owned by the Village, detailing diameter, length, and age can be found in **Appendix A** following this report. The following figures and discussion summarize the trends noted in the inventory

A breakdown of the Village's water distribution system by pipe diameter is shown below in Table 3 and Figure 1. This breakdown shows 19,074 feet of the Village's water distribution piping, 14.8% of the system, falls below the 6 inch minimum standard with a further 30,058 feet, or 23.2%, right at the 6 inch minimum diameter.

Table 3: Water Distribution Network Summary (By Size)

Pipe Diameter, inches	*Length of Pipe, feet*	*% of System*
2	9,079	7.0%
2 1/2	241	0.2%
3	458	0.4%
4	9,296	7.2%
6	30,058	23.2%
8	39,858	30.7%
10	15,541	12.0%
12	24,944	19.2%
16	172	0.1%
Total	129,645	100%

Figure 1: Water Distribution Network Summary (By Size)



Each pipe size is broken down by material in Figure 2. This shows the predominant pipe materials by size. Smaller pipes tend to be galvanized steel while the mid-size pipes 4-6 inch pipes are largely cast iron, and 8 inch and larger pipes tend to be ductile iron.

Figure 2: Water Distribution Network Summary (By Size and Material)

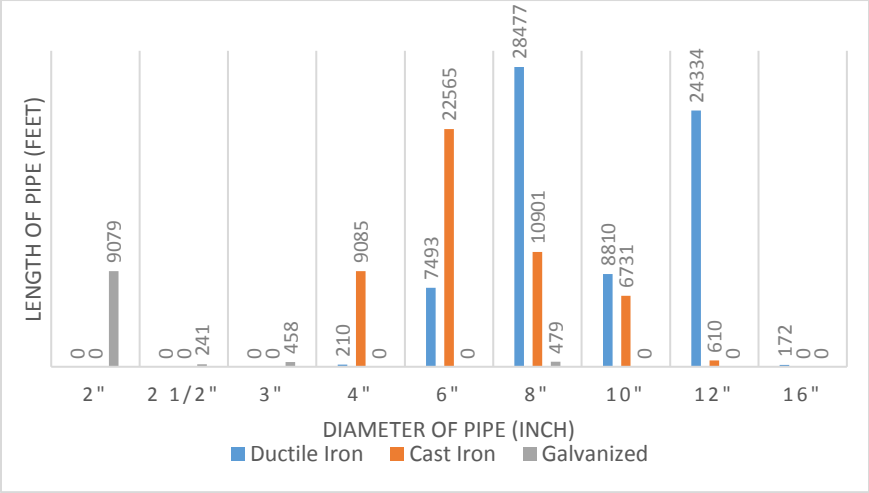
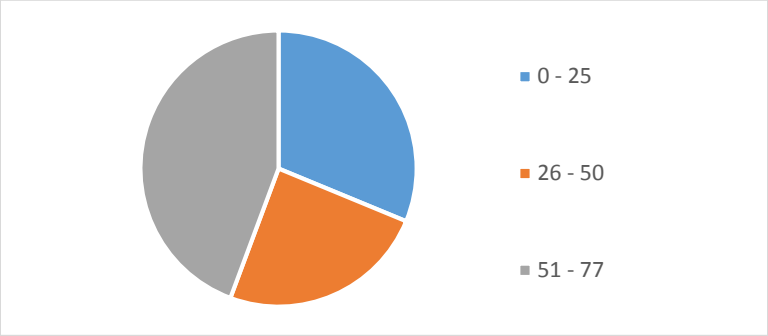


Table 4 and Figure 3 below show the age ranges within the system. Over 40% of the system is greater than 50 years of age with nearly all of those older pipes dating to the 1940's. Underground pipes have an effective life based on the pipe material and installation practices used during their installation. Galvanized pipes generally have an estimated effective life less than 50 years while cast iron pipes can last 75 years, and new ductile iron or plastic pipe materials capable of lasting 90 years or longer with modern construction practices. The advanced age of the water distribution network is a significant factor in the condition assessment and probability of failure discussed later in the report

Table 4: Water Distribution Network Summary (By Age)

Age Range	Length of Pipe, feet	%
0 - 25	40,491	31%
26 - 50	31,685	24%
51 - 77	57,469	44%
Total	129,645	100%

Figure 3: Water Distribution Network Summary (By Age)



Short-Lived Asset

Water Meters – Short-Lived Assets

The Village currently utilizes 1,105 water meters which measure water usage for residential, commercial, industrial, and governmental customers. The current breakdown of meter usage can be seen below in Table 5.

Table 5: Summary of Existing Water Meters by Use

User Type	*Number of Meters*	*% of System*
Residential	863	78.1%
Commercial	188	17.0%
Industrial	4	0.4%
Municipal	5	0.5%
Other (Tax Exempt)	45	4.1%
Total	1,105	100%

Fire Hydrants

There are currently 196 fire hydrants in the Village and these hydrants were recently classified by flow value for the Water Reliability Study in 2015. A summary of the hydrants which fall into each class is provided in Table 6. The majority of the network meets required fire flows, however there are a few locations that could increase available flows by providing increased water main sizes and looping dead end mains. A detailed summary of improvements recommended to improve system flow and pressure is outlined in the Reliability Study report. A map showing the location and classification of the hydrants, as reported in the 2015 Reliability Study report, can be found in **Appendix B**.

Table 6: Hydrant Classification

Hydrant Classification	*Flow Range (GPM)*	*Number of Hydrants*
AA	More than 1500	31
A	1000 – 1499	126
B	500 – 999	39
C	Less than 500	0

Water Tower

A single pedestal elevated storage tank provides the Village with water storage for fire protection and to improve system pressure. The elevated tank was constructed in 1969, has a tank capacity of 500,000 gallons and has a head range (estimated) of 48 feet. The tank meets Insurance Services Office (ISO) standards for firefighting protection within the recommended range of two (2) to four (4) hours. A formal inspection of the tower's condition was completed by Dixon Engineering in 2015. The Dixon report provides a summary of recommended repair and maintenance items and is included in **Appendix C** for further review.

In summary, Dixon recommends an estimated $154,000 in repair and improvement work with the most critical item being an overcoat of the exterior coating for an estimated cost of $75,000. This item was recommended to be completed as soon as the budget allows as this was last completed in 1997. Other items will be reviewed and prioritized with the Village for inclusion in the five (5) and twenty (20) year asset management plans. It should be noted that the anticipated 20-year life of the exterior overcoat would require a second application at the end of the 20-year planning period for this asset management plan.

Wells and Well Pumps

The Village currently maintains 3 wells that provide drinking water to users via a groundwater aquifer between 110 feet and 178 feet in depth located in the southwest corner of town. These wells are inspected yearly by Peerless Midwest. A summary of the existing well information is presented below in Table 7. Primary Wells #6 and #8 provide the majority of the water to the Village, with Well #4 currently on standby.

Table 7: Existing Water Well and Well Pump Summary

Asset Parameter	*Well #4 (On Standby)*	*Well #6*	*Well #8*
Well Diameter (Inch)	12	12	12
Well Depth (Feet)	110	178	160
Screen I.D. (Inch)	12	12	12
Type	Cook	WW SST	Cook SST
*Current Static Level (Feet)**	--	5	6
*Current Pumping Level (Feet)**	--	22.5	20.0
*Current Pressure (PSI)**	--	66	66
*Current Specific Capacity (GPM/FT) **	21.9	128.6	150.0
Year Drilled	1961	1991	1992
*Well Condition**	Excellent	Excellent	Excellent
Capacity Rating (GPM)	750	1500	1500
Latest Test	May 2017	May 2017	May 2017
Location	Well Field	Well Field	Well Field
HP	50	100	100
Volts	460	460	460
Phase	3	3	3
Pump Condition	Overhauled in 2014 (No Work Needed)	Overhauled in 2006 (Satisfactory)	Overhauled in 2007 (No Work Needed)

*2014 Peer Midwest Inc. Report (At Pump's Rated Flow)

**2017 Peerless Midwest Inc. Report

The latest pump inspection report from 2017 notes that the pumps in Wells #6 and #8 were last overhauled 10 and 11 years ago respectively and that the Village should budget for normal wearing part overhauls in the next couple of years. The Village should plan to continue to budget for yearly maintenance to ensure these pumps remain in good working order and that plans are made for these pumps to be overhauled as recommended in the next few years. The latest three (3) years (2014-2016) of well testing report summaries are provided in **Appendix D** for reference.

Drinking Water Source

The Village of Paw Paw performs yearly water quality analysis and reporting to inform the public about drinking water quality. **Appendix E** provides the previous three (3) years (2014-2016) of water quality reports as prepared by the Village. In summary, the Village is meeting drinking water standards as defined by the Environmental Protection Agency (EPA) and has not been found in violation of the measured standards. No significant contamination has been identified in the water supply.

MDEQ performed a source susceptibility to potential contamination test based on a seven (7) tiered scale from "Very-Low" to "Very-High" and found that Wells #6 and #8 are "Moderately Low" in susceptibility and Well #4 is "Moderately High." Well #4 is the oldest water well and is held in reserve, operating only rarely or in an emergency when Well #6 and Well #8 were unavailable or unable to meet peak demand. These conditions will continue to be monitored and if conditions change in contamination risk, measures will be reviewed to ensure the drinking water source is protected. Paw Paw also participates in the State's Wellhead Protection Program as a preventative measure in ensuring risk is managed and mitigated.

SCADA System

Paw Paw Monitors their wells and water tower with a Supervisory Control and Data Acquisition System to monitor pump status and water level in the tower. The system monitors the operation of this equipment and communicates alarms to Village staff in case of equipment fault or failure. The system consists of Programmable Logic Controller (PLC) based control panels, radio modems, and antenna at each location, with a central computer system which logs alarm events and provides for monitoring and control at the DPS building. The system was recently upgraded in 2013 with new equipment and central HMI screen located at Village DPS. The table below shows the costs and expected effective life of these assets.

Table 8: SCADA System Summary

Component	*Service Life (Years)*	*Age (Years)*	*O&M Cost/ Frequency*	*Replacement Cost*
Control Panel (West Michigan Inst.) Allen-Bradley MicroLogix Controller	20	10	$1,850/yr* + $2000/5yr	$22,500
Serial Radio Modem (EL-Pro 900)	15	10	$35/yr*	$950
HMI Operator Panel (West Michigan Int.)	10	3	$500/yr*	$30,500
55-Foot Wood Pole	50	20	$0/yr	$4,000
Steel Truss Type Antenna Tower	50	20	$0/yr	

*- Indicates Currently Budgeted Item under existing O&M

Staff

The Village's Staff, including all associated HR and training needs are accounted for in their current annual budgets. Budget projections moving forward include a 3% annual cost-of-living increase escalation of associated costs accounting for inflation and other factors. Paw Paw's Annual Budgets are attached as an Appendix to this report. The 2015 Water Reliability Study, attached to this report, includes a discussion of staffing. Assuming a retirement age of 63-65 years, the Village will be facing retirement of key personnel within the 20-year planning period. Replacement of experienced staff with younger staff will result in a salary savings, but will result in more training. For the purposes of this study, the HR needs for this department will likely increase for the next 5 years at a rate similar to the cost of living. Once retirement of key and senior staff commences around year 5, this budget will likely hold constant for the remainder of the study period as younger staff will hire in lower on the wage scale, but require additional training. A summary of DPS staff is attached in Appendix G. Expected Staff replacement is indicated in the following table.

Table 9: Staff Replacement Needs

Position	*Year*	*Licenses*
Director	11-13 years	CDL, Storm Water A-J1, D2, S3
Water Treatment Supervisor	1-3 years	D-2, F-3, S-4; Municipal A, B, C, D, L2, L1; Industrial A-1b, A-1d, A-1f, A-1h, A-2b, A-2c, B-1b, B-2a, B-3b, C-1b, C-1A, c-3a
Crew Leader, Jouneyman Lineman	Immediate	CDL
Jouneyman Lineman	4-6 years	CDL
Crew Leader, Public Works III	4-6 years	CDL
Public Works III	1-3 years	CDL
Public Works III	0-2 years	CDL
Master Electrician, Lineman	7-9 years	CDL, Master Electrician
Laboratory Technician	15-17 years	S3, Municipal D
Administrative Assistant	9-11 years	-

Condition Assessment, Remaining Life and Value

Once an inventory of assets to be included in the asset management plan has been collected and reviewed, the next step is determining what the current condition of these assets is, how much remaining life they have, and what their overall value is. Knowing this information will help the Village in setting budgeting priorities in the short and long term.

To determine the anticipated condition of the water system in the Village of Paw Paw, historical mapping and as-built drawings from previous projects were collected and reviewed. As records for the water system have not been consistently updated, assumptions were necessary to approximate the age of the pipe network. Any pipes installed prior to 1970 were assumed to be cast iron unless otherwise noted and pipes less than thee (3) inches in diameter were assumed to be galvanized unless otherwise noted. **Appendix A** provides a complete listing of the distribution network in the Village which shows the assumed age, size, and length of assets along with other related information.

In regards to anticipated life of the distribution network, Table 10 below shows the service life values that were assumed for a given material.

Table 10: Distribution Pipe Service Life Summary

Material	*Service Life (Years)*
Galvanized	40
Cast Iron	75
PVC	90
Ductile Iron	90

It is important to have an order of magnitude understanding of the present value of assets owned so that maintenance and rehabilitation costs can be justified. In plain terms, more overall assets means more money needs to be allocated to their maintenance. Table 11 below summarizes and approximate value of the water distribution asset (water main, hydrants and valves) in the Village.

Table 11: Water Distribution Replacement Values

Pipe Diameter (Inches)	*Length of Pipe (Feet)*	*Unit Replacement Cost ($/Foot)***	*Current Replacement Value ($)*
2*	9,079	$320	$2,905,280
2 1/2*	241	$320	$77,120
3*	458	$320	$146,560
4*	9,296	$320	$2,974,720
6*	30,058	$320	$9,618,560
8	39,858	$335	$13,352,430
10	15,541	$395	$6,138,695
12	24,944	$405	$10,102,320
16	172	$450	$77,400
Total	129,645		**$45,393,085**

*Assumed that mains 6 inches and under would be sized to the new 8 inch standard

** - Unit costs include removal and replacement of water main, installation of control valves, hydrants, and water services as well as replacement of pavement/surface improvements associated with a 10 foot wide trench.

Level of Service

Introduction

As described in the MDEQ Guidance Document, Level of Service (LOS) defines the way in which the utility stakeholders want the utility to perform over the long term. The LOS can include any technical, managerial, or financial components the utility wishes, as long as all regulatory requirements are met. The LOS will become a fundamental part of how the utility is operated.

All utilities must operate within the state and federal regulations and requirements. These regulations are generally specified in the Safe Drinking Water Act for water systems but there are additional rules and regulations at the State and Federal level. Although the State and Federal regulations set minimum standards of operation in the LOS, these standards will not adequately address all areas of operation and should not be the sole factor in determining LOS. Utility owners should include other factors to delineate important areas of the utility's operation.

Within the range of the minimum (regulations) and maximum (absolute capabilities of assets), there are numerous items a utility could include within its LOS metrics so the utility can communicate its intentions with its customers, measure its performance, and determine critical assets. Understanding what LOS to choose will help in developing an Asset Management Plan that truly captures the utility's performance and how to accomplish future goals.

Defining the LOS sets the goals for the utility. These goals allow the operations staff to have a better understanding of what is desired from them, and give management a better understanding of how to use staff and other resources more efficiently and effectively. Reviewing how the utility is meeting LOS also allows the management to shift resources if needed from one task to another to meet all the goals most effectively. Understanding the desired LOS will help to prioritize and characterize the system's assets, as well as how to assist in determining how to manage finances to reach LOS goals.

There is a direct link between the LOS desired and the cost to the customer. When a higher LOS is provided, costs to provide that level will likely increase. This direct link demands that the utility have an open dialogue with its customers regarding the LOS desired and the amount the customers are willing to pay to maintain or improve that LOS.

Typical questions to consider when developing the LOS for the system include the following:

- What is the LOS goal for health, safety, and security?
- How often is the system out of compliance with regulations?
- Are the operators properly certified?
- How does the utility stay aware of and prepare for new regulations?
- Do you share your LOS statement with your customers?
- How do you track and respond to customer needs/complaints?
- Can the current process be improved?
- How quickly does the utility respond to customer issues?
- Is maintenance being deferred to save money?
- How much will the improvements cost and how will they be funded?
- Are assets being properly maintained to insure they are in reliable working condition?
- What areas within the system are most important to insure the best LOS possible?
- When considering a preferred LOS, are asset age and life cycles, asset conditions, funding availability, etc. being factored in?
- How often will the LOS statement be reviewed in order to capture changes such as funding availability (growth and decline), regulatory requirements, demand of customers (increases/decreases in customers), and physical deterioration of assets (addressing maintenance)?
- Are O&M activities being maximized to meet the LOS goals?

Village Level of Service Goals

The following general LOS goals were selected as a guide to managing their water system.

- Deliver safe drinking water to all users
  - Meet State and Federal requirements for contaminants.
  - Compliance tracked with laboratory testing and Monthly Operating Reports.
- Ensure that taste and appearance are acceptable to all users
  - Meet selected secondary standards for taste, clarity, and color.
  - Performance tracked based on laboratory testing and Monthly Operating Reports.
  - User feedback to Village Staff and corrective action needed. The Village must implement a system of tracking user feedback on water quality issues to determine frequent or clustered water quality issues are present.
- Provide adequate fire flows to ensure safety of community
  - AA (>1,500 gpm)flows to all commercial, industrial, and educational uses
  - A (> 1,000 gpm) flows to all residential areas with Village limits
  - Fire Flows will be tracked periodically with hydrant testing and computer modeling needed for Water Reliability Studies.
- Undertake all necessary preventative maintenance and corrective actions on the system
  - Ensure that assets are meeting or exceeding their lifespans in good condition
  - Minimize cost of ownership
  - Minimize user interruptions due to unscheduled repairs and breaks
  - The Village must implement a mechanism of tracking repair work which would help identify condition of assets where frequent or clustered service issues are present.

Asset Criticality

Introduction

The criticality of an asset is related to its probability of failure and its consequence of failure. Assets will have different criticality ratings. Criticality ratings are important in determining what assets need attention first. Assets with a higher criticality rating should receive priority first and should be outlined in the Village's Asset Management Plan as being a future project. This allows the Village to start budgeting for the work that needs to be done. The two components of assessing criticality, Probability of Failure and Consequence of Failure, are described below.

Probability of Failure (POF)

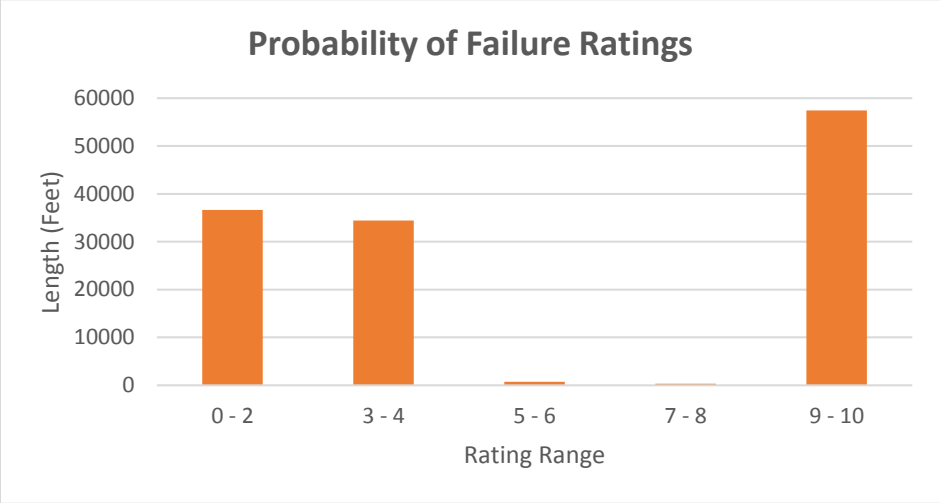
By using the service life values defined in Table 10, and taking the assumed age of the pipes in the distribution network we are able to determine the anticipated probability of failure using equation (1) below. The result of this ratio is multiplied by 10 for use in criticality analysis of the network which is discussed in detail further in the report. In regards to probability of failure, a newly installed pipe will have a POF value of 0 which indicates very low to no probability of failure. A POF value of 10 indicates that the asset has reached or exceeded its intended service life and failure is likely imminent or that the reliability of the asset is severely degraded.

Equation (1): $$\text{Probability of Failure (POF)} = \frac{\text{Age of Asset (Years)}}{\text{Service Life (Years)}} * 10$$

If Age of Asset > Service Life, POF = 10

Figure 4 below shows a breakdown of the distribution network based on the POF rankings. Much of the system has aged to or beyond its maximum life as indicated by the large amount of the network in the 9-10 rating category. However, there has been recent work done on the water network as part of the Sanitary Sewer Improvements and Water Reliability Study process which is seen by the relatively large amount of pipes in the 0-2 rating category.

Figure 4: Network Probability of Failure (POF) Distribution



Consequence of Failure (COF)

The next step in determining which assets will have the largest impact if failure occurs is determining consequence of failure for the network. In relation to the pipe network, a series of factors were created which, when combined, determine a specific pipes level of severity during failure.

Table 12 below provides a summary of the selected factors and the ranges that were used to weight a given factor. As certain parameters, such as pipe size, play a larger role in determining consequence, these factors were given greater overall weight in the scoring process.

Table 12: Consequence of Failure Factor Summary

Factor & Weight	*Range of Value*	*Multiplier*
Size of Pipe (Inches) W: 5	< 4	0.1
	4 - 6	0.4
	8 - 10	0.7
	≥ 12	1.0
Proximity to Buildings (feet) W: 2	X ≥ 10	0
	5 < X < 10	0.5
	≤ 5	0.8
	0	1.0
Proximity to Roadways (feet) W: 3	Outside ROW	0
	In ROW Alley/Minor Road (Not Under)	0.2
	IN ROW Major Road (Not Under)	0.5
	Under Alley/Minor Road	0.8
	Under Major Road	1.0

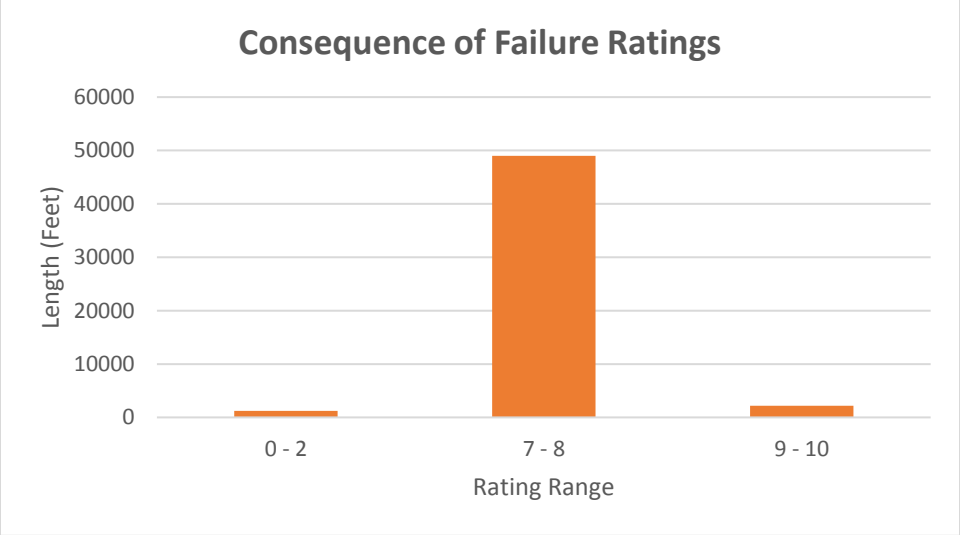
The formula to determine COF has a value range of 0.5 to 10 with a lower score indicating the lowest criticality (small pipe, far away from buildings, outside of the ROW) and a 10 indicating the most critical situation (large pipe, under a building, under a major roadway). Equation 2 presented below was used in the calculation of criticality as previously discussed.

Equation (2): $\text{Consequence of Failure (COF)} = S*5 + Prox_B*2 + Prox_R*3$

Where:
S = Size of Pipe
$Prox_B$ = Proximity to Buildings
$Prox_R$ = Proximity to Roadways

Figure 5 below shows a breakdown of the distribution network based on the COF rankings.

Figure 5: Network Consequence of Failure (COF) Distribution



Criticality and Risk Evaluation

Multiplying the Probability of Failure (POF) and the Consequence of Failure (POF) together results in an asset's criticality factor, also referred to as the Business Risk Evaluation (BRE). The assets that have the greatest probability of failure along with the greatest consequence of failure will be the most critical. The equation for calculating the BRE can be seen below.

Equation (3): $BRE = POF * COF$

Where:
BRE = Business Risk Evaluation
POF = Probability of Failure
COF = Consequence of Failure

The product of multiplying the probability of failure with the consequence of failure produces a BRE score of 1 to 100. A BRE score of 1-20 is considered low priority, 21-55 are medium priority, and 56-100 are high priority. Table 13 shows the criticality matrix used for analyzing the assets. Assets with the highest BRE scores should be considered candidates for the 5-year or 20-year Capital Improvement Project list.

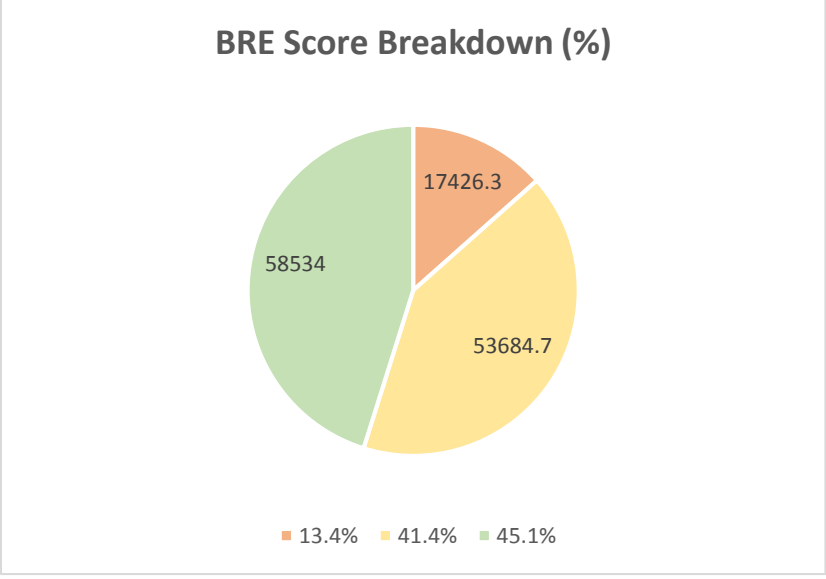
Appendix A shows all the BRE scores for the Village of Paw Paw Water System. **Appendix F** provides mapping based on a variety of factors including remaining useful life, probability of failure, and criticality.

Table 13: Business Risk Evaluation (BRE) Score Priority Matrix

Consequence of Failure (COF)											
	10	10	20	30	40	50	60	70	80	90	100
	9	9	18	27	36	45	54	63	72	81	90
	8	8	16	24	32	40	48	56	64	72	80
	7	7	14	21	28	35	42	49	56	63	70
	6	6	12	18	24	30	36	42	48	54	60
	5	5	10	15	20	25	30	35	40	45	50
	4	4	8	12	16	20	24	28	32	36	40
	3	3	6	9	12	15	18	21	24	27	30
	2	2	4	6	8	10	12	14	16	18	20
	1	1	2	3	4	5	6	7	8	9	10
		1	2	3	4	5	6	7	8	9	10
	Probability of Failure (POF)										

Projects selected in the Capital Improvement Program (CIP) should be based on the BRE rating to ensure that the most critical assets are receiving attention first. Figure 4 breaks down the current system by BRE ranking (low, medium, or high). More than half of the system is in a medium or high risk category from a BRE perspective. Projects will be selected from the 13.4% of the network that is currently in the high risk category with future projects coming from the medium risk category.

Figure 6: Existing Water Network BRE Breakdown



Capital Improvement Program

Introduction

To ensure that the water network in Paw Paw meets or exceeds the AMP goals outlined in previous sections, specific projects need to be selected in both the short and long term. For the purposes of this AMP, projects were allocated to a five (5) year and a twenty (20) year improvement program. Projects were broken into the three (3) main categories of work anticipated on the water system which includes the supply system, storage system, and distribution network. The following sections highlight the selected projects and tasks that should be completed to meet network needs.

Cost Estimates for the 5 and 20 year CIP are given in present worth. Further discussion of cost escalation and project timing are given in the Revenue Structure section with the project schedule.

Five (5) Year CIP Plan

Presented on the following page are the five (5) year projects for the water supply, storage, and distribution system in the order listed. The listed projects have a total presen AMP - Water Storage - Exterior Overcoat (Year 20) worth of $1,321,558 which works out to approximately $264,312 per year for the five (5) year project period.

Table 14: Water Supply 5 Year CIP (Present Worth)

ID	Project Description	Estimated Cost
W.1	SCADA O&M Costs (3 units at $300/yr)	$4,500
W.2	SCADA Radio Modem Replacement (3 units at $950 - Year 5)	$2,950
W.3	Well O&M Costs (Every 2 Years)	$10,000
W.4	Pump Overhaul: Pump #4 (Year 5)	$20,000
5 Year Water Supply CIP Estimate		**$37,450**

Table 15: Water Storage 5 Year CIP (Present Worth)

ID	Project Description	Estimated Cost
S.1	Exterior Overcoat	$75,000
S.2	Dry Interior Partial Repaint	$7,000
S.3	Pit Piping Repaint	$4,000
S.4	Install Cathodic Protection System	$20,000
S.5	Weld Cathodic Covers	$2,000
S.6	Install Overflow Flap Gate	$2,000
S.7	Replace Wet Interior Roof Hatch	$3,000
S.8	Replace Access Tube Roof Hatch	$3,000
S.9	Replace Condensate Platform Hatch	$2,000
S.10	Install a Frost Free Roof Vent	$5,000
S.11	Replace Condensate Drain Line	$2,000
S.12	SCADA O&M Costs (1 unit at $300/yr)	$1,500
S.13	SCADA Radio Modem Replacement (1 unit at $950 - Year 5)	$950
5 Year Water Storage CIP Estimate		**$127,450**

Table 16: Water Distribution 5 Year CIP (Present Worth)

#	Location Description	Criticality Ranking	Est. Construction Cost
1	Commercial Avenue (S. Gremps Street to Kalamazoo Street)	85	$314,567
2	Business Park (East of Kalamazoo Street - Across from Industrial Avenue)	83	$345,805
3	Duo Tang Industrial Loop	74	$391,467
4	Bronson Hospital Service	70	$104,821
5 Year Water Distribution CIP Estimate			**$1,156,658**

Twenty (20) Year CIP Plan

Presented on the following page are the twenty (20) year projects for the water supply, storage, and distribution system in the order listed. The listed projects have a total present worth of $4,911,866 which works out to approximately $288,933 per year for the fifteen (15) year project period.

Table 17: Water Supply 20 Year CIP (Present Worth)

#	Project Description	Estimated Cost
W.1	SCADA O&M Costs (3 units at $300/yr)	$15,300
W.2	SCADA Radio Modem Replacement (3 units at $950 - Year 20)	$2,950
W.3	Well O&M Costs (Every 2 Years)	$45,000
W.4	Pump Overhaul: Pump #4 (Year 15)	$20,000
W.5	SCADA Central DPS System Upgrade (Year 7)	$30,500
W.6	SCADA Central DPS System Upgrade (Year 17)	$30,500
W.7	Pump Overhaul: Pump #6 (Year 10)	$25,000
W.8	Pump Overhaul: Pump #6 (Year 20)	$25,000
W.9	Pump Overhaul: Pump #8 (Year 10)	$25,000
W.10	Pump Overhaul: Pump #8 (Year 20)	$25,000
W.11	Roof Replacement: Pump House for Pump #4	$20,000
W.12	Roof Replacement: Pump House for Pump #6 & #8	$20,000
20 Year Water Supply CIP Estimate		**$284,250**

Table 18: Water Storage 20 Year CIP (Present Worth)

#	Project Description	Estimated Cost
S.14	Exterior Overcoat (Year 20)	$75,000
S.15	Install Painter's Railing	$5,000
S.16	Install Fall Prevention on the Dry Interior Ladders	$3,000
S.17	Install Fall Prevention on the Wet Interior Ladders	$1,000
S.12	SCADA O&M Costs (1 unit at $300/y)	$5,100
S.13	SCADA Radio Modem Replacement (1 unit at $950 - Year 15)	$950
20 Year Water Storage CIP Estimate		**$90,050**

Table 19: Water Distribution 20 Year CIP (Present Worth)

#	Location Description	Criticality Ranking	Est. Construction Cost
5	N. Van Buren Street (Oak Street to W. Michigan Avenue)	65	$57,185
6	Commercial Avenue (Lake Boulevard East to S. Gremps Street)	65	$102,921
7	Lakeview Terrace (Corner to Dead End)	64	$73,555
8	Business Park (East of Kalamazoo Street - Across from Fadel Street)	64	$100,859
9	Commercial Avenue (Duo Tang Road to Lake Boulevard East)	59	$86,792
10	Hazen Street (W. Willard Street to W. Michigan Avenue)	65	$408,150
11	W. Michigan Avenue (Paw Paw River Crossing)	50	$162,570
12	N. Harris Street (Midblock to W. Willard Street)	59	$174,585
13	S. Kalamazoo Street (Industrial Avenue to Fadel Street)	65	$231,493
14	Oak Street (N. Niles Street to N. Brown Street)	65	$253,347
15	Ampey Road (Old S. Gremps Street to S. Kalamazoo Street)	58.5	$287,719
16	W. Willard Street (N. Harrison Street to Hazen Street)	59	$302,871
17	S. Gremps Street (Midblock to E. Michigan Avenue)	65	$334,619
18	E. Michigan Avenue (S. Gremps Street to N. Van Buren Street)	65	$835,994
19	S. Kalamazoo Street (Michigan Avenue to Warner Vineyards)	65	$770,124
20	E. Berrien Street (Lake Boulevard to S. Kalamazoo Street)	64	$354,782
20 Year Water Distribution CIP Estimate			**$4,537,566**

In summary for both the five (5) and twenty (20) year CIP plans, an estimated present worth of $6,233,424 will be needed to maintain and meet the goals of this AMP. This would be an estimated yearly cost of $296,830 which, as shown above should be collected to ensure that the aforementioned project timeline can be met.

Table 20: Water Reliability Projects (Present Worth)

Plan Year	Reliability Study Projects	Summary of Costs
5 Year WRS (2017 – 2022)	LaGrave Street River Rd to South	$231,700
	Dyckman Street Pine St. to Elm St.	$78,500
	Hillcrest Road Midblock to Fairfield Dr. & Fairfield Drive Ridge Rd. to Michigan Ave.	$119,200
	Tulip Street East & West of Lake Blvd.	$140,700
	Lilac Street East of Lake Blvd.	$83,600
	Lily Street West of Lake Blvd.	$89,600
	Hazen Street Willard St. to Michigan Ave. & Mather Court Hazen St. to End	In AMP See Table 17
5 Year Water Reliability Study CIP Estimates		**$743,300**
10 Year WRS (2017 – 2027)	Brown Street Pine St. to Elm St.	$66,700
	Saint Joseph Street Gremps St. to Kalamazoo St.	$112,200
	Cherry Street Midblock to Industrial Ave. & Industrial Avenue Cherry St. to Lake Blvd.	$206,900
	Elm Street Dyckman St. to Michigan Ave.	$316,100
	River Road Stub	$84,000
10 Year Water Reliability Study CIP Estimates		**$873,700**

Revenue Structure

To help fund rehabilitation or replacement of assets, methodologies are used to determine how revenue is generated. These methodologies vary in how revenue is generated. Whether those revenues are generated based on fixed assets, billable flow rates (commodity rates), or a combination thereof. Generally, rate structures use a combination of "fixed" and "flow rate" methodologies to account for operation, maintenance and replacement of fixed assets while addressing variable costs with the commodity component of the rate.

The rate methodology should include costs for maintaining, repairing and replacing system assets based on each asset's expected effective life, current age, and condition. These factors were assessed and used as the basis for the Capital Improvement Program (CIP) outlined above. Also included in the Capital Improvement plan are projects identified in the Water Reliability Study which address improvements needed to achieve the level of service goals pertaining to water flows and pressures within the system. An adequate revenue structure will address these needs through a proper combination of "fixed" and "flow rate" revenue generation with grants or borrowing utilized only if needed.

Authority to Set and Adjust Rates

The Village of Paw Paw owns and operates the Drinking Water System. Chapter 38, Section 38-32, Paragraph (a) of the Village's Code of Ordinances establishes the authority of the Village to establish "rates to be charged for water services." Chapter 38, Section 38-32, Paragraph (e) of the Ordinance establishes Paw Paw's authority for periodic review and adjustment at annual intervals or "at such other times as determined by the village council." The Village's complete Code of Ordinances is available online at www.municode.com.

Under the Village's rate structure, user fees are charged a "Ready to Serve" fee for the fixed portion of the fee as well as a commodity charge for water usage. Village council Resolution 13-03 established a phased rate increase through January of 2019. The resolution adopting the current rates is included in Appendix

Current Asset Allocation

The Village of Paw Paw has recently instituted increases in their water utility rate system. Since the end of the Village's 2013 fiscal year, net budget position has improved each year. Beginning at a deficit of $23,000 in 2013, the village observed budget surpluses of $4,000, $51,000, $31,000, and $196,000 in FY 2014 – 2017. The Village has been able to achieve these surpluses with a modest replacement of infrastructure as well as some deferral of preventative maintenance and replacement projects.

Future Funding Requirements

The Capital Improvement Plan above combines the Water Reliability and Asset Management needs into a single plan. Combined, the overall CIP outlines $9.18 million dollars in spending to maintain and improve the Village's Drinking Water system. By that time, other assets will be reaching the end of their Expected Effective Lives, requiring further investment. Paw Paw is nearing the end of its first generation of water infrastructure with other generations following behind. Because of the ongoing nature of this work, it is advisable to develop a rate structure to sustain the investment without reliance on bonds or other debt instruments.

In order to achieve this, the Abonmarche developed a project schedule to addresses priority projects while utilizing a pay-as-you-go approach, avoiding the need to borrow in order to accomplish the needed projects. The work is scheduled to commence in 2019 which will provide the Village with time to establish a good starting fund balance. 5-year and 20-year asset management projects will be completed within their respective timeframes with some lower priority water reliability projects extending an additional 2 years in order to facilitate cash-flow. While borrowing or bonding for the work is not necessary, modest annual rate increases will be required in order to pay for the projects as indicated in Table 21.

Table 21: Project Schedule and Annual Costs (Annual Worth)

Fiscal Year	Location Description (Annual O&M Costs Omitted from Description)	Escalated Annual Cost
2019	AMP - Water Storage - Exterior Overcoat (Year 1)	$76,200
2020	AMP - Water Supply - Well O&M Costs AMP - Commercial Avenue (S. Gremps Street to Kalamazoo Street)	$322,370
2021	AMP - Business Park (East of Kalamazoo Street - Across from Industrial Avenue)	$350,483
2022	AMP - Water Supply - Well O&M Costs AMP - Duo Tang Industrial Loop	$405,670
2023	AMP - Water Supply - SCADA Radio Modem Replacement AMP - Water Supply - Well Pump Overhaul: Pump #4 AMP - Water Storage - Remainder of 5 Year Projects AMP - Water Storage - SCADA Radio Modem Replacement Remainder of 5 Year Projects AMP - Bronson Hospital Service	$185,377
2024	AMP - Water Supply - Well O&M Costs WRS - LaGrave Street River Rd to South	$247,566
2025	AMP - Water Supply - SCADA Central DPS System Upgrade AMP - N. Van Buren Street (Oak Street to W. Michigan Avenue) WRS - Dyckman Street Pine St. to Elm St.	$175,928
2026	AMP - Water Supply - Well O&M Costs AMP - Commercial Avenue (Lake Boulevard East to S. Gremps Street) WRS Hillcrest Road Midblock to Fairfield Dr. WRS - Fairfield Drive Ridge Rd. to Michigan Ave.	$242,373
2027	AMP - Lakeview Terrace (Corner to Dead End) WRS - Tulip Street East & West of Lake Blvd.	$231,003
2028	AMP - Water Supply - Well O&M Costs AMP - Water Supply - Well Pump Overhaul: Pump #6 AMP - Water Supply - Well Pump Overhaul: Pump #8 AMP - Business Park (East of Kalamazoo Street - Across from Fadel Street) WRS - Lilac Street East of Lake Blvd. WRS - Lily Street West of Lake Blvd.	$357,632
2029	AMP - Hazen Street (W. Willard Street to W. Michigan Avenue) WRS - Mather Court Hazen St. to End WRS - Commercial Avenue (Duo Tang Road to Lake Boulevard East)	$691,461
2030	AMP - Water Supply - Well O&M Costs AMP - W. Michigan Avenue (Paw Paw River Crossing)	$186,432
2031	AMP - N. Harris Street (Midblock to W. Willard Street)	$196,123
2032	AMP - Water Supply - Well O&M Costs AMP - S. Kalamazoo Street (Industrial Avenue to Fadel Street)	$267,845

Fiscal Year	Location Description (Annual O&M Costs Omitted from Description)	Escalated Annual Cost
2033	AMP - Water Supply - Well Pump Overhaul: Pump #4 AMP - Water Storage - Railing and Ladder Improvement Projects AMP - Oak Street (N. Niles Street to N. Brown Street)	$312,468
2034	AMP - Water Supply - Well O&M Costs AMP - Ampey Road (Old S. Gremps Street to S. Kalamazoo Street)	$337,861
2035	AMP - Roof Replacement: Pump House for Pump #6 & #8 AMP - W. Willard Street (N. Harrison Street to Hazen Street)	$411,656
2036	AMP - Water Supply - Well O&M Costs AMP - S. Gremps Street (Midblock to E. Michigan Avenue)	$399,647
2037	AMP - Roof Replacement: Pump House for Pump #4 AMP - E. Michigan Avenue (S. Gremps Street to N. Van Buren Street) AMP - S. Kalamazoo Street (Michigan Avenue to Warner Vineyards)	$1,903,601
2038	AMP - Water Storage - Exterior Overcoat (Year 20) AMP - Roof Replacement: Pump House for Pump #4 AMP - Water Supply - Well O&M Costs AMP - Water Supply - Well Pump Overhaul: Pump #6 AMP - Water Supply - Well Pump Overhaul: Pump #8 AMP - E. Berrien Street (Lake Boulevard to S. Kalamazoo Street) WRS - Harris Street Well 4 to Michigan Ave.	$787,422
2039	WRS - Brown Street Pine St. to Elm St. WRS - Saint Joseph Street Gremps St. to Kalamazoo St. WRS - River Road Stub WRS - Kalamazoo Commercial Ave. to Industrial Ave.	$488,451
2040	AMP - Water Supply - Well O&M Costs WRS - St. joseph Street Gremps St. to Kalamazoo St. WRS - Cherry Street Midblock to Industrial Ave. & Industrial Avenue Cherry St. to Lake Blvd.	$602,911

This rate structure analysis assumes incremental escalation of 0.50% in 2020 and 2021 followed by 1.0% per year thereafter. It also assumes no water main breaks or major repairs are needed except those described in the Water Reliability Study and the Asset Management Plan. It also assumes work on Kalamazoo Avenue (M-40) can be scheduled to best suit the Village of Paw Paw. Since this is an MDOT route, there will be coordination to coincide with MDOT reconstruction of the roadway. Therefore, the Village may need to accelerate or delay the project in order to construct along with roadway work. Any one of these factors may affect the calculated rate increases needed to pay for the plan outlined in this report. Therefore, the Village should examine project schedule, and rate adjustments on an annual basis to determine exact amount of the adjustment.

Conclusion

Overall, the Village of Paw Paw has an aging water infrastructure network, similar to many other communities, which will require continual investment to ensure that it meets both State and Federal requirements as well as the Village's specific operating goals. The level of investment for both the five (5) year and twenty (20) year CIP plans should be implemented to ensure that the existing water quality and reliability is maintained and improved within the network. The Capital Improvements Outlined in the Asset

Management Plan and Water Reliability study total to $9,180,479 expended between 2019 and 2040. These are summarized in the following table.

Table 22: Combined Asset Management and Water Reliability Projects (Annual Worth)

Location Description	Est. Construction Cost
5 Year Water Supply CIP Estimate	*$38,331*
5 Year Water Storage CIP Estimate	*$129,015*
5 Year Water Distribution CIP Estimate	*$1,172,755*
5 Year Water Reliability Study CIP Estimates	*$976,006*
Total 5 Year Water Project Costs	**$2,316,107**
20 Year Water Supply CIP Estimate	*$322,891*
20 Year Water Storage CIP Estimate	*$108,374*
20 Year Water Distribution CIP Estimate	$5,372,459
10 Year Water Reliability Study CIP Estimates	$1,060,648
Total 10-20 Year Water Project Costs	**$6,864,372**
Total Water Project Costs	**$9,180,479**

As new information on the system and future projects or improvements are completed, this document should be updated such that it remains a useful guide in determining where limited funds should be allocated to ensure the network goals are achieved.

APPENDIX C:

POPULATION AND ECONOMIC DATA

Annual Estimates of the Resident Population for Counties in Michigan: April 1, 2010 to July 1, 2019

Geographic Area	April 1, 2010		Population Estimate (as of July 1)									
	Census	Estimates Base	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
St. Joseph County, Michigan	61,295	61,303	61,288	61,068	60,992	60,989	61,015	60,804	60,790	60,710	60,912	60,964
Sanilac County, Michigan	43,114	43,106	43,087	42,705	42,306	41,901	41,661	41,464	41,405	41,242	41,192	41,170
Schoolcraft County, Michigan	8,485	8,485	8,472	8,477	8,350	8,263	8,137	8,121	7,967	8,013	8,044	8,094
Shiawassee County, Michigan	70,648	70,668	70,634	69,998	69,329	68,903	68,808	68,505	68,542	68,400	68,133	68,122
Tuscola County, Michigan	55,729	55,722	55,698	55,400	54,708	54,216	53,923	53,726	53,276	52,815	52,633	52,245
Van Buren County, Michigan	76,258	76,269	76,149	75,936	75,298	75,318	75,226	75,060	75,267	75,303	75,481	75,677
Washtenaw County, Michigan	344,791	345,163	345,717	349,753	352,303	356,040	360,021	362,975	366,135	368,807	369,483	367,601
Wayne County, Michigan	1,820,584	1,820,473	1,815,081	1,803,189	1,795,929	1,780,225	1,771,679	1,764,872	1,760,612	1,757,217	1,754,453	1,749,343
Wexford County, Michigan	32,735	32,735	32,739	32,640	32,521	32,479	32,851	32,889	33,081	33,234	33,446	33,631

Note: The estimates are based on the 2010 Census and reflect changes to the April 1, 2010 population due to the Count Question Resolution program and geographic program revisions. All geographic boundaries for the 2019 population estimates are as of January 1, 2019. For population estimates methodology statements, see http://www.census.gov/programs-surveys/popest/technical-documentation/methodology.html.

Suggested Citation:
Annual Estimates of the Resident Population for Counties in Michigan: April 1, 2010 to July 1, 2019 (CO-EST2019-ANNRES-26)
Source: U.S. Census Bureau, Population Division
Release Date: March 2020

Annual Estimates of the Resident Population for Incorporated Places in Michigan: April 1, 2010 to July 1, 2019

Geographic Area	April 1, 2010		Population Estimate (as of July 1)									
	Census	Estimates Base	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ortonville village, Michigan	1,442	1,439	1,437	1,447	1,457	1,468	1,470	1,463	1,462	1,458	1,448	1,443
Otisville village, Michigan	864	864	862	855	846	841	835	832	837	835	836	835
Otsego city, Michigan	3,956	3,965	3,966	3,939	3,937	3,935	3,959	3,960	3,960	3,990	3,993	3,994
Otter Lake village, Michigan	389	389	389	387	388	388	386	386	384	382	380	378
Ovid city, Michigan	1,603	1,586	1,587	1,591	1,593	1,602	1,601	1,591	1,597	1,608	1,614	1,613
Owendale village, Michigan	241	241	241	238	236	234	233	230	228	227	226	224
Owosso city, Michigan	15,194	15,180	15,167	15,014	14,854	14,749	14,715	14,635	14,623	14,562	14,475	14,441
Oxford village, Michigan	3,436	3,434	3,436	3,458	3,479	3,507	3,548	3,541	3,549	3,552	3,541	3,556
Parchment city, Michigan	1,804	1,800	1,803	1,814	1,827	1,836	1,839	1,837	1,840	1,841	1,834	1,828
Parma village, Michigan	769	763	763	759	757	754	754	751	748	747	746	744
Paw Paw village, Michigan	3,534	3,514	3,506	3,488	3,454	3,446	3,436	3,417	3,406	3,389	3,378	3,366
Peck village, Michigan	632	635	635	627	619	610	606	601	601	598	596	595
Pellston village, Michigan	822	822	821	825	823	828	831	830	829	833	838	843
Pentwater village, Michigan	857	862	859	858	854	852	854	852	850	851	853	848

Annual Estimates of the Resident Population for Minor Civil Divisions in Michigan: April 1, 2010 to July 1, 2019

Geographic Area	April 1, 2010		Population Estimate (as of July 1)									
	Census	Estimates Base	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Keeler township, Van Buren County, Michigan	2,169	2,176	2,175	2,180	2,167	2,167	2,169	2,160	2,159	2,162	2,156	2,159
Lawrence township, Van Buren County, Michigan	3,259	3,261	3,257	3,252	3,227	3,232	3,232	3,228	3,235	3,239	3,244	3,244
Paw Paw township, Van Buren County, Michigan	7,041	7,043	7,031	7,001	6,939	6,932	6,916	6,886	6,879	6,849	6,830	6,821
Pine Grove township, Van Buren County, Michigan	2,949	2,947	2,942	2,938	2,918	2,927	2,928	2,918	2,927	2,927	2,941	2,948
Porter township, Van Buren County, Michigan	2,466	2,466	2,463	2,453	2,439	2,438	2,433	2,425	2,438	2,451	2,465	2,460
South Haven city, Van Buren County, Michigan	4,400	4,413	4,406	4,393	4,360	4,364	4,364	4,354	4,361	4,357	4,349	4,345
South Haven charter township, Van Buren County, Michigan	3,983	3,966	3,959	3,945	3,919	3,918	3,916	3,905	3,914	3,935	3,957	3,993
Waverly township, Van Buren County, Michigan	2,554	2,556	2,552	2,545	2,521	2,526	2,519	2,515	2,517	2,521	2,524	2,532
Ann Arbor city, Washtenaw County, Michigan	113,934	113,988	114,173	115,539	116,079	116,820	118,716	119,884	120,919	121,493	121,429	119,980
Ann Arbor charter township, Washtenaw County, Michigan	4,361	4,349	4,352	4,397	4,420	4,463	4,483	4,485	4,520	4,531	4,543	4,520

Table: ACSST5Y2019.S1903

	Michigan						Van Buren County, Michigan						Paw Paw village, Michigan					
	Number		Percent Distribution		Median income (dollars)		Number		Percent Distribution		Median income (dollars)		Number		Percent Distribution		Median income (dollars)	
Label	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
HOUSEHOLD INCOME BY RACE AND HISPANIC OR LATINO ORIGIN OF HOUSEHOLDER																		
Households	3,935,041	±8,563	3,935,041	±8,563	57,144	±216	29,411	±528	29,411	±528	54,485	±1,786	1,375	±168	1,375	±168	43,226	±4,897
One race--																		
White	3,183,051	±7,623	80.9%	±0.1	61,400	±243	26,415	±470	89.8%	±0.7	57,082	±2,405	1,271	±166	92.4%	±5.8	44,504	±6,457
Black or African American	527,956	±2,678	13.4%	±0.1	35,322	±398	847	±131	2.9%	±0.4	28,771	±3,998	0	±10	0.0%	±1.8	-	**
American Indian and Alaska Native	19,528	±747	0.5%	±0.1	43,453	±2,117	210	±84	0.7%	±0.3	-	**	11	±13	0.8%	±1.0	-	**
Asian	101,311	±1,140	2.6%	±0.1	86,611	±1,882	170	±42	0.6%	±0.1	97,813	±69,980	0	±10	0.0%	±1.8	-	**
Native Hawaiian and Other Pacific Islander	937	±178	0.0%	±0.1	59,508	±20,225	0	±24	0.0%	±0.1	-	**	0	±10	0.0%	±1.8	-	**
Some other race	34,198	±1,234	0.9%	±0.1	44,286	±1,733	952	±133	3.2%	±0.5	41,818	±14,721	49	±62	3.6%	±4.4	-	**
Two or more races	68,060	±1,711	1.7%	±0.1	45,242	±1,735	817	±160	2.8%	±0.5	42,537	±8,183	44	±46	3.2%	±3.3	-	**
Hispanic or Latino origin (of any race)	140,493	±1,731	3.6%	±0.1	48,256	±937	2,178	±140	7.4%	±0.5	42,176	±4,626	123	±93	8.9%	±6.4	43,210	±24,752
White alone, not Hispanic or Latino	3,087,557	±7,330	78.5%	±0.1	61,750	±252	25,452	±446	86.5%	±0.7	57,920	±2,069	1,197	±166	87.1%	±7.4	44,196	±9,084
HOUSEHOLD INCOME BY AGE OF HOUSEHOLDER																		
15 to 24 years	157,278	±2,703	4.0%	±0.1	30,853	±464	909	±190	3.1%	±0.6	37,003	±4,583	62	±67	4.5%	±4.9	-	**
25 to 44 years	1,167,034	±4,333	29.7%	±0.1	63,027	±445	7,993	±305	27.2%	±0.8	57,725	±3,890	383	±93	27.9%	±7.8	48,341	±7,227
45 to 64 years	1,547,395	±3,323	39.3%	±0.1	69,897	±405	12,181	±289	41.4%	±0.9	67,141	±2,998	510	±136	37.1%	±7.5	44,333	±27,046
65 years and over	1,063,334	±4,133	27.0%	±0.1	44,061	±231	8,328	±230	28.3%	±0.7	40,185	±1,702	420	±108	30.5%	±5.9	29,426	±7,365
FAMILIES																		
Families	2,517,441	±8,128	2,517,441	±8,128	72,600	±364	20,380	±523	20,380	±523	66,975	±2,431	806	±110	806	±110	59,531	±17,621
With own children of householder under 18 years	1,016,547	±6,997	40.4%	±0.2	70,381	±637	8,098	±377	39.7%	±1.3	62,767	±3,297	393	±101	48.8%	±11.9	49,977	±39,340
With no own children of householder under 18 years	1,500,894	±4,891	59.6%	±0.2	73,857	±308	12,282	±363	60.3%	±1.3	70,190	±3,136	413	±118	51.2%	±11.9	59,609	±19,963
Married-couple families	1,853,456	±10,342	73.6%	±0.2	86,923	±348	15,613	±513	76.6%	±1.8	77,081	±2,548	519	±108	64.4%	±12.2	75,795	±11,735
With own children under 18 years	672,898	±7,183	26.7%	±0.2	96,983	±486	5,629	±305	27.6%	±1.2	81,104	±4,933	282	±95	35.0%	±12.3	69,625	±26,790
Female householder, no spouse present	475,082	±3,924	18.9%	±0.2	35,135	±402	3,240	±292	15.9%	±1.4	33,069	±2,874	154	±73	19.1%	±8.6	-	**
With own children under 18 years	252,073	±3,324	10.0%	±0.1	26,515	±361	1,706	±242	8.4%	±1.2	25,367	±5,318	50	±56	6.2%	±7.0	-	**
Male householder, no spouse present	188,903	±2,663	7.5%	±0.1	49,283	±695	1,527	±263	7.5%	±1.2	44,195	±6,210	133	±88	16.5%	±10.2	42,813	±13,584
With own children under 18 years	91,576	±2,115	3.6%	±0.1	42,000	±996	763	±182	3.7%	±0.9	36,717	±8,418	61	±65	7.6%	±7.8	-	**
FAMILY INCOME BY FAMILY SIZE																		
2-person families	1,252,208	±5,360	49.7%	±0.2	63,733	±313	10,176	±394	49.9%	±1.5	61,982	±3,130	391	±126	48.5%	±12.2	44,896	±21,726
3-person families	536,991	±5,129	21.3%	±0.2	76,449	±643	4,076	±356	20.0%	±1.6	68,877	±4,998	158	±81	19.6%	±9.3	68,188	±28,519
4-person families	430,428	±5,154	17.1%	±0.2	93,492	±793	3,290	±257	16.1%	±1.2	81,071	±6,455	118	±86	14.6%	±10.6	125,050	±95,233
5-person families	191,036	±2,185	7.6%	±0.1	86,517	±950	1,795	±244	8.8%	±1.2	82,971	±9,780	84	±51	10.4%	±6.3	76,071	±24,364
6-person families	67,930	±1,926	2.7%	±0.1	79,417	±1,463	596	±165	2.9%	±0.8	63,636	±23,188	55	±78	6.8%	±10.0	-	**
7-or-more person families	38,848	±1,488	1.5%	±0.1	70,375	±2,157	447	±118	2.2%	±0.6	48,209	±7,503	0	±10	0.0%	±3.1	-	**
FAMILY INCOME BY NUMBER OF EARNERS																		
No earners	430,572	±3,691	17.1%	±0.1	43,003	±363	3,252	±275	16.0%	±1.3	39,934	±3,245	137	±67	17.0%	±7.5	-	**
1 earner	810,706	±4,636	32.2%	±0.2	52,026	±362	6,381	±419	31.3%	±1.8	45,527	±3,340	233	±106	28.9%	±12.4	43,688	±12,076
2 earners	997,130	±6,629	39.6%	±0.2	94,460	±432	8,406	±445	41.2%	±1.9	83,908	±3,505	377	±111	46.8%	±13.0	70,982	±15,471
3 or more earners	279,033	±2,694	11.1%	±0.1	119,246	±866	2,341	±269	11.5%	±1.3	103,843	±9,397	59	±39	7.3%	±5.0	79,712	±24,421
NONFAMILY HOUSEHOLDS																		
Nonfamily households	1,417,600	±5,755	1,417,600	±5,755	33,711	±225	9,031	±533	9,031	±533	30,584	±1,723	569	±196	569	±196	19,917	±13,613
Female householder	744,373	±4,689	52.5%	±0.2	30,102	±191	4,457	±328	49.4%	±3.0	26,022	±1,438	408	±165	71.7%	±14.3	-	**
Living alone	631,818	±4,479	44.6%	±0.2	27,120	±202	3,823	±293	42.3%	±2.7	23,918	±2,213	354	±154	62.2%	±14.1	16,594	±12,923
Not living alone	112,555	±2,009	7.9%	±0.1	54,889	±946	634	±135	7.0%	±1.5	49,211	±8,396	54	±44	9.5%	±7.6	-	**
Male householder	673,227	±3,681	47.5%	±0.2	39,259	±388	4,574	±428	50.6%	±3.0	38,210	±3,591	161	±96	28.3%	±14.3	20,268	±10,373
Living alone	532,201	±3,285	37.5%	±0.2	34,533	±432	3,816	±407	42.3%	±3.1	33,131	±4,158	131	±83	23.0%	±12.6	20,804	±8,686
Not living alone	141,026	±2,454	9.9%	±0.2	61,970	±914	758	±116	8.4%	±1.2	57,778	±8,884	30	±35	5.3%	±6.0	-	**

	Michigan		Van Buren County, Michigan		Paw Paw village, Michigan	
Label	**Estimate**	**Margin of Error**	**Estimate**	**Margin of Error**	**Estimate**	**Margin of Error**
Per capita income in the past 12 months (in 2019 inflation-adjusted dollars)	31,713	±129	28,049	±944	23,796	±5,228

APPENDIX D:

WELL INSPECTION REPORTS

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 150 ft east of Harris Road & 150 ft west of Miller Road N. 42.21932 / W. 085.90029

Well No. 4 Date Drilled 1961 Dia. 34" Depth 110' Type Well GWW

Screen ID. 12" Screen Length 30' Depth to Top of Screen 80' Type Screen Cook

Dates of Cleaning 1979, 1988, 1991

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1961	12' 8"	820	68' 9"	-	14.6
AFTER LAST CLEANING	1991	15'	545	45'	73#	18.0
AFTER LAST TEST	2011	10.5'	508	41'	73#	16.7
AT PUMP'S RATED FLOW						
AT SYSTEM OPERATING PSI	2015	14.5'	540	43'	80#	18.9

Test Completed Through Meter ___ Thread Size 4" Confined Space Entry? No

Motor HP 50 Make U.S. Volts 230/460 RPM 1800 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required ___

Pump Mfg. Layne Serial No. 42975 Airline Length 66'

Rated Capacity: 750 GPM 201' TDH Operating Pressure stand by

Total Setting 79' 6" Size of Packing 3/8" Date Installed 1961

Dates of Overhaul 1969, 1980, 1988, 2014 (others)

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump ___

Pump is Presently Developing 540 **GPM** 228' **TDH** **Projected Curve Capacity** 750 **GPM** 216' **TDH**

Shut Off Pressure 95 PSI Rated Shut Off Head 240 ft. Calculated Shut Off Head 234 ft.

Electrical Data (With Pump in Operation) 460 V 54.4 / 45.8 / 51.4 Amps 61 @ 460 v Full Load Amps

Location of Power Lines 2' East & 5' above hatch Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Drop spool & dresser off head, need short 8" x 6" elbow off head, two (2) hoses to tank, 75' to waste (spool is 12 3/4" long).

Need a Smeal to Raise Pump? No Remarks Orifice Test.

Maintenance: 4" coupling outside to run test, (1) fire hose, 6"x4" orifice. This is back up only.

Inspected By Doug Gentry Date Inspected April 8, 2015

PEERLESS MIDWEST

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 150 ft east of Harris Road & 150 ft west of Miller Road

Well No. 4 Date Drilled 1961 Dia. 34" Depth 110' Type Well GWW

Screen ID. 12" Screen Length 30' Depth to Top of Screen 80' Type Screen Cook

Dates of Cleaning 1979, 1988, 1991

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1961	12' 8"	820	68' 9"	-	14.6
AFTER LAST CLEANING	1991	15'	545	45'	73#	18.0
AFTER LAST TEST	2011	10.5'	508	41'	73#	16.7
AT PUMP'S RATED FLOW						
AT SYSTEM OPERATING PSI	Inspect	And	Assess	This	Time	Only

Test Completed Through Meter ___ Thread Size 4" Confined Space Entry? No

Motor HP 50 Make U.S. Volts 230/460 RPM 1800 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required ___

Pump Mfg. Layne Serial No. 42975 Airline Length 66'

Rated Capacity: 750 GPM 201' TDH Operating Pressure stand by

Total Setting 79' 6" Size of Packing 3/8" Date Installed 1961

Dates of Overhaul 1969, 1980, 1988

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? ___ Change Motor Oil & Grease ___ Repack Pump ___ Grease Pump ___

Pump is Presently Developing ___ **GPM** ___ **TDH** **Projected Curve Capacity** 750 **GPM** ___ **TDH**

Shut Off Pressure ___ PSI Rated Shut Off Head 240 ft. Calculated Shut Off Head ___ ft.

Electrical Data (With Pump in Operation) ___ V / / Amps 61 @ 460 v Full Load Amps

Location of Power Lines 2' East & 5' above hatch Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Drop spool & dresser off head, need short 8" x 6" elbow off head, two (2) hoses to tank, 75' to waste (spool is 12 3/4" long).

Need a Smeal to Raise Pump? No Remarks Shafting is a part. There is no non-reverse ratchet on motor. Power should be pulled before pull pump.

Maintenance: 4" coupling outside to run test, (1) fire hose, 6"x4" orifice. This is back up only.

Inspected By Ron Mead Date Inspected March 25, 2013

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 150 ft east of Harris Road & 150 ft west of Miller Road

Well No. 4 Date Drilled 1961 Dia. 34" Depth 110' Type Well GWW

Screen ID. 12" Screen Length 30' Depth to Top of Screen 80' Type Screen Cook

Dates of Cleaning 1979, 1988, 1991

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1961	12' 8"	820	68' 9"	-	14.6
AFTER LAST CLEANING	1991	15'	545	45'	73#	18.0
AFTER LAST TEST	2010	10.5'	512	42'	71#	16.3
AT PUMP'S RATED FLOW						
AT SYSTEM OPERATING PSI	2011	10.5'	508	41'	73#	16.7

Test Completed Through Meter ___ Thread Size 4" Confined Space Entry? No

Motor HP 50 Make U.S. Volts 230/460 RPM 1800 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required ___

Pump Mfg. Layne Serial No. 42975 Airline Length 66'

Rated Capacity: 750 GPM 201' TDH Operating Pressure stand by

Total Setting 79' 6" Size of Packing 3/8" Date Installed 1961

Dates of Overhaul 1969, 1980, 1988

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease ___ Repack Pump ___ Grease Pump ___

Pump is Presently Developing 508 **GPM** 210' **TDH** **Projected Curve Capacity** 750 **GPM** 197' **TDH**

Shut Off Pressure 104 PSI Rated Shut Off Head 240 ft. Calculated Shut Off Head 251 ft.

Electrical Data (With Pump in Operation) 480 V ndc / ndc / ndc Amps 61 @ 460 v Full Load Amps

Location of Power Lines 2' East & 5' above hatch Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Drop spool & dresser off head, need short 8" x 6" elbow off head, two (2) hoses to tank, 75' to waste (spool is 12 3/4" long).

Need a Smeal to Raise Pump? No Remarks Orifice test with 6"x4" plate. Headshaft worn causing packing to fail. Can not keep adjusted.

Maintenance: 4" coupling outside to run test, (1) fire hose, 6"x4" orifice. This is back up only.

Inspected By John Kollar Date Inspected September 13, 2011

Peerless Midwest Inc. *Water Supply Contractors*

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574-254-9050 / Fax 574-254-9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 150 ft east of Harris Road & 150 ft west of Miller Road

Well No. 4 Date Drilled 1961 Dia. 34" Depth 110' Type Well GWW

Screen ID. 12" Screen Length 30' Depth to Top of Screen 80' Type Screen Cook

Dates of Cleaning 1979, 1988, 1991

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1961	12' 8"	820	68' 9"		14.6
AFTER LAST CLEANING	1991	15'	545	45'	73#	18.0
AFTER LAST TEST	2009	9'	524	43'	74#	15.4
AT PUMP'S RATED FLOW						
AT SYSTEM OPERATING PSI	2010	10.5'	512	42'	71#	16.3

Test Completed Through Meter ___ Thread Size 4" Confined Space Entry? No

Motor HP 50 Make U.S. Volts 230/460 RPM 1800 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required ___

Pump Mfg. Layne Serial No. 42975 Airline Length 66'

Rated Capacity: 750 GPM 201' TDH Operating Pressure stand by

Total Setting 79' 6" Size of Packing 3/8" Date Installed 1961

Dates of Overhaul 1969, 1980, 1988

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump 2 rings X Grease Pump ___

Pump is Presently Developing 512 **GPM** 206' **TDH** **Projected Curve Capacity** 750 **GPM** 192' **TDH**

Shut Off Pressure 104 PSI Rated Shut Off Head 240 ft. Calculated Shut Off Head 251 ft.

Electrical Data (With Pump in Operation) 480 V 48 / 41 / 46 Amps 61 @ 460 v Full Load Amps

Location of Power Lines 2' east & 5' above hatch Can Electrical Box be Locked Out? yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Drop spool & dresser off head, need short 8" x 6" elbow off head, two (2) hoses to tank, 75' to waste (spool is 12 3/4" long).

Need a Smeal to Raise Pump' No Remarks This was an orifice test using 6"x4" orifice. Used (1) 100' Airline gauge.

Maintenance: 4" coupling outside to run test, (1) fire hose, 6"x4" orifice. This is back up only.

Inspected By J. Kollar Date Inspected August 31, 2010

PEERLESS MIDWEST INC

141895

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 150 ft east of Harris Road & 150 ft west of Miller Road N. 42.21932 / W. 085.90029

Well No. 4 Date Drilled 1961 Dia. 34" Depth 110' Type Well GWW

Screen ID. 12" Screen Length 30' Depth to Top of Screen 80' Type Screen Cook

Dates of Cleaning 1979, 1988, 1991

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1961	12' 8"	820	68' 9"	-	14.6
AFTER LAST CLEANING	1991	15'	545	45'	73#	18.0
AFTER LAST TEST	2019	13'	758	54'	63#	18.5
AT PUMP'S RATED FLOW	2020	14'	747	52'	68#	19.7
AT SYSTEM OPERATING PSI	2020	14'	708	48'	70#	20.8

Test Completed Through Meter ___ Thread Size 4" Confined Space Entry? No

Motor HP 50 Make U.S. Volts 230/460 RPM 1800 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required ___

Pump Mfg. Layne Serial No. 42975 Airline Length 66'

Rated Capacity: 750 GPM 201' TDH Operating Pressure stand by

Total Setting 79' 6" Size of Packing 3/8" Date Installed 1961

Dates of Overhaul 1969, 1980, 1988, 2014 (others)

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump ___

Pump is Presently Developing 747 **GPM** 209' **TDH** **Projected Curve Capacity** 750 **GPM** 208' **TDH**

Shut Off Pressure - PSI Rated Shut Off Head 240 ft. Calculated Shut Off Head - ft.

Electrical Data (With Pump in Operation): 480 V 55 / 51 / 57 Amps 61 @ 460 v Full Load Amps

Location of Power Lines 2' East & 5' above hatch Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Drop spool & dresser off head, need short 8" x 6" elbow off head, two (2) hoses to tank, 75' to waste (spool is 12 3/4" long).

Need a Smeal to Raise Pump? No Remarks On/Off switch not operational.

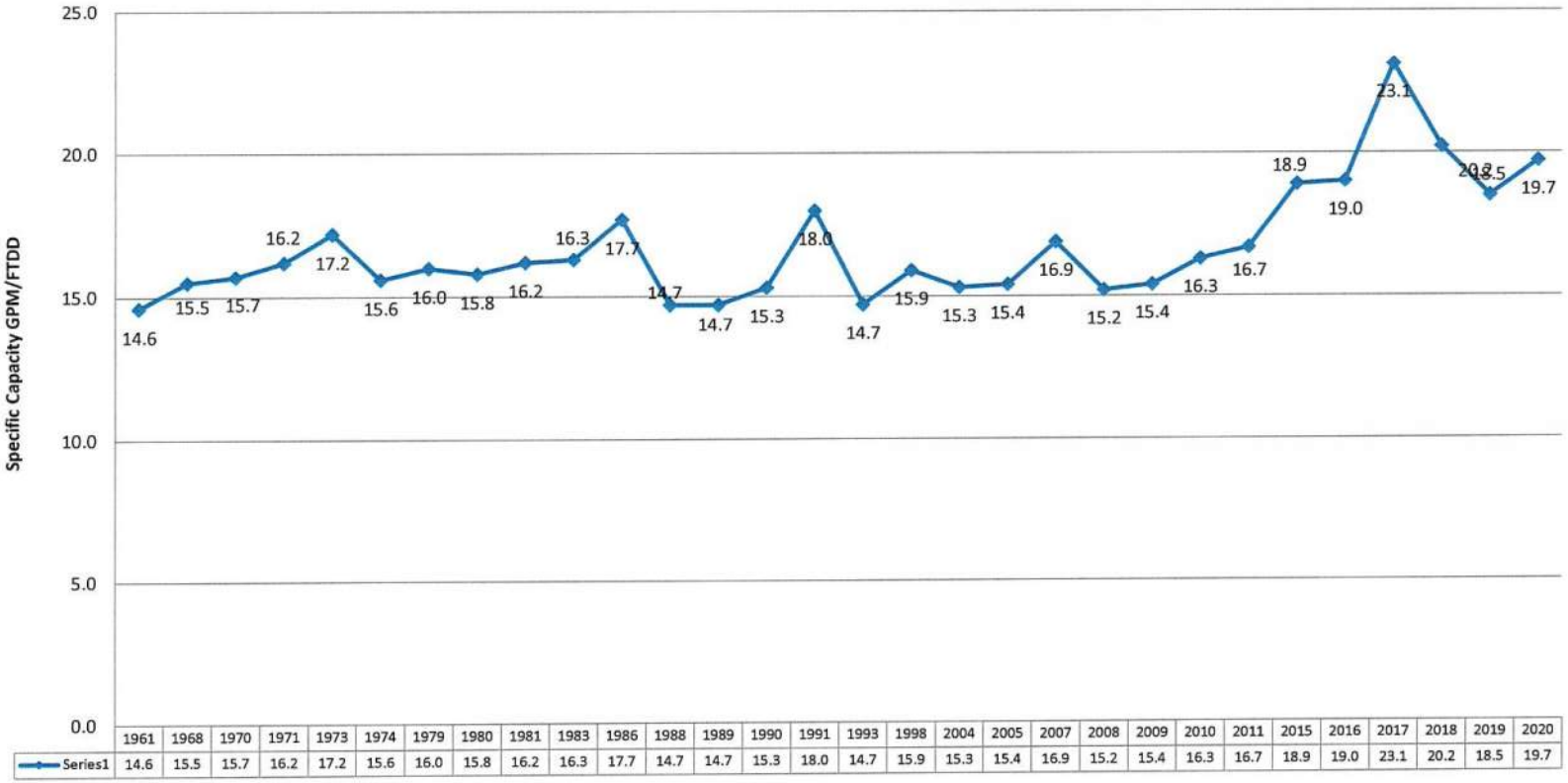
Maintenance: 4" coupling outside to run test, (1) fire hose, 6"x4" orifice. This is back up only.

Inspected By Mike Kline Date Inspected December 3, 2020

Specific Capacity Trend Analysis

Village of Paw Paw
Well #4

PEERLESS MIDWEST INC.



	1961	1968	1970	1971	1973	1974	1979	1980	1981	1983	1986	1988	1989	1990	1991	1993	1998	2004	2005	2007	2008	2009	2010	2011	2015	2016	2017	2018	2019	2020
Series1	14.6	15.5	15.7	16.2	17.2	15.6	16.0	15.8	16.2	16.3	17.7	14.7	14.7	15.3	18.0	14.7	15.9	15.3	15.4	16.9	15.2	15.4	16.3	16.7	18.9	19.0	23.1	20.2	18.5	19.7

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 227 ft east of Johnson Road & 955 ft south of Paw Paw Road; 73' West of Well #8 N. 42.20881 / W. 085.90187

Well No. 6 Date Drilled 1991 Dia. 14" Depth 178' Type Well GWW

Screen ID. 12" Screen Length 40' Depth to Top of Screen 138' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1991	+ 2'	1507	33'	-	43.1
AFTER LAST CLEANING						
AFTER LAST TEST	2014	5'	1570	22.5'	66#	89.7
AT PUMP'S RATED FLOW	2015	3'	1600	22'	64#	84.2
AT SYSTEM OPERATING PSI	**2015	3'	900	13.5'	60#	85.7

Test Completed Through Meter X Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne Serial No. 114587 Airline Length 70'

Rated Capacity: 1500 GPM 185' TDH Operating Pressure 72#

Total Setting 84' 6" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 1998, 2006

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump

Pump is Presently Developing *1568 **GPM** *163' **TDH** **Projected Curve Capacity** 1500 **GPM** *173' **TDH**

Shut Off Pressure NDA PSI Rated Shut Off Head 261 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 487/491/491 V 127.2 / 128.2 / 105.1 Amps 122 @ 460 v Full Load Amps

Location of Power Lines 8' away Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 2' Materials Needed to Clean Well Turn pump or take 12"x 23-1/2" spool out. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? Remarks *Test Ran at 60 Hz, 1837 RPM, Projected Results at 1800 RPM, **Test Ran at 48 Hz. Electrical Data taken at 60 Hz. Meter Test. No Way to Get Shut Off Pressure.

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By Doug Gentry Date Inspected April 8, 2015

PEERLESS MIDWEST INC

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 227 ft east of Johnson Road & 955 ft south of Paw Paw Road; 73' West of Well #8

Well No. 6 Date Drilled 1991 Dia. 14" Depth 178' Type Well GWW

Screen ID. 12" Screen Length 40' Depth to Top of Screen 138' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1991	+ 2'	1507	33'	-	43.1
AFTER LAST CLEANING						
AFTER LAST TEST	2013	5'	1500	21'	72#	93.8
AT PUMP'S RATED FLOW	2014	5'	1570	22.5'	66#	89.7
AT SYSTEM OPERATING PSI						

Test Completed Through Meter X Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne Serial No. 114587 Airline Length 70'

Rated Capacity: 1500 GPM 185' TDH Operating Pressure 72#

Total Setting 84' 6" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 1998, 2006

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump 3 Rings Grease Pump

Pump is Presently Developing *1552 **GPM** *171' **TDH** **Projected Curve Capacity** 1500 **GPM** *179' **TDH**

Shut Off Pressure N/A PSI Rated Shut Off Head 261 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 480 V 105 / 118 / 115 Amps 122 @ 460 v Full Load Amps

Location of Power Lines 8' away Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 2' Materials Needed to Clean Well Turn pump or take 12"x 23-1/2" spool out. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? Remarks Meter test.

Test ran at 1821 RPM. *Projected at 1800 RPM.

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By John Kollar Date Inspected April 3, 2014

PEERLESS MIDWEST INC.

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 227 ft east of Johnson Road & 955 ft south of Paw Paw Road; 73' West of Well #8

Well No. 6 Date Drilled 1991 Dia. 14" Depth 178' Type Well GWW

Screen ID. 12" Screen Length 40' Depth to Top of Screen 138' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1991	+ 2'	1507	33'	-	43.1
AFTER LAST CLEANING						
AFTER LAST TEST	2011	7'	1500	26'	65#	78.9
AT PUMP'S RATED FLOW	2013	5'	1500	21'	72#	93.8
AT SYSTEM OPERATING PSI						

Test Completed Through Meter X Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne Serial No. 114587 Airline Length 70'

Rated Capacity: 1500 GPM 185' TDH Operating Pressure 72#

Total Setting 84' 6" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 1998, 2006

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump

Pump is Presently Developing 1500 **GPM** 187' **TDH** **Projected Curve Capacity** 1500 **GPM** 187' **TDH**

Shut Off Pressure N/A PSI Rated Shut Off Head 261 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 480 V 110 / 109 / 98 Amps 122 @ 460 v Full Load Amps

Location of Power Lines 8' away Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 2' Materials Needed to Clean Well Turn pump or take 12"x 23-1/2" spool out. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? Remarks

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By Ron Mead Date Inspected March 25, 2013

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 227 ft east of Johnson Road & 955 ft south of Paw Paw Road; 73' West of Well #8

Well No. 6 Date Drilled 1991 Dia. 14" Depth 178' Type Well GWW

Screen ID. 12" Screen Length 40' Depth to Top of Screen 138' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1991	+ 2'	1507	33'	-	43.1
AFTER LAST CLEANING						
AFTER LAST TEST	2010	7'	1500	26.5'	64#	76.9
AT PUMP'S RATED FLOW						
AT SYSTEM OPERATING PSI	2011	7'	1500	26'	65#	78.9

Test Completed Through Meter X Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne Serial No. 114587 Airline Length 70'

Rated Capacity: 1500 GPM 185' TDH Operating Pressure 72#

Total Setting 84' 6" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 1998, 2006

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump Grease Pump

Pump is Presently Developing 1500 **GPM** 176' **TDH** **Projected Curve Capacity** 1500 **GPM** 176' **TDH**

Shut Off Pressure N/A PSI Rated Shut Off Head 261 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 480 V 118 / 115 / 110 Amps 122 @ 460 v Full Load Amps

Location of Power Lines 8' away Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 2' Materials Needed to Clean Well Turn pump or take 12"x 23-1/2" spool out. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? Remarks Meter test. Pump was running before testing.

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By John Kollar Date Inspected September 13, 2011

PEERLESS MIDWEST INC

141896

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 227 ft east of Johnson Road & 955 ft south of Paw Paw Road; 73' West of Well #8 N. 42.20881 / W. 085.90187

Well No. 6 Date Drilled 1991 Dia. 14" Depth 178' Type Well GWW

Screen ID. 12" Screen Length 40' Depth to Top of Screen 138' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1991	+ 2'	1507	33'	-	43.1
AFTER LAST CLEANING						
AFTER LAST TEST	2019	6'	1550	22'	65#	96.9
AT PUMP'S RATED FLOW	2020	5'	1520	22'	72#	89.4
AT SYSTEM OPERATING PSI	2020 (48 Hz.)	5'	815	13'	65#	101.9

Test Completed Through Meter ___ Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required YES

Pump Mfg. Layne Serial No. 114587 Airline Length 70'

Rated Capacity: 1500 GPM 185' TDH Operating Pressure 72#

Total Setting 84' 6" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 1998, 2006

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump ___

Pump is Presently Developing 1520 **GPM** 188' **TDH** **Projected Curve Capacity** 1500 **GPM** 190' **TDH**

Shut Off Pressure - PSI Rated Shut Off Head 261 ft. Calculated Shut Off Head - ft.

Electrical Data (With Pump in Operation): 480 V 77 / 77 / 77 Amps 122 @ 460 v Full Load Amps

Location of Power Lines 8' away Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 2' Materials Needed to Clean Well Turn pump or take 12"x 23-1/2" spool out. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? ___ Remarks

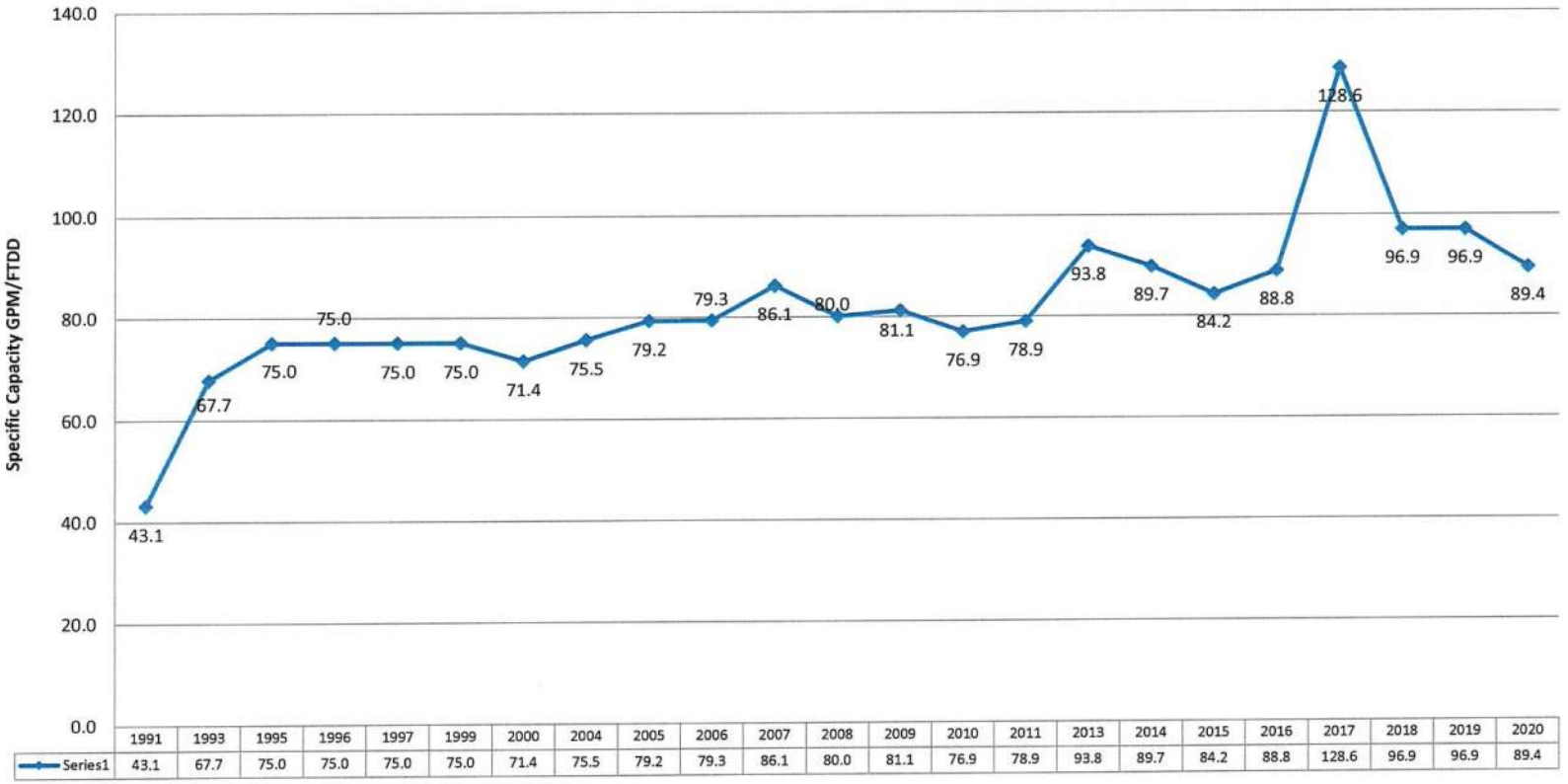
Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By Mike Kline Date Inspected December 3, 2020

Specific Capacity Trend Analysis

Village of Paw Paw
Well #6

PEERLESS MIDWEST INC.



	1991	1993	1995	1996	1997	1999	2000	2004	2005	2006	2007	2008	2009	2010	2011	2013	2014	2015	2016	2017	2018	2019	2020
Series1	43.1	67.7	75.0	75.0	75.0	75.0	71.4	75.5	79.2	79.3	86.1	80.0	81.1	76.9	78.9	93.8	89.7	84.2	88.8	128.6	96.9	96.9	89.4

PEERLESS MIDWEST INC

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 300 ft east of Johnson Road & 950 ft south of Paw Paw Road; 73' East of Well #6 N. 42.20881 / W. 085.90187

Well No. 8 Date Drilled 1992 Dia. 14" Depth 159' 9" Type Well GWW

Screen ID. 12" Screen Length 32' 9" Depth to Top of Screen 127' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1992	+1'	1560	24.25'	-	61.7
AFTER LAST CLEANING						
AFTER LAST TEST	2014	6'	1490	20'	66#	106.4
AT PUMP'S RATED FLOW	2015	7'	1510	21'	64.5#	107.9
AT SYSTEM OPERATING PSI	**2015	7'	950	14.5'	60#	126.7

Test Completed Through Meter X Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne / Floway Serial No. 114588 Airline Length 70'

Rated Capacity: 1500 GPM 199' TDH Operating Pressure 74#

Total Setting 84' 9" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 2007

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump

Pump is Presently Developing 1510 **GPM** 170' **TDH** **Projected Curve Capacity** 1500 **GPM** 172' **TDH**

Shut Off Pressure NDA PSI Rated Shut Off Head 280 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 480 V 124.7 / 126.2 / 124.7 Amps 122 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 13" Materials Needed to Clean Well Turn pump or take out 12"x19-1/2" spool. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? Remarks Meter Test. No Way to Get Shut Off Pressure.

** Test Ran at 48 Hz.

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By Doug Gentry Date Inspected April 8, 2015

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 300 ft east of Johnson Road & 950 ft south of Paw Paw Road; 73' East of Well #6

Well No. 8 Date Drilled 1992 Dia. 14" Depth 159' 9" Type Well GWW

Screen ID. 12" Screen Length 32' 9" Depth to Top of Screen 127' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1992	+1'	1560	24.25'	-	61.7
AFTER LAST CLEANING						
AFTER LAST TEST	2013	6'	1500	21'	69#	100.0
AT PUMP'S RATED FLOW	2014	6'	1490	20'	66#	106.4
AT SYSTEM OPERATING PSI						

Test Completed Through Meter X Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne Serial No. 114588 Airline Length 70'

Rated Capacity: 1500 GPM 199' TDH Operating Pressure 74#

Total Setting 84' 9" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 2007

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump 4 Rings Grease Pump

Pump is Presently Developing 1490 **GPM** 172' **TDH** **Projected Curve Capacity** 1500 **GPM** 170' **TDH**

Shut Off Pressure N/A PSI Rated Shut Off Head 280 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 480 V 101 / 117 / 115 Amps 122 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 13" Materials Needed to Clean Well Turn pump or take out 12"x19-1/2" spool. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? Remarks Meter test.

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By John Kollar Date Inspected April 3, 2014

PEERLESS MIDWEST INC

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 300 ft east of Johnson Road & 950 ft south of Paw Paw Road; 73' East of Well #6

Well No. 8 Date Drilled 1992 Dia. 14" Depth 159' 9" Type Well GWW

Screen ID. 12" Screen Length 32' 9" Depth to Top of Screen 127' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1992	+1'	1560	24.25'	-	61.7
AFTER LAST CLEANING						
AFTER LAST TEST	2011	7.5'	1490	22.5'	67#	99.3
AT PUMP'S RATED FLOW	2013	6'	1500	21'	69#	100.0
AT SYSTEM OPERATING PSI						

Test Completed Through Meter ___ Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne Serial No. 114588 Airline Length 70'

Rated Capacity: 1500 GPM 199' TDH Operating Pressure 74#

Total Setting 84' 9" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 2007

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump ___

Pump is Presently Developing 1500 **GPM** 180' **TDH** **Projected Curve Capacity** 1500 **GPM** 180' **TDH**

Shut Off Pressure N/A PSI Rated Shut Off Head 280 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 480 V 125 / 128 / 133 Amps 122 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 13" Materials Needed to Clean Well Turn pump or take out 12"x19-1/2" spool. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? ___ Remarks

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By Ron Mead Date Inspected March 25, 2013

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 300 ft east of Johnson Road & 950 ft south of Paw Paw Road; 73' East of Well #6

Well No. 8 Date Drilled 1992 Dia. 14" Depth 159' 9" Type Well GWW

Screen ID. 12" Screen Length 32' 9" Depth to Top of Screen 127' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1992	+1'	1560	24.25'	-	61.7
AFTER LAST CLEANING						
AFTER LAST TEST	2010	8'	1500	22'	66#	107.1
AT PUMP'S RATED FLOW						
AT SYSTEM OPERATING PSI	2011	7.5'	1490	22.5'	67#	99.3

Test Completed Through Meter X Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne Serial No. 114588 Airline Length 70'

Rated Capacity: 1500 GPM 199' TDH Operating Pressure 74#

Total Setting 84' 9" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 2007

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump 3 Rings Grease Pump

Pump is Presently Developing 1490 **GPM** 177' **TDH** **Projected Curve Capacity** 1500 **GPM** 174' **TDH**

Shut Off Pressure N/A PSI Rated Shut Off Head 280 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 480 V 116 / 108 / 108 Amps 122 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 13" Materials Needed to Clean Well Turn pump or take out 12"x19-1/2" spool. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? Remarks Meter test.

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By John Kollar Date Inspected September 13, 2011

Peerless Midwest Inc. *Water Supply Contractors*

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574-254-9050 / Fax 574-254-9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 300 ft east of Johnson Road & 950 ft south of Paw Paw Road; 73' East of Well #6

Well No. 8 Date Drilled 1992 Dia. 14" Depth 159' 9" Type Well GWW

Screen ID. 12" Screen Length 32' 9" Depth to Top of Screen 127' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1992	+1'	1560	24.25'		61.7
AFTER LAST CLEANING						
AFTER LAST TEST	2009	8'	1500	23'	71#	100.0
AT PUMP'S RATED FLOW						
AT SYSTEM OPERATING PSI	2010	8'	1500	22'	66#	107.1

Test Completed Through Meter X Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne Serial No. 114588 Airline Length 70'

Rated Capacity: 1500 GPM 199' TDH Operating Pressure 74#

Total Setting 84' 9" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 2007

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump

Pump is Presently Developing 1500 **GPM** 174' **TDH** **Projected Curve Capacity** 1500 **GPM** 174' **TDH**

Shut Off Pressure N/A PSI Rated Shut Off Head 280 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation 480 V 115 / 107 / 107 Amps 122 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 13" Materials Needed to Clean Well Turn pump or take out 12"x19-1/2" spool. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump Remarks Meter test.

Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By J. Kollar Date Inspected August 31, 2010

PEERLESS MIDWEST INC.

141897

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Paw Paw City Paw Paw State MI

Location 300 ft east of Johnson Road & 950 ft south of Paw Paw Road; 73' East of Well #6 N. 42.20881 / W. 085.90187

Well No. 8 Date Drilled 1992 Dia. 14" Depth 159' 9" Type Well GWW

Screen ID. 12" Screen Length 32' 9" Depth to Top of Screen 127' Type Screen SSWW

Dates of Cleaning

Phone 269-657-3169 Cell#269-806-2347 Person to Contact John Small

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1992	+1'	1560	24.25'	-	61.7
AFTER LAST CLEANING						
AFTER LAST TEST	2019	9'	1540	22'	62#	118.5
AT PUMP'S RATED FLOW	2020	7'	1580	22'	70#	105.3
AT SYSTEM OPERATING PSI	2020 (49 Hz.)	7'	965	15'	63#	120.6

Test Completed Through Meter ___ Flange or Thread Size N/A Confined Space Entry? No

Motor HP 100 Make G.E. Volts 460 RPM 1780 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required YES

Pump Mfg. Layne / Floway Serial No. 114588 Airline Length 70'

Rated Capacity: 1500 GPM 199' TDH Operating Pressure 74#

Total Setting 84' 9" Size of Packing 3/8" Date Installed 1992

Dates of Overhaul 2007, 2015 (motor)

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump x Grease Pump ___

Pump is Presently Developing 1580 **GPM** 184' **TDH** **Projected Curve Capacity** 1500 **GPM** 188' **TDH**

Shut Off Pressure - PSI Rated Shut Off Head 280 ft. Calculated Shut Off Head - ft.

Electrical Data (With Pump in Operation): 418/417/418 V 74 / 74 / 74 Amps 122 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 13" Materials Needed to Clean Well Turn pump or take out 12"x19-1/2" spool. Need elbow and (2) hoses to tank. 20' to waste.

Need a Smeal to Raise Pump? Yes Remarks

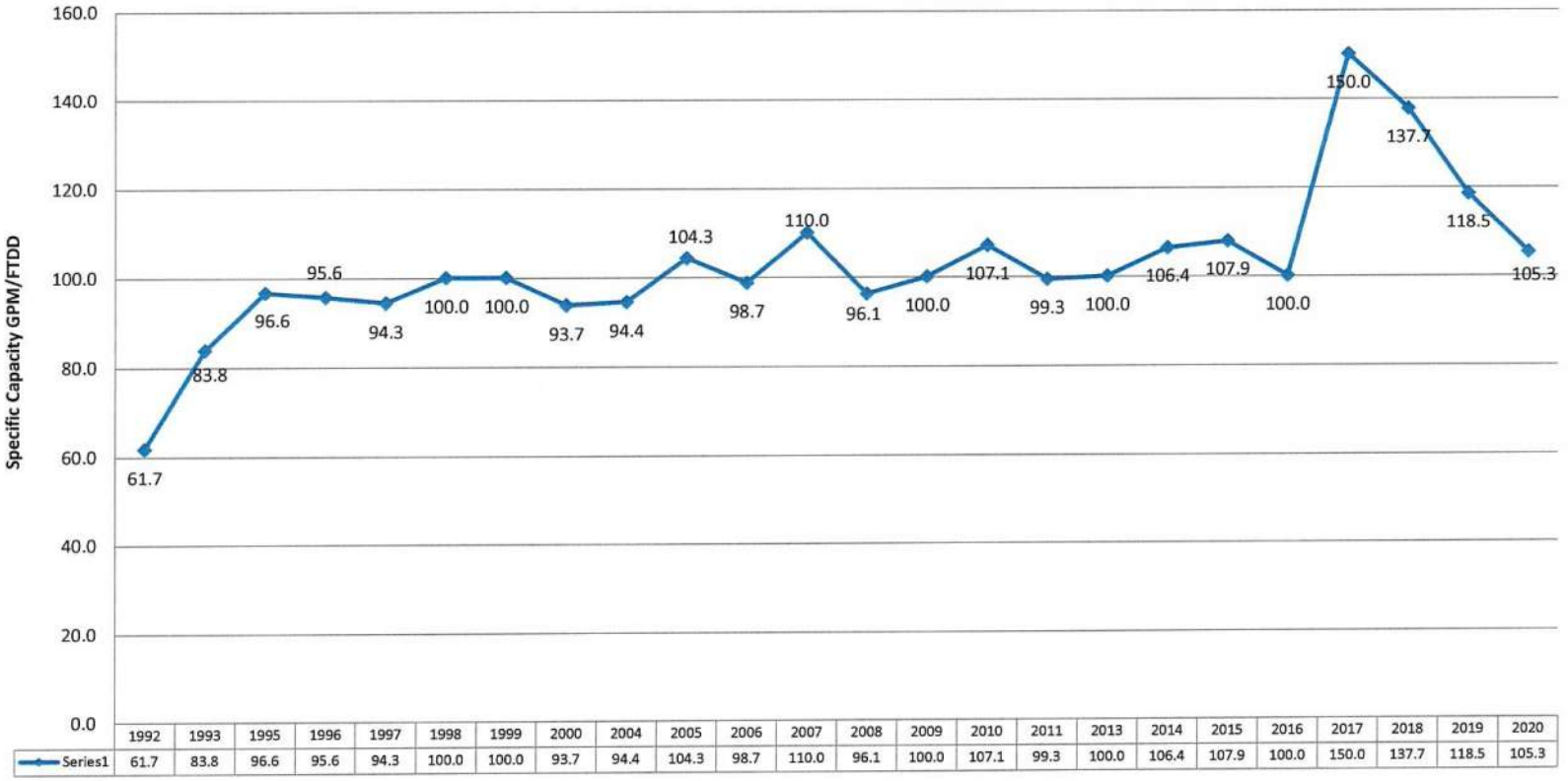
Maintenance: Meter, or 3"APCO, 1-fire hose, have to shut underground valve.

Inspected By Mike Kline Date Inspected December 3, 2020

Specific Capacity Trend Analysis

Village of Paw Paw
Well #8

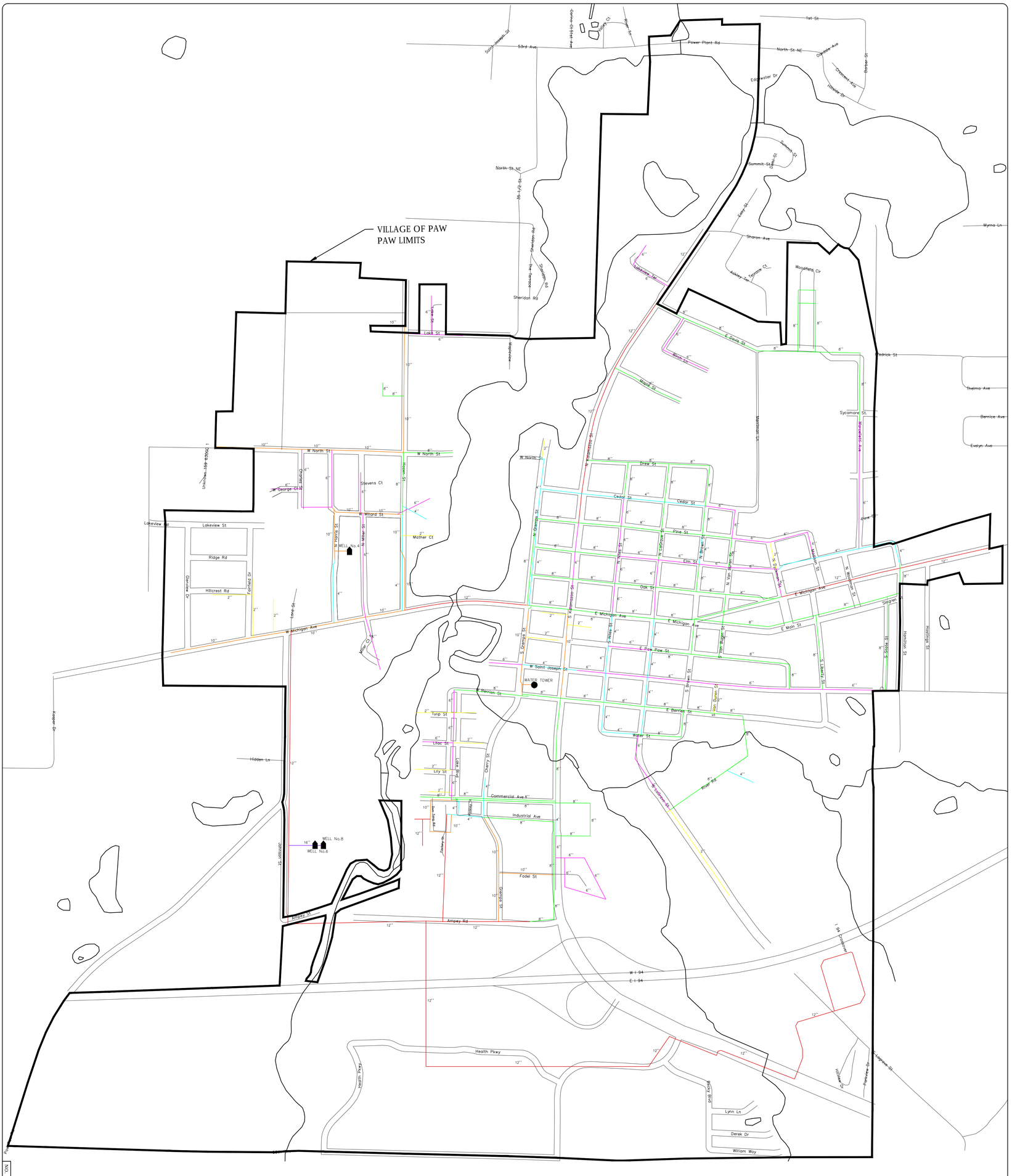
PEERLESS MIDWEST INC.



	1992	1993	1995	1996	1997	1998	1999	2000	2004	2005	2006	2007	2008	2009	2010	2011	2013	2014	2015	2016	2017	2018	2019	2020
Series1	61.7	83.8	96.6	95.6	94.3	100.0	100.0	93.7	94.4	104.3	98.7	110.0	96.1	100.0	107.1	99.3	100.0	106.4	107.9	100.0	150.0	137.7	118.5	105.3

APPENDIX E:

EXISTING MAIN LAYOUT



WATERMAIN LEGEND

- 2" WATER MAIN
- 4" WATER MAIN
- 6" WATER MAIN
- 8" WATER MAIN
- 10" WATER MAIN
- 12" WATER MAIN
- 16" WATER MAIN

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

NO.	REVISION DESCRIPTION:	BY:	DATE:

SHEET NO: 1 of 6

ACT JOB #: 14-0826

SCALE:
HORZ: 1"=500'
VERT: NA

THIS PLAN IS DESIGNED TO BE 24" X 36" WHEN PLOTTED. SCALE(S) INDICATED AND GRAPHICS SHOULD NOT BE ACCURATE FOR ANY OTHER SIZES

SIGNATURE:

DATE:

SEAL:

DATE: DECEMBER 2015

QA/QC REVIEW: CJC
QA/QC REVIEW:

PM REVIEW:

DESIGNED BY:

DRAWN BY: LMV

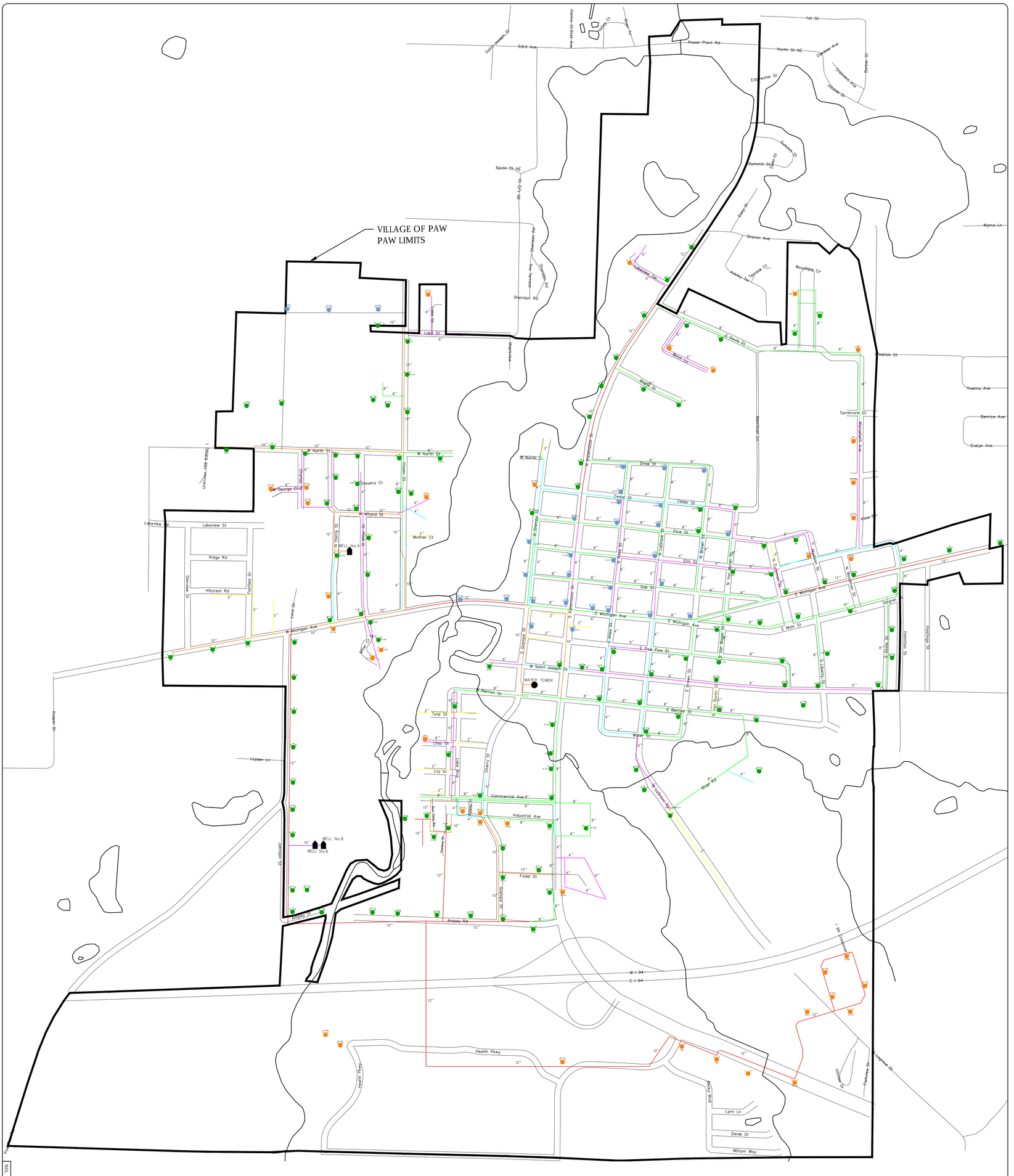
SHEET TITLE:
EXISTING CONDITIONS

PROJECT:
PAW PAW WATER RELIABILITY STUDY

ABONMARCHE
Confidence By Design
95 West Main Street
Benton Harbor, MI. 49023
T 269.927.2295
F 269.927.1017
Manistee, MI
South Haven, MI
South Bend, IN
Portage, IN
Engineering
Architecture
Land Surveying
Marina/Waterfront
Community Planning
Landscape Architecture
Development Services

APPENDIX F:

HYDRANT CLASSIFICATION MAP



WATERMAIN LEGEND

- 2" WATER MAIN
- 4" WATER MAIN
- 6" WATER MAIN
- 8" WATER MAIN
- 10" WATER MAIN
- 12" WATER MAIN
- 16" WATER MAIN

HYDRANT LEGEND

- CLASS AA (1500 GPM OR MORE)
- CLASS A (1000 – 1499 GPM)
- CLASS B (500 – 999 GPM)
- CLASS C (LESS THAN 499 GPM)

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

NO.	REVISION DESCRIPTION:	BY:	DATE:

SHEET TITLE:

HYDRANT CLASSIFICATIONS

PROJECT:

PAW PAW WATER RELIABILITY STUDY

DRAWN BY: LMV
DESIGNED BY:
PM REVIEW: CJC
QA/QC REVIEW: QA-QC
DATE: DECEMBER 2015
SEAL:

SCALE: HORZ: 1"=500'
VERT: NA
JOB/FOB #: 14-0826
SHEET NO: 2 of 6

THIS PLOT IS TO BE SCALED TO 24" X 36" WHEN PLOTTED. SCALE(S) INDICATED AND GRAPHICAL QUANTITIES MAY NOT BE ACCURATE FOR ANY OTHER SIZES

SIGNATURE:

DATE:

ABONMARCHE
Confidence By Design
95 West Main Street
Benton Harbor, MI. 49023
T 269.927.2295
F 269.927.1017
Manistee, MI
South Haven, MI
South Bend, IN
Portage, IN
Engineering
Architecture
Land Surveying
Marina/Waterfront
Community Planning
Landscape Architecture
Development Services

APPENDIX G:

WATER QUALITY REPORTS

VILLAGE OF PAW PAW
WATER QUALITY REPORT-2010

The Village of Paw Paw strives to produce the best quality drinking water possible. The purpose of this report is to provide you with information about your drinking water. The report explains to you where your water comes from and the treatment it receives before it reaches your tap. The report also lists all of the contaminants detected in your water and an explanation of all violations in the past year.

The bottom line is the Village of Paw Paw's water supply is safe. This report is emailed to area media outlets such as the daily and weekly newspapers, radio stations and television stations servicing the area. It is also mailed to the County Health Department. Please take time to review the report. Copies are available at Village Hall. The report is also posted on the Village's Website, www.pawpaw.net (click on the left hand menu item titled Public Services and then click on the item titled "Consumer Confidence Report 2011". This report is not being mailed to all water customers.

Your drinking water comes from 3 wells located on the west side of the Village. Well #4 is located on Miller Street and is on stand-by status. It is 110' deep and pumps 750 gallons per minute. Well #6 and #8 operate daily and are located on Johnson Road. Well #6 is 178' deep and Well #8 is 160' deep. Both Wells pump about 1,500 gallons per minute. The water is pumped from the ground by the wells, then chlorine and phosphate are added for disinfection and corrosion control, respectively. The water then goes to a 500,000 gallon water tower located across from the Department of Public Service Building. We are making efforts to protect our well water supply by completing a Wellhead Protection Program which was started in 1996.

The State performed an assessment of our source water in 2003 to determine the susceptibility or the relative potential of contamination. The susceptibility rating is on a six-tiered scale from "very-low" to "high" based on geologic sensitivity, water chemistry and contaminant sources. The Susceptibility of Wells #6 and #8 is "Moderate". The susceptibility of Well #4 is also "Moderate". A copy of the full report can be obtained by contacting John Small, Department of Public Services Director, 110 Harry L. Bush Blvd, Paw Paw, Michigan, 49079.

The sources of drinking water, both tap water and bottled water, including rivers, lakes, streams, ponds, reservoirs, springs, and wells may contain contaminants. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about the contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general populations. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of the infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline 1-800-426-4791.

The Paw Paw water supply comes from groundwater. As water travels through the ground, it dissolves naturally occurring minerals and can pick up substances from the presence of animals or from human activity. These include:

- **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, livestock, and wildlife.

- **Inorganic contaminants**, such as salts and metals, which can be natural or may result from storm runoff, wastewater discharges, oil and gas production and farming

- **Organic chemicals**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also originate from gas stations, storm runoff and septic systems.

- **Radioactive substances**, which can be naturally occurring or be the result of oil and gas production and mining activities.

- **Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban runoff, and residential uses.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with the service lines and home plumbing. The Village of Paw Paw is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about the lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http;//www.epa.gov/safewater/lead.

In order to ensure that tap water is safe, the U.S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in the water provided by public water systems.

If you would like more information about your water, or a copy of this Consumer Confidence Report, please contact the Village of Paw Paw Department of Public Service Director John Small at 657-3169, located at 110 Harry L. Bush Blvd. Individual copies of this report are not being mailed without request. Also, you may contact the Village of Paw Paw Council, which meets the second and fourth Monday of every month at 7:30 p.m. at Village Hall, 111 West Michigan Avenue.

The table below lists all the drinking water contaminants that were detected. The detected concentration can be either below or above the state/federal safe drinking water standard (also known as the Maximum Contaminant Level). If the detected concentration is above the safe drinking water standard a violation has occurred and a "**YES**" in bold will be indicated in the violation column. EPA requires water suppliers to report the most recent sampling results within a five-year period from 2007 to 2011. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year.

WATER QUALITY DATA

Terms and Abbreviations used below:

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

N/A: not applicable

ND: not detectable at testing limit

ppb: parts per billion per liter

ppm: parts per million per liter

pCi/l: picocuries per liter (a measure of radiation)

Action Level: the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Regulated Contaminants

Inorganic Contaminants	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Arsenic(ppb)	10*	0	3.0	2.0 – 3.0	3/9/2010 6/23/2010	No	Erosion of natural deposits
Barium (ppm)	2	2	0.257	.145 -.350	3/9/2010 6/23/2010	No	Erosion of natural deposits
Fluoride (ppm)	4	4	.17	.17	6/23/2010	No	Erosion of natural deposits
Radionuclides							
Combined Radium-226 & 228(pCi/l)	5	0	1.2	N/A	6/11/2001	No	Erosion of natural deposits

Distribution Monitoring

	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Total Trihalomethanes (ppb)	80	NA	3.7	NA	6/23/2010	No	Byproduct of water Chlorination
Lead and Copper	**AL**	**MCLG**	**Village of Paw Paw Water**	**No. of sites exceeding AL****			
Copper (ppm)	1.3	1.3	90 percentile***	0	6/24/2009	No	Corrosion of household plumbing Systems
Lead (ppb)	15	0	<2	0	6/24/2009	No	Corrosion of household plumbing Systems

Special Monitoring

Sodium(mg/L)	N/A	N/A	15.5	13.5-18.5	6-23-2010

1. The Village of Paw Paw's Drinking Water System was analyzed for at least 80 other contaminants; all analyses showed no detection.

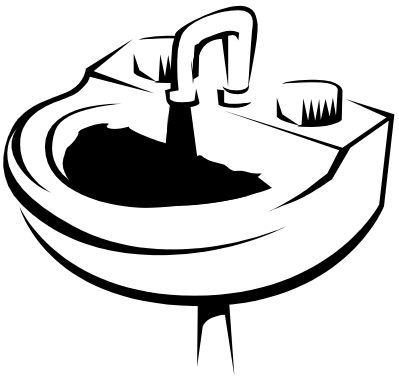
* These arsenic values are effective January 23, 2006. Until then the MCL is 50 PPB and there is no MCLG.

** Lead/copper samples were collected from ten sampling sites and none exceeded the lead/copper action level.

***90 percent of the samples do not exceed this level.

Supplemental Information on the
Quality of Tap Water Provided by the Village of Paw Paw

How Could I Have Used That Much Water?



The biggest complaint we hear from customers is that they think their water bill is too high. We explain how the meter works – that water only goes through the meter when something (a faucet, the toilet, a water softener, etc.) in the house or business asks for more water. It is impossible for water to pass through a meter unless something in the house asks for water. This could be someone turning on a faucet, taking a bath or flushing a toilet. It could also be a water softener recycling, leak or a break in some water line! You may want to carefully check all faucets, toilets, and anything that has water pipes connected to it. Most often people come back or call back to say they found the leak. Most often it is a toilet that was running silently!

Not all leaking faucets or toilets, breaks or water softener recycling makes noise. We advise customers to put a drop of food coloring in their toilet tank at night before they go to bed. If there is no color in their tank in the morning (or a lighter color) and they did not flush the toilet over night, then the toilet leaks a little and money is going down the drain. We also advise people to look at their meter and write down the numbers on the meter. Then don't use any water for at least 6 hours and then look at the numbers again. If they are different, there is a leak somewhere.

Leaks are very costly!

People are also amazed that even a small leak can be so costly. They forget leaks can run 24 hours a day, seven days a week. Toilets, however, can 'stick' only occasionally, which requires you check them more frequently. Repair leaks promptly.

Money down the drain and you pay twice!

That's what happens when you don't fix a leak right away – it is money down the drain, twice. You pay for the water and you pay for the sewer charge. Sewer is billed on the amount of water that goes in, so it is expensive and you can help yourself by fixing leaks quickly.

- A leak as small as 1/32" wastes 170 gallons every 24 hours.
- A leak 1/16 of inch in diameter wastes 600 gallons every 24 hours
- A leak 1/8' in diameter wastes 2,500 gallons every 24 hours.

Troubleshooting Common Water Complaints

WATER SMELLING LIKE SULFUR OR ROTTEN EGGS?

Sulfur smells come from the iron in the water. Iron is a natural thing to find in water that comes from ground wells. As the iron collects in pipes, it will give off a sulfur smell. Iron especially builds up in hot water heaters and in seldom-used water lines. Letting water run through seldom used water lines will prevent the sulfur smells that come from the iron build up. Your water heater should be cleaned and drained at least once a year. Over time, water heaters collect particles of iron sediment from the water. Overtime, as the sediment settles to the bottom of your water heater it gives off smells that comes out when you turn on your hot water faucets or use hot water in your laundry wash. To fix this…

1) Turn off the water supply to the water heater.
2) If it is a gas water heater, turn off the gas to the heater. If it is an electric heater, turn off the breaker or unscrew the fuse that works the water heater.
3) Open the spigot on the bottom of the water heater and drain the heater completely. To do this you may want to connect a hose to the spigot and run it to your sump pump, floor drain or into a bucket. You'll want a bucket that you can dump out during this process.
4) Drain the water heater.
5) Once it has drained, turn the water supply back on and let it wash the iron particles (sediment) out of your water heater. Let it run this way for about 15 minutes or until no more particles is being washed out the spigot.
6) If it doesn't drain, that is a real problem. You probably need a new water heater. Call a plumber.

How do I know if it is my water heater that is causing the smell?

Simple, run the cold and the hot water separately and smell each. If you only smell the sulfur smell when the hot water is turned on, it's the water heater.

How Does My Water Heater Cause Smells?

It is relatively common to have this rotten egg odor in hot water only. That is because the water heater's "sacrificial" anode rod is to blame. This rod, made of magnesium, helps protect the tank lining from corrosion; instead, the rod itself corrodes. Unfortunately, as it does, the magnesium gives off electrons that nourish sulfate reducing bacteria – the bacteria that eats up the iron particles and in the process releases the sulfur smell. Removing this rod may eliminate the problem. Some have found aluminum rods can be installed with success.

Temperature is Important

Once you get the sulfate-reducing bacteria in your water heater you will want to get them out. Even if you drain your water heater, change the anode you'll still have the bacteria. But, there is an easy way to kill them off. To eliminate sulfate-reducing bacteria from the water heater, you need to raise the water temperature above 140 degrees for 8 hours. Bacteria die out at temperatures above 140 degrees. To safely follow this procedure, first make sure your water heater has a functioning temperature and pressure relief valve. Also, to prevent accidental scalding, warn users that water will come out of faucets extremely hot and should not be used at the increased temperature.

How do we know if it is because the line is seldom used?

Go to the faucet you use the most and turn the cold and hot water on separately. If you don't smell the sulfur from this faucet, it means the ones you do smell it from are seldom used and the smells build up in this line. Also, if the smell goes away, the smell is because the water line is seldom used and the smells build up in that line and are released when you do turn the water on.

WHAT IF THE WATER SMELLS OF CHLORINE

There are two reasons for chlorine smells in water lines. One, it is common in seldom used lines. Thus, you may notice more smells with water lines that you don't use very often. Second, it is from the chlorine we add to the water supply.

First, Chlorine and sulfur collect in little used lines and dead-end lines. When these lines are used, you may smell chlorine or sulfur. If this is the case, briefly turn these lines on more frequently.

Secondly, this may be caused by the injection of chlorine in the water main at each well. Chlorine helps purify the water. When we turn a well on, chlorine is injected into the water. Customers a short distance from the well may smell the burst of the chlorine. Customers further away may not notice this smell as the injection disperses better over distance.

WHAT IF IT IS BROWN OR RUSTY WATER?

While brown and rusty looking water is safe, it just isn't appealing, tasty or good for washing clothes. Sometimes, this is a problem caused by the water system (run by the Village). Sometimes it may mean a problem in your home system (from the shut-off valve to faucets).

It may mean that we have been working on a water line, flushing hydrants, or that the fire department fought a fire and opened a hydrant. All of these actions can rapidly change the pressure in the line or the direction of the water in the line. This loosens particles of iron that collect on the walls of the water lines. They break loose and flow into the line going into your home.

When a waterline breaks and we work to fix the line we bang on the waterline. This loosens the particles of iron that then flow into your home.

Older pipes in your home will build up with particles too. Banging or working on your pipes will also cause discolored water. Changing temperatures cause pipes to expand or shrink. This process loosens up the particles and you'll get brown / rusty water. If an indoor water line runs by a window or an exterior wall the pipe and the water in it may get really cold, almost freeze, or actually freeze. This causes the water in the pipe to expand. This puts pressure on the pipe. This expansion loosens the particles that have collected on the walls of the pipe. Then, when you turn on the water, you get a brown or rusty colored water.

COST: VILLAGE WATER VS. BOTTLED WATER

We know money doesn't grow on trees in our yard or in your yard. We monitor our rates closely. We compare our rates with other ground-water supplied municipal systems. We are not the highest and we are not the lowest. Our rates are in the middle of the pack. Residents pay two fees. One is what we call the "Ready-to-Serve" fee (RTS). This RTS fee covers all our expenses for the ground wells that pump water out of the ground, the storage tank (water tower) that keeps the pressure in the water lines so when

you turn on a faucet water comes out, and the delivery of the water to your home (water mains, hydrants, valves, etc). As of July 2008, costs residents $13.65 per month. The second cost is what we call the "Consumption" fee. This consumption fee covers the cost for treating the water once it comes out of the ground, reading meters, billing and such.

In June 2010, the consumption cost is just $1.49 for 1,000 gallons of water.

The American Water Association estimates that the typical family of four (two parents and two children) uses 180 gallons a day or 5,400 gallons a month. In this case, this typical person would pay the $13.65 for the RTS fee and $8.05 for the amount of water; a total of $21.70 for the month.

How Does This Compare To Bottled Water?

Our water is really cheap compared to bottled water you buy at a store. Let's assume you can buy a 16.9 ounce bottle of water in Paw Paw for $0.99. Since a gallon is 128 ounces, you would need to but 7.57 bottles to equal a gallon of water. This would cost you $7.49. Two gallons of bottled water - roughly 15 bottles - would cost you $14.98.

For $15.14 you get 1,000 gallons from the Village. This is the monthly RTS fee ($13.65) and the Consumption fee ($1.49) added together.

- **Bottled water is 500 times more expensive than Village water!**
- **To buy 1,000 gallons in bottled water, you would need to purchase 7,570 bottles - 315.41 cases of bottled water. This would cost you a grand total of $7,494.30.**

READING YOUR METER

We read your bill each month weather permitting. When we need to estimate your bill you will see an ' E ' on the bill. Sometimes the snow is too deep to get to pit meters and we have to estimate your bill.

READY-TO-SERVE FEE

Residential customers in the Village are charged $9.00 (more for those out of the Village and more for those with larger meters) a month as a ' Ready-to-Serve' fee. This amount is for the 'infrastructure' - the wells, the meters, the pumps, all the water testing equipment, and the waterlines, etc. - needed so the Village can bring water to your home or business. This fee is used, in part, to make repairs or replace any part of the infrastructure.

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VILLAGE OF PAW PAW
WATER QUALITY REPORT-2011

The Village of Paw Paw strives to produce the best quality drinking water possible. The purpose of this report is to provide you with information about your drinking water. The report explains to you where your water comes from and the treatment it receives before it reaches your tap. The report also lists all of the contaminants detected in your water and an explanation of all violations in the past year.

The bottom line is the Village of Paw Paw's water supply is safe. This report is emailed to area media outlets such as the daily and weekly newspapers, radio stations and television stations servicing the area. It is also mailed to the County Health Department. Please take time to review the report. Copies are available at Village Hall. The report is also posted on the Village's Website, www.pawpaw.net (click on the left hand menu item titled Public Services and then click on the item titled "Consumer Confidence Report 2011". This report is not being mailed to all water customers.

Your drinking water comes from 3 wells located on the west side of the Village. Well #4 is located on Miller Street and is on stand-by status. It is 110' deep and pumps 750 gallons per minute. Well #6 and #8 operate daily and are located on Johnson Road. Well #6 is 178' deep and Well #8 is 160' deep. Both Wells pump about 1,500 gallons per minute. The water is pumped from the ground by the wells, then chlorine and phosphate are added for disinfection and corrosion control, respectively. The water then goes to a 500,000 gallon water tower located across from the Department of Public Service Building. We are making efforts to protect our well water supply by completing a Wellhead Protection Program which was started in 1996.

The State performed an assessment of our source water in 2003 to determine the susceptibility or the relative potential of contamination. The susceptibility rating is on a six-tiered scale from "very-low" to "high" based on geologic sensitivity, water chemistry and contaminant sources. The Susceptibility of Wells #6 and #8 is "Moderate". The susceptibility of Well #4 is also "Moderate". A copy of the full report can be obtained by contacting John Small, Department of Public Services Director, 110 Harry L. Bush Blvd, Paw Paw, Michigan, 49079.

The sources of drinking water, both tap water and bottled water, including rivers, lakes, streams, ponds, reservoirs, springs, and wells may contain contaminants. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about the contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general populations. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of the infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline 1-800-426-4791.

The Paw Paw water supply comes from groundwater. As water travels through the ground, it dissolves naturally occurring minerals and can pick up substances from the presence of animals or from human activity. These include:

- **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, livestock, and wildlife.

- **Inorganic contaminants**, such as salts and metals, which can be natural or may result from storm runoff, wastewater discharges, oil and gas production and farming

- **Organic chemicals**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also originate from gas stations, storm runoff and septic systems.

- **Radioactive substances**, which can be naturally occurring or be the result of oil and gas production and mining activities.

- **Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban runoff, and residential uses.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with the service lines and home plumbing. The Village of Paw Paw is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about the lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http;//www.epa.gov/safewater/lead.

In order to ensure that tap water is safe, the U.S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in the water provided by public water systems.

If you would like more information about your water, or a copy of this Consumer Confidence Report, please contact the Village of Paw Paw Department of Public Service Director John Small at 657-3169, located at 110 Harry L. Bush Blvd. Individual copies of this report are not being mailed without request. Also, you may contact the Village of Paw Paw Council, which meets the second and fourth Monday of every month at 7:30 p.m. at Village Hall, 111 West Michigan Avenue.

The table below lists all the drinking water contaminants that were detected. The detected concentration can be either below or above the state/federal safe drinking water standard (also known as the Maximum Contaminant Level). If the detected concentration is above the safe drinking water standard a violation has occurred and a "**YES**" in bold will be indicated in the violation column. EPA requires water suppliers to report the most recent sampling results within a five-year period from 2007 to 2011. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year.

WATER QUALITY DATA

Terms and Abbreviations used below:

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

N/A: not applicable

ND: not detectable at testing limit

ppb: parts per billion per liter

ppm: parts per million per liter

pCi/l: picocuries per liter (a measure of radiation)

Action Level: the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Regulated Contaminants

Inorganic Contaminants	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Arsenic(ppb)	10	0	7.0	4.0 – 7.0	3/8/2011 6/23/2011 8-25-2011	No	Erosion of natural deposits
Barium (ppm)	2	2	0.337	.149 -.337	3/8/2011 6/23/2011 8-25-2011	No	Erosion of natural deposits
Fluoride (ppm)	4	4	Not Detected	Not Detected	8/25/2011	No	Erosion of natural deposits
Radionuclides							
Combined Radium-226 & 228(pCi/l)	5	0	1.12	N/A	8/25/2011	No	Erosion of natural deposits

Distribution Monitoring

	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Total Trihalomethanes (ppb)	80	NA	3.7	NA	6/23/2010	No	Byproduct of water Chlorination
Lead and Copper	**AL**	**MCLG**	**Village of Paw Paw Water**	**No. of sites exceeding AL***			
Copper (ppm)	1.3	1.3	90 percentile**	0	6/24/2009	No	Corrosion of household plumbing Systems
Lead (ppb)	15	0	<2	0	6/24/2009	No	Corrosion of household plumbing Systems

Special Monitoring

Sodium(mg/L)	N/A	N/A	14.3	12.7-14.3	8-25-2011		

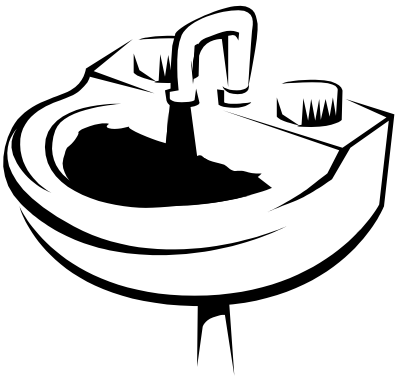
1. The Village of Paw Paw's Drinking Water System was analyzed for at least 80 other contaminants; all analyses showed no detection.

* Lead/copper samples were collected from ten sampling sites and none exceeded the lead/copper action level.

**90 percent of the samples do not exceed this level.

Supplemental Information on the
Quality of Tap Water Provided by the Village of Paw Paw

How Could I Have Used That Much Water?



The biggest complaint we hear from customers is that they think their water bill is too high. We explain how the meter works – that water only goes through the meter when something (a faucet, the toilet, a water softener, etc.) in the house or business asks for more water. It is impossible for water to pass through a meter unless something in the house asks for water. This could be someone turning on a faucet, taking a bath or flushing a toilet. It could also be a water softener recycling, leak or a break in some water line! You may want to carefully check all faucets, toilets, and anything that has water pipes connected to it. Most often people come back or call back to say they found the leak. Most often it is a toilet that was running silently!

Not all leaking faucets or toilets, breaks or water softener recycling makes noise. We advise customers to put a drop of food coloring in their toilet tank at night before they go to bed. If there is no color in their tank in the morning (or a lighter color) and they did not flush the toilet over night, then the toilet leaks a little and money is going down the drain. We also advise people to look at their meter and write down the numbers on the meter. Then don't use any water for at least 6 hours and then look at the numbers again. If they are different, there is a leak somewhere.

Leaks are very costly!

People are also amazed that even a small leak can be so costly. They forget leaks can run 24 hours a day, seven days a week. Toilets, however, can 'stick' only occasionally, which requires you check them more frequently. Repair leaks promptly.

Money down the drain and you pay twice!

That's what happens when you don't fix a leak right away – it is money down the drain, twice. You pay for the water and you pay for the sewer charge. Sewer is billed on the amount of water that goes in, so it is expensive and you can help yourself by fixing leaks quickly.

- A leak as small as 1/32" wastes 170 gallons every 24 hours.
- A leak 1/16 of inch in diameter wastes 600 gallons every 24 hours
- A leak 1/8' in diameter wastes 2,500 gallons every 24 hours.

Troubleshooting Common Water Complaints

WATER SMELLING LIKE SULFUR OR ROTTEN EGGS?

Sulfur smells come from the iron in the water. Iron is a natural thing to find in water that comes from ground wells. As the iron collects in pipes, it will give off a sulfur smell. Iron especially builds up in hot water heaters and in seldom-used water lines. Letting water run through seldom used water lines will prevent the sulfur smells that come from the iron build up. Your water heater should be cleaned and drained at least once a year. Over time, water heaters collect particles of iron sediment from the water. Overtime, as the sediment settles to the bottom of your water heater it gives off smells that comes out when you turn on your hot water faucets or use hot water in your laundry wash. To fix this…

1) Turn off the water supply to the water heater.
2) If it is a gas water heater, turn off the gas to the heater. If it is an electric heater, turn off the breaker or unscrew the fuse that works the water heater.
3) Open the spigot on the bottom of the water heater and drain the heater completely. To do this you may want to connect a hose to the spigot and run it to your sump pump, floor drain or into a bucket. You'll want a bucket that you can dump out during this process.
4) Drain the water heater.
5) Once it has drained, turn the water supply back on and let it wash the iron particles (sediment) out of your water heater. Let it run this way for about 15 minutes or until no more particles is being washed out the spigot.
6) If it doesn't drain, that is a real problem. You probably need a new water heater. Call a plumber.

How do I know if it is my water heater that is causing the smell?

Simple, run the cold and the hot water separately and smell each. If you only smell the sulfur smell when the hot water is turned on, it's the water heater.

How Does My Water Heater Cause Smells?

It is relatively common to have this rotten egg odor in hot water only. That is because the water heater's "sacrificial" anode rod is to blame. This rod, made of magnesium, helps protect the tank lining from corrosion; instead, the rod itself corrodes. Unfortunately, as it does, the magnesium gives off electrons that nourish sulfate reducing bacteria – the bacteria that eats up the iron particles and in the process releases the sulfur smell. Removing this rod may eliminate the problem. Some have found aluminum rods can be installed with success.

Temperature is Important

Once you get the sulfate-reducing bacteria in your water heater you will want to get them out. Even if you drain your water heater, change the anode you'll still have the bacteria. But, there is an easy way to kill them off. To eliminate sulfate-reducing bacteria from the water heater, you need to raise the water temperature above 140 degrees for 8 hours. Bacteria die out at temperatures above 140 degrees. To safely follow this procedure, first make sure your water heater has a functioning temperature and pressure

relief valve. Also, to prevent accidental scalding, warn users that water will come out of faucets extremely hot and should not be used at the increased temperature.

How do we know if it is because the line is seldom used?

Go to the faucet you use the most and turn the cold and hot water on separately. If you don't smell the sulfur from this faucet, it means the ones you do smell it from are seldom used and the smells build up in this line. Also, if the smell goes away, the smell is because the water line is seldom used and the smells build up in that line and are released when you do turn the water on.

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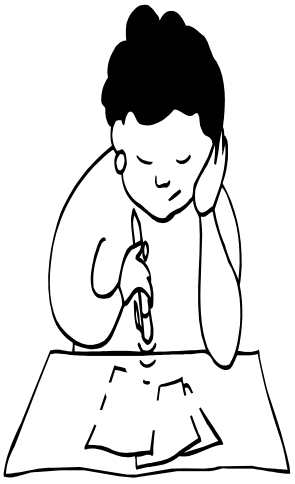

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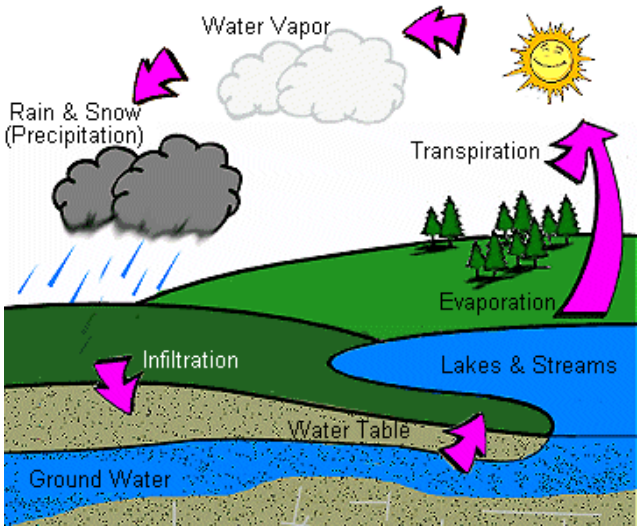

- ☐ **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, livestock, and wildlife.
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The Village sampled ten sites in 2012 for lead and copper. The number of sites required was twenty. Due to this sampling number violation, the Village is required to sample 20 sites for lead and copper in 2013.

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ppm: parts per million per liter

pCi/l: picocuries per liter (a measure of radiation)

Action Level: the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Regulated Contaminants

Inorganic Contaminants	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Arsenic(ppb)	10	0	6.0	3.0 – 6.0	3/20/2012 6/12/2012 12/4/2012	No	Erosion of natural deposits
Barium (ppm)	2	2	0.337	.156 -.337	3/20/2012 6/12/2012 12/4/2012	No	Erosion of natural deposits
Fluoride (ppm)	4	4	.16	.07-.16	8/21/2012	No	Erosion of natural deposits
Radionuclides							
Combined Radium-226 & 228(pCi/l)	5	0	1.12	N/A	8/25/2011	No	Erosion of natural deposits

Distribution Monitoring

	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Total Trihalomethanes (ppb)	80	NA	3.7	NA	6/23/2010	No	Byproduct of water Chlorination
Lead and Copper	**AL**	**MCLG**	**Village of Paw Paw Water**	**No. of sites exceeding AL***			
Copper (ppm)	1.3	1.3	90 percentile**	0	9/11/2012	No	Corrosion of household plumbing Systems
Lead (ppb)	15	0	<0.003	0	9/11/2012	No	Corrosion of household plumbing Systems
Special Monitoring							
Sodium(mg/L)	N/A	N/A	14.5	14.3-14.5	8/21/2012		

1. The Village of Paw Paw's Drinking Water System was analyzed for at least 80 other contaminants; all analyses showed no detection.

* Lead/copper samples were collected from ten sampling sites and none exceeded the lead/copper action level.

**90 percent of the samples do not exceed this level.

Supplemental Information on the
Quality of Tap Water Provided by the Village of Paw Paw
Troubleshooting Common Water Complaints

HOW COULD I HAVE USED THAT MUCH WATER?

The biggest complaint we hear from customers is that they think their water bill is too high. We explain how the meter works – that water only goes through the meter when something (a faucet, the toilet, a water softener, etc.) in the house or business asks for more water. It is impossible for water to pass through a meter unless something in the house asks for water. This could be someone turning on a faucet, taking a bath or flushing a toilet. It could also be a water softener recycling, leak or a break in some water line! You may want to carefully check all faucets, toilets, and anything that has water pipes connected to it. Most often people come back or call back to say they found the leak. Most often it is a toilet that was running silently!

Not all leaking faucets or toilets, cracked waterlines, or water softener recycling makes noise. We advise customers to put a drop of food coloring in their toilet tank at night before they go to bed. If they did not use the toilet during the night and there is no color in their tank in the morning (or a lighter color), then the toilet leaks. That is money down the drain. We also advise people to look at their meter and write down the numbers on the meter. Then don't use any water for at least 6 hours and then look at the numbers again. If they are different, there is a leak somewhere.

Leaks are very costly!
People are also amazed that even a small leak can be so costly. They forget leaks can run 24 hours a day, seven days a week. Toilets, however, can 'stick' only occasionally, which requires you check them more frequently. Repair leaks promptly.

Money down the drain and you pay twice!
That's what happens when you don't fix a leak right away – it is money down the drain… twice! You pay for the water and you pay for the sewer charge. Sewer is billed on the amount of water that goes in, so leaks are doubly expensive. You can help yourself by fixing leaks quickly.

- A leak as small as 1/32" wastes 170 gallons every 24 hours.
- A leak 1/16 of inch in diameter wastes 600 gallons every 24 hours
- A leak 1/8' in diameter wastes 2,500 gallons every 24 hours.

MY WATER SMELLS LIKE SULFUR OR ROTTEN EGGS! WHY?

There are a couple of reasons this may happen. But, be assured it is not because the Village of Paw Paw water is bad. Read on to learn why this happens.

Sulfur smells come from the iron in the water. Iron is a natural element in water; especially water that comes from ground wells as Paw Paw's does. As the iron collects in pipes, it starts to break down. When it does, it will give off a sulfur smell. Iron especially builds up in hot water heaters and in seldom-used water lines.

How do we know if it is because the water line is seldom used?
Go to the faucet you use the most and turn the cold and hot water on separately. If you don't smell the sulfur from this faucet, it means the ones you do smell it from are used less frequently and the smells build up in this line. Also, if the smell goes away, the smell is because the water line is seldom used

and the smells build up in that line and are released when you do turn the water on. Letting water run through seldom used water lines will prevent the sulfur smells that come from the iron build up.

How do we know if it is because of the water heater?

When was the last time you drained it? Your water heater should be cleaned and drained at least once a year. Here's why. Over time, water heaters collect particles of iron sediment from the water. There are two ways for sulfur/rotten-egg smells to happen. First, overtime, as the sediment settles to the bottom of your water heater they break down and give off sulfur smells. Please read 'How does my water heater cause smells?' below for the second way. These smells then come out when you turn on your hot water faucets or use hot water in your laundry wash. To fix this problem, try this…

1) Turn off the water supply to the water heater.

2) If it is a gas water heater, turn off the gas to the heater. If it is an electric heater, turn off the breaker or unscrew the fuse that works the water heater.

3) Open the spigot on the bottom of the water heater and drain the heater completely. To do n this you may want to connect a hose to the spigot and run it to your sump pump, floor drain or into a bucket. You'll want a bucket that you can dump out during this process.

4) Drain the water heater.

5) Once it has drained, turn the water supply back on and let it wash the iron particles (sediment) out of your water heater. Let it run this way for about 15 minutes or until no more particles is being washed out the spigot.

6) If it doesn't drain, that is a real problem. You probably need a new water heater. Call a plumber.

How Do I Know if it is My Water Heater That is Causing the Smell?

Simple, run some cold water in one place and some hot water in another room, smelling each. If you only smell the sulfur/rotten-egg smell in the room in which the hot water is running, it's the water heater.

How Does My Water Heater Cause Smells?

It is relatively common to have this sulfur/rotten-egg odor in hot water only. That is because the water heater's "sacrificial" anode rod is to blame. This rod, made of magnesium, helps protect the tank lining from corrosion; instead, the rod itself corrodes. Unfortunately, as it does, the magnesium gives off electrons that nourish sulfate reducing bacteria – the bacteria that eats up the iron particles and in the process releases the sulfur smell. Removing this rod may eliminate the problem. Some have found aluminum rods can be installed with success. But, draining the water heater regularly is the easiest way to help get rid of the sulfur/rotten-egg smell.

Sulfate-reducing Bacteria! How do I get rid of that?

Once you get the sulfate-reducing bacteria in your water heater you will want to get them out. Even if you drain your water heater, change the anode you'll still have the bacteria. But, there is an easy way to kill them off. To eliminate sulfate-reducing bacteria from the water heater, you need to raise the water temperature above 140 degrees for 8 hours. Bacteria die out at temperatures above 140 degrees. To safely follow this procedure, first make sure your water heater has a functioning temperature and pressure relief valve. Also, to prevent accidental scalding, warn users that water will come out of faucets extremely hot and should not be used at the increased temperature.

WHAT IF THE WATER SMELLS OF CHLORINE

There are two reasons for chlorine smells in water lines. One, it is common in seldom used lines. Thus, you may notice more smells with water lines that you don't use very often. Second, it is from the chlorine we add to the water supply.

First, Chlorine and sulfur collect in little used lines and dead-end lines. When these lines are used, you may smell chlorine (or sulfur, remember?). If this is the case, briefly turn these lines on more frequently.

Secondly, this may be caused by the injection of chlorine in the water main at each well. Chlorine helps purify the water. When we turn a well on, chlorine is injected into the water. Customers a short distance from the well may smell the burst of the chlorine. Customers further away may not notice this smell as the injection disperses better over distance.

WHAT IF IT IS BROWN OR RUSTY WATER?

While brown and rusty looking water is safe, it just isn't appealing, tasty or good for washing clothes. It leaves terrible stains in toilets, sinks and tubs. Ugh! Sometimes, this is a problem caused by the water system (run by the Village). Sometimes it may mean a problem in your home system (from the shut-off valve to faucets).

It may mean that we have been flushing hydrants, or that the fire department fought a fire and opened a hydrant. This can rapidly change the pressure in the line or the direction of the water in the line. This loosens particles of iron that collect on the walls of the water lines. They break loose and flow into the line going into your home.

It mean we had a watermain break or leak. When we fix a break or a leak, we shut some service off for a while and then back on. This changing pressure and flow can carry the loosened iron particles into your home. When we fix watermain leaks and breaks we cut, clamp, repair the main. This 'banging' on the watermain loosens the particles of iron that then flow into your home.

Older pipes in your home will build up with particles too. Banging or working on your pipes will also cause discolored water. Changing temperatures cause pipes to expand or shrink. This process loosens up the particles and you'll get brown / rusty water. If an indoor water line runs by a window or an exterior wall the pipe and the water in it may get really cold, almost freeze, or actually freeze. This causes the water in the pipe to expand. This puts pressure on the pipe. This expansion loosens the particles that have collected on the walls of the pipe. Then, when you turn on the water, you get brown or rusty colored water.

COST of VILLAGE WATER

We know money doesn't grow on trees in our yard or in your yard. We monitor our rates closely. We compare our rates with other ground-water supplied municipal systems. We are not close to being the highest. The fact is, we are among the lowest in the State. Survey after survey finds the cost of water near the cheapest in the state.

Customers pay two fees for water.

- One is what we call the "Ready-to-Serve" (RTS) fee. This RTS fee covers all our expenses for the ground wells that pump water out of the ground, the storage tank (water tower) that keeps the pressure in the water lines so when you turn on a faucet water comes out, and the delivery of the water to your home (water mains, hydrants, valves, etc). Simply stated it pays for what we have to provide to your home to be 'ready' when you turn on a faucet.
- The second cost is what we call the "Commodity Charge". This consumption fee covers the cost for treating the water once it comes out of the ground and such. Simply stated, this is the cost for every 1,000 gallons of water you use; you pay for what you use.

For the last 8 years the RTS and Commodity charges have been the same. It would be hard to name one other thing that has not gone up in price of the last 8 years! The cost of our water may be the only thing that hasn't gone up in price.

Starting January 1, 2014, rates will increase and we will still be in the bottom (lower) half of the pack.

- Residents currently pay $13.65 per month as their RTS fee. This will increase by 50 cents with the water you us in January 2014 and appearing on the bill you receive in February.
- For the last eight (8) years the cost of 1,000 gallons of water has been $1.49. This will increased to $2.75 for every 1,000 gallons of water you use. Again, this will begin with the water you use in January 2014, and appearing on the bill you receive in January. (One of our neighbors currently pay $3.41 per 1,000 gallons.

Cost of our Water: Now vs. Jan. 1, 2014:

The American Water Association estimates that the typical family of four (two parents and two children) uses 180 gallons a day or 5,400 gallons a month.

- Now: This typical family would pay the $13.65 for the RTS fee and $8.05 for the amount of water; a total of $21.70 for the month.
- January 1, 2014: The typical family would pay $14.15 for the RTS and $14.85 for the water they used; a total of $29.00.

How Does This Compare To Bottled Water?

Our water is really cheap compared to bottled water you buy at a store. Let's assume you can buy a 16.9 ounce bottle of water in Paw Paw for $0.99. Since a gallon is 128 ounces, you would need to buy 7.57 bottles to equal a gallon of water. This would cost you $7.49. Just 2 gallons of bottled water - roughly 15 bottles - would cost you $14.98. Yikes!

You would have to buy 7,574 bottles to equal 1,000 gallons. At a Paw Paw store this would cost you $7,475. Outrageous! 1,000 gallons of Paw Paw water costs just $21.70 now and $29.00 next January.

More information about the Village of Paw Paw is available online at:

www.pawpaw.net and **http://www.vbco.org/pawpawvillage.asp** and **www.uncorkpawpaw.com**

VILLAGE OF PAW PAW
WATER QUALITY REPORT-2013

The Village of Paw Paw strives to produce the best quality drinking water possible. The purpose of this report is to provide you with information about your drinking water. The report explains to you where your water comes from and the treatment it receives before it reaches your tap. The report also lists all of the contaminants detected in your water and an explanation of all violations in the past year.

The bottom line is the Village of Paw Paw's water supply is safe. This report is emailed to area media outlets such as the daily and weekly newspapers, radio stations and television stations servicing the area. It is also mailed to the County Health Department. Please take time to review the report. Copies are available at Village Hall. The report is also posted on the Village's Website, www.pawpaw.net (click on the left hand menu item titled Public Services and then click on the item titled "Consumer Confidence Report 2013". This report is not being mailed to all water customers.

Your drinking water comes from 3 wells located on the west side of the Village. Well #4 is located on Miller Street and is on stand-by status. It is 110' deep and pumps 750 gallons per minute. Well #6 and #8 operate daily and are located on Johnson Road. Well #6 is 178' deep and Well #8 is 160' deep. Both Wells pump about 1,500 gallons per minute. The water is pumped from the ground by the wells, then chlorine and phosphate are added for disinfection and corrosion control, respectively. The water then goes to a 500,000 gallon water tower located across from the Department of Public Service Building. We are making efforts to protect our well water supply by completing a Wellhead Protection Program which was started in 1996.

The State performed an assessment of our source water in 2003 to determine the susceptibility or the relative potential of contamination. The susceptibility rating is on a six-tiered scale from "very-low" to "high" based on geologic sensitivity, water chemistry and contaminant sources. The Susceptibility of Wells #6 and #8 is "Moderate". The susceptibility of Well #4 is also "Moderate". A copy of the full report can be obtained by contacting John Small, Department of Public Services Director, 110 Harry L. Bush Blvd, Paw Paw, Michigan, 49079.

The sources of drinking water, both tap water and bottled water, including rivers, lakes, streams, ponds, reservoirs, springs, and wells may contain contaminants. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about the contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general populations. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of the infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline 1-800-426-4791.

The Paw Paw water supply comes from groundwater. As water travels through the ground, it dissolves naturally occurring minerals and can pick up substances from the presence of animals or from human activity. These include:

- **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, livestock, and wildlife.

- **Inorganic contaminants**, such as salts and metals, which can be natural or may result from storm runoff, wastewater discharges, oil and gas production and farming

- **Organic chemicals**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also originate from gas stations, storm runoff and septic systems.

- **Radioactive substances**, which can be naturally occurring or be the result of oil and gas production and mining activities.

- **Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban runoff, and residential uses.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with the service lines and home plumbing. The Village of Paw Paw is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about the lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http;//www.epa.gov/safewater/lead.

In order to ensure that tap water is safe, the U.S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in the water provided by public water systems.

If you would like more information about your water, or a copy of this Consumer Confidence Report, please contact the Village of Paw Paw Department of Public Service Director John Small at 657-3169, located at 110 Harry L. Bush Blvd. Individual copies of this report are not being mailed without request. Also, you may contact the Village of Paw Paw Council, which meets the second and fourth Monday of every month at 7:30 p.m. at Village Hall, 111 West Michigan Avenue.

The table below lists all the drinking water contaminants that were detected. The detected concentration can be either below or above the state/federal safe drinking water standard (also known as the Maximum Contaminant Level). If the detected concentration is above the safe drinking water standard a violation has occurred and a "**YES**" in bold will be indicated in the violation column. EPA requires water suppliers to report the most recent sampling results within a five-year period from 2009 to 2013. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year.

The Village sampled ten sites in 2012 for lead and copper. The number of sites required was twenty. Due to this sampling number violation, the Village is required to sample 20 sites for lead and copper in 2013.

WATER QUALITY DATA

Terms and Abbreviations used below:

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

N/A: not applicable

ND: not detectable at testing limit

ppb: parts per billion per liter

ppm: parts per million per liter

pCi/l: picocuries per liter (a measure of radiation)

Action Level: the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Regulated Contaminants

Inorganic Contaminants	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Arsenic(ppb)	10*	0	5.0	4.0 – 5.0	3/13/2013 6/11/2013	No	Erosion of natural deposits
Barium (ppm)	2	2	0.291	.233 -.291	3/13/2013 6/11/2013	No	Erosion of natural deposits
Fluoride (ppm)	4	4	.12	.08-.12	6/18/2013	No	Erosion of natural deposits
Radionuclides							
Combined Radium-226 & 228(pCi/l)	5	0	1.12	N/A	8/25/2011	No	Erosion of natural deposits

Distribution Monitoring

	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Total Trihalomethanes (ppb)	80	NA	0.5	NA	7/10/2013	No	Byproduct of water Chlorination
Lead and Copper	**AL**	**MCLG**	**Village of Paw Paw Water**	**No. of sites exceeding AL****			
Copper (ppm)	1.3	1.3	90 percentile***	0	7/9/2013	No	Corrosion of household plumbing Systems
Lead (ppb)	15	0	3	0	7/9/2013	No	Corrosion of household plumbing Systems

Special Monitoring

Sodium(mg/L)	N/A	N/A	17.8	13.0-17.8	3/12/2013		

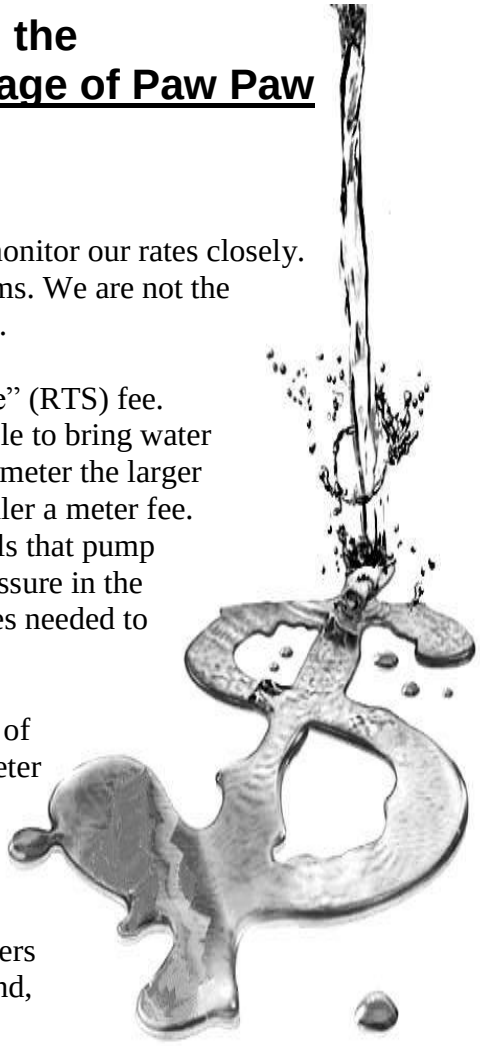
1. The Village of Paw Paw's Drinking Water System was analyzed for at least 80 other contaminants; all analyses showed no detection.

* These arsenic values are effective January 23,2006. Until then the MCL is 50 PPB and there is no MCLG.

* Lead/copper samples were collected from ten sampling sites and none exceeded the lead/copper action level.

**90 percent of the samples do not exceed this level.

Supplemental Information on the
Quality of Tap Water Provided by the Village of Paw Paw



COST: VILLAGE WATER

We know money doesn't grow on trees in our yard or in your yard. We monitor our rates closely. We compare our rates with other ground-water supplied municipal systems. We are not the highest and we are not the lowest. Our rates are in the middle of the pack.

Your water bill includes two charges. One charge is the "Ready-to-Serve" (RTS) fee. The RTS fee covers all our expenses for infrastructure necessary to be able to bring water to you. This fee varies depending on the size of the meter; the larger the meter the larger the fee. Because this fee is based on meter size, it is often mistakenly caller a meter fee. It is actually much more than that. The RTS fee includes the ground wells that pump water out of the ground, the storage tank (water tower) that keeps the pressure in the water lines so when you turn on a faucet water comes out, and all the lines needed to deliver water to your home (water mains, hydrants, valves, etc).

After eight (8) years without an increase, the RTS fee was increased. As of January 2014, the RTS fee for a residential with a ½ or ¾ inch service meter is $14.15 per month. Non-Residents pay 150% of this amount.

The second fee is based on your 'Consumption' of the 'Commodity'. In other words, the fee is based on how much water goes through the meter. The fee is based on 1,000 gallons units in the billing period. The fee covers the costs associated with treating the water once it comes out of the ground, reading meters, and billing customers.

After eight (8) years without any increase, in January an increase went into effect. Village customers now pay $2.75 for every 1,000 gallons used. Non-Residents pay 150% of this amount.

The American Water Association estimates that the typical family of four (two parents and two children) uses 180 gallons a day or 5,400 gallons a month. In this case, this typical person would pay the $14.15 for the RTS fee and $14.85 for the amount of water; a total of $29.00 for the month.

How Does This Compare To Bottled Water?

Our water is really cheap compared to bottled water you buy at a store. Let's assume you can buy a 16.9 ounce bottle of water in Paw Paw for $0.99. Since a gallon is 128 ounces, you would need to but 7.57 bottles to equal a gallon of water. These 7.57 bottles (1 gallon of water) costs you $7.49.

For $16.90 you get 1,000 gallons from the Village of Paw Paw. This is the monthly RTS fee ($14.15) and the Consumption fee ($2.75) added together.

- **To buy 1,000 gallons in bottled water, you would need to purchase 7,570 bottles of water. This would cost you a grand total of $7,494.30.**

- **To buy 1,000 gallons of bottled water, you would need to purchase 7,570 bottles of water.**

Use Water Wisely

WATER LEAK FACTS - COSTLY DROPS OF WATER

The biggest complaint we hear from customers is that they think their water bill is too high. We explain how the meter works – that water only goes through the meter when something (a faucet, the toilet, a water softener, etc.) in the house or business asks for more water. It is impossible for water to pass through a meter unless something in the house asks for water. This could be someone turning on a faucet, taking a bath or flushing a toilet. It could also be a water softener recycling, leak or a break in a water line on your side of the meter! You may want to carefully check all faucets, toilets, and anything that has water pipes connected to it. Most often people come back or call back to say they found the leak. Most often it is a toilet that was running silently!

Not all leaking faucets or toilets, breaks or water softener recycling makes noise. We advise customers to put a drop of food coloring in their toilet tank at night before they go to bed. If there is no color in their tank in the morning (or a lighter color) and if no one flushed the toilet over night, then the toilet leaks a little and money is going down the drain. We also advise people to look at their meter and write down the numbers on the meter. Then don't use any water for at least 6 hours and then look at the numbers again. If they are different, there is a leak somewhere.

LEAKS ARE VERY COSTLY!

People are also amazed that even a small leak can be so costly. They forget leaks can run 24 hours a day, seven days a week. Toilets, however, can 'stick' only occasionally, which requires you check them more frequently. Repair leaks promptly.

MONEY DOWN THE DRAIN AND YOU PAY TWICE!

That's what happens when you don't fix a leak right away – it is money down the drain, twice. You pay for the water and you pay for the sewer charge. Sewer is billed on the amount of water that goes in, so it is expensive and you can help yourself by fixing leaks quickly.

- A leak as small as 1/32" wastes 170 gallons every 24 hours.
- A leak 1/16 of inch in diameter wastes 600 gallons every 24 hours
- A leak 1/8' in diameter wastes 2,500 gallons every 24 hours.

CHECK FOR LEAKS

Use your water meter to check for leaks in your home. Start by turning off all faucets and water-using appliances and make sure no one uses water during the testing period. Take a reading on your water meter, wait about 3 to 6 hours, and then take a second reading. If the dial has moved, you have a leak. You can do this overnight or when everyone leaves for a while.

CHECK FOR LEAKY TOILETS

The most common source of leaks is the toilet. Check toilets for leaks by placing a few drops of food coloring in the tank. If after 15 minutes the dye shows up in the bowl, the toilet has a leak. Or, you can put a few drops of food coloring in your toilet tank at night before going to bed. If there is no color in their tank in the morning (or a lighter color) and you did not flush the toilet over night, then the toilet leaks. Either way, money is going down the drain.

Test Your Water Knowledge

1. In the Paw Paw area and most of Van Buren County our source of drinking water comes from:
   A. Paw Paw River B. Maple Lake C. Lake Cora D. Ackley Lake
   E. Lake Michigan F. Groundwater G. All of them H. None of them
2. True / False: Groundwater comes from underground lakes and rivers.
3. True / False: Most pollutants dumped on the ground will be filtered out before it reaches groundwater.
4. True / False: If some products are not Okay to take internally (swallow), they are also Okay to flush down the toilet or pour down a drain or even dump on the ground.
5. All stormwater that runs into catch basins runs directly into rivers, lakes, or streams.
6. Storm drains can carry pollutants into rivers, lakes or streams.
7. Abandoned water wells are better left alone.
8. Changing your vehicles oil in your backyard letting the dirty oil drain into the ground is a common acceptable practice.
9. True or False: Watersheds mainly are located in mountainous regions with high rainfall.
10. Circle the correct answer. Most of the pollutants entering our waters come from the following source:
    A. Wastewater treatment B. Runoff from lawns, farm fields and streets
    C. Factories along rivers D. Backyard mechanics draining oil on the ground.
11. True or False: Once groundwater is contaminated it cannot be restored.
12. True or False: Dirt, fecal bacteria and nutrients are the most common pollutants in our waters.
13. True or False: Leaves should be raked down a storm drain so they can decompose in the stream and provide food for the fish.
14. Circle the correct answer. Nutrients that enter our ground and surface waters come from the following sources: A. Leaking septic systems B. Excess fertilizers washing off lawns
    C. Pet waste D. All of the above
15. Is it good to feed waterfowl?
    A. Yes, the poor things need my food B. Yes, the poor things need a safe place to eat
    C. Both of the above. D. None of the above.
16. True or False: The best way to get rid of old prescriptions and others pharmaceuticals is to flush them down the toilet.
17. True or False: Groundwater is the water that fills the cracks and voids between underground rocks and soil particles.
18. True or False: Every rain drop "percolates" through the soil to become groundwater.
19. True or False: Groundwater can move pretty fast.
20. True or False: Groundwater can become contaminated - polluted - only by injecting chemicals into the groundwater layer.
21. True or False. Clustering development into cities, villages or subdivisions is a good way to protect groundwater from contamination.
22. True or False. Animal waste doesn't pollute groundwater.
23. True or False. Agricultural and household herbicides, insecticides, fertilizers and other man-made solvents can't pollute groundwater.
24. True or False. Best way to make sure your drinking water is safe is to buy bottled water.
25. True or False. Residential properties don't contribute to groundwater contamination.
26. True or False. Farmers have few options in herbicide, insecticide and fertilizer applications to lessen the possibility of groundwater contamination.

Answers: 1-F (most all in VB County), 2-F, 3-F, 4-F, 5-F, 6-T, 7-F, 8-F, 9-F, 10-B, 11-F, 12-T, 13-F, 14-D, 15-D, 16-F, 17-T, 18-F, 19-F, 20-F, 21-F, 22-F, 23-F, 24-F, 25-F, and 226-F

VILLAGE OF PAW PAW
WATER QUALITY REPORT-2014

The Village of Paw Paw strives to produce the best quality drinking water possible. The purpose of this report is to provide you with information about your drinking water. The report explains to you where your water comes from and the treatment it receives before it reaches your tap. The report also lists all of the contaminants detected in your water and an explanation of all violations in the past year.

The bottom line is the Village of Paw Paw's water supply is safe. This report is emailed to area media outlets such as the daily and weekly newspapers, radio stations and television stations servicing the area. It is also mailed to the County Health Department. Please take time to review the report. Copies are available at Village Hall. The report is also posted on the Village's Website, www.pawpaw.net (click on the left hand menu item titled Public Services and then click on the item titled "Consumer Confidence Report 2014". This report is not being mailed to all water customers.

Your drinking water comes from 3 wells located on the west side of the Village. Well #4 is located on Miller Street and is on stand-by status. It is 110' deep and pumps 750 gallons per minute. Well #6 and #8 operate daily and are located on Johnson Road. Well #6 is 178' deep and Well #8 is 160' deep. Both Wells pump about 1,500 gallons per minute. The water is pumped from the ground by the wells, then chlorine and phosphate are added for disinfection and corrosion control, respectively. The water then goes to a 500,000 gallon water tower located across from the Department of Public Service Building. We are making efforts to protect our well water supply by completing a Wellhead Protection Program which was started in 1996.

The State performed an assessment of our source water in 2003 and again in 2014 to determine the susceptibility or the relative potential of contamination. The susceptibility rating is on a six-tiered scale from "very-low" to "high" based on geologic sensitivity, water chemistry and contaminant sources. The Susceptibility of Wells #6 and #8 is "Moderately Low". The susceptibility of Well #4 is also "Moderately High". A copy of the full report can be obtained by contacting John Small, Department of Public Services Director, 110 Harry L. Bush Blvd, Paw Paw, Michigan, 49079.

The sources of drinking water, both tap water and bottled water, including rivers, lakes, streams, ponds, reservoirs, springs, and wells may contain contaminants. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about the contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general populations. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of the infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline 1-800-426-4791.

The Paw Paw water supply comes from groundwater. As water travels through the ground, it dissolves naturally occurring minerals and can pick up substances from the presence of animals or from human activity. These include:

- **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, livestock, and wildlife.

- **Inorganic contaminants**, such as salts and metals, which can be natural or may result from storm runoff, wastewater discharges, oil and gas production and farming

- **Organic chemicals**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also originate from gas stations, storm runoff and septic systems.

- **Radioactive substances**, which can be naturally occurring or be the result of oil and gas production and mining activities.

- **Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban runoff, and residential uses.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with the service lines and home plumbing. The Village of Paw Paw is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about the lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http;//www.epa.gov/safewater/lead.

In order to ensure that tap water is safe, the U.S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in the water provided by public water systems.

If you would like more information about your water, or a copy of this Consumer Confidence Report, please contact the Village of Paw Paw Department of Public Service Director John Small at 657-3169, located at 110 Harry L. Bush Blvd. Individual copies of this report are not being mailed without request. Also, you may contact the Village of Paw Paw Council, which meets the second and fourth Monday of every month at 7:30 p.m. at Village Hall, 111 West Michigan Avenue.

The table below lists all the drinking water contaminants that were detected. The detected concentration can be either below or above the state/federal safe drinking water standard (also known as the Maximum Contaminant Level). If the detected concentration is above the safe drinking water standard a violation has occurred and a "**YES**" in bold will be indicated in the violation column. EPA requires water suppliers to report the most recent sampling results within a five-year period from 2009 to 2013. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year.

WATER QUALITY DATA

Terms and Abbreviations used below:

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

N/A: not applicable

ND: not detectable at testing limit

ppb: parts per billion per liter

ppm: parts per million per liter

pCi/l: picocuries per liter (a measure of radiation)

Action Level: the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Regulated Contaminants

Inorganic Contaminants	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Arsenic(ppb)	10*	0	5.0	2.0 – 5.0	3/19/2014 6/20/2014 9/16/2014 12/2/2014	No	Erosion of natural deposits
Barium (ppm)	2	2	0.352	.055 -.352	3/4/2014 6/10/2014 9/16/2014 12/2/2014	No	Erosion of natural deposits
Fluoride (ppm)	4	4	.22	.12-.22	7/15/2014 9/12/2014	No	Erosion of natural deposits
Radionuclides							
Combined Radium-226 & 228(pCi/l)	5	0	1.45+/-0.65	N/A	7/15/2014	No	Erosion of natural deposits

Distribution Monitoring

	MCL	MCLG	Village of Paw Paw Water	Range of Detections	Sample Date	Violation	Typical Source of Contaminant
Total Trihalomethanes (ppb)	80	NA	< 2.0 ug/L	NA	7/15/2014	No	Byproduct of water Chlorination
Lead and Copper	**AL**	**MCLG**	**Village of Paw Paw Water**	**No. of sites exceeding AL****			
Copper (ppm)	1.3	1.3	90 percentile***	0	7/9/2013	No	Corrosion of household plumbing Systems
Lead (ppb)	15	0	3	0	7/9/2013	No	Corrosion of household plumbing Systems

Special Monitoring

Sodium(mg/L)	N/A	N/A	17.8	12.7-17.8	6/10/2014		

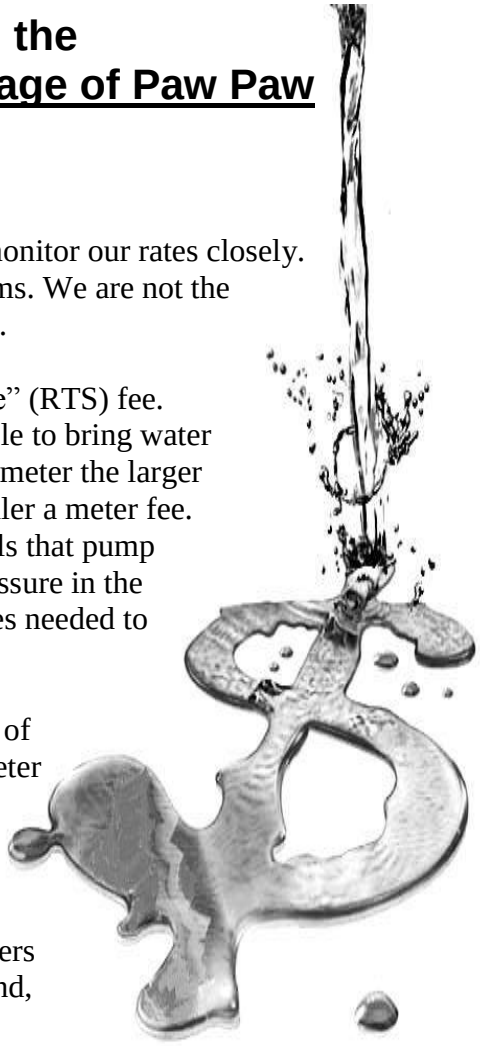
1. The Village of Paw Paw's Drinking Water System was analyzed for at least 80 other contaminants; all analyses showed no detection.

* These arsenic values are effective January 23,2006. Until then the MCL is 50 PPB and there is no MCLG.

* Lead/copper samples were collected from ten sampling sites and none exceeded the lead/copper action level.

**90 percent of the samples do not exceed this level.

Supplemental Information on the
Quality of Tap Water Provided by the Village of Paw Paw



COST: VILLAGE WATER

We know money doesn't grow on trees in our yard or in your yard. We monitor our rates closely. We compare our rates with other ground-water supplied municipal systems. We are not the highest and we are not the lowest. Our rates are in the middle of the pack.

Your water bill includes two charges. One charge is the "Ready-to-Serve" (RTS) fee. The RTS fee covers all our expenses for infrastructure necessary to be able to bring water to you. This fee varies depending on the size of the meter; the larger the meter the larger the fee. Because this fee is based on meter size, it is often mistakenly caller a meter fee. It is actually much more than that. The RTS fee includes the ground wells that pump water out of the ground, the storage tank (water tower) that keeps the pressure in the water lines so when you turn on a faucet water comes out, and all the lines needed to deliver water to your home (water mains, hydrants, valves, etc).

After eight (8) years without an increase, the RTS fee was increased. As of January 2014, the RTS fee for a residential with a ½ or ¾ inch service meter is $14.15 per month. Non-Residents pay 150% of this amount.

The second fee is based on your 'Consumption' of the 'Commodity'. In other words, the fee is based on how much water goes through the meter. The fee is based on 1,000 gallons units in the billing period. The fee covers the costs associated with treating the water once it comes out of the ground, reading meters, and billing customers.

After eight (8) years without any increase, in January an increase went into effect. Village customers now pay $2.75 for every 1,000 gallons used. Non-Residents pay 150% of this amount.

The American Water Association estimates that the typical family of four (two parents and two children) uses 180 gallons a day or 5,400 gallons a month. In this case, this typical person would pay the $14.15 for the RTS fee and $14.85 for the amount of water; a total of $29.00 for the month.

How Does This Compare To Bottled Water?

Our water is really cheap compared to bottled water you buy at a store. Let's assume you can buy a 16.9 ounce bottle of water in Paw Paw for $0.99. Since a gallon is 128 ounces, you would need to but 7.57 bottles to equal a gallon of water. These 7.57 bottles (1 gallon of water) costs you $7.49.

For $16.90 you get 1,000 gallons from the Village of Paw Paw. This is the monthly RTS fee ($14.15) and the Consumption fee ($2.75) added together.

- **To buy 1,000 gallons in bottled water, you would need to purchase 7,570 bottles of water. This would cost you a grand total of $7,494.30.**

- **To buy 1,000 gallons of bottled water, you would need to purchase 7,570 bottles of water.**

Use Water Wisely

WATER LEAK FACTS - COSTLY DROPS OF WATER

The biggest complaint we hear from customers is that they think their water bill is too high. We explain how the meter works – that water only goes through the meter when something (a faucet, the toilet, a water softener, etc.) in the house or business asks for more water. It is impossible for water to pass through a meter unless something in the house asks for water. This could be someone turning on a faucet, taking a bath or flushing a toilet. It could also be a water softener recycling, leak or a break in a water line on your side of the meter! You may want to carefully check all faucets, toilets, and anything that has water pipes connected to it. Most often people come back or call back to say they found the leak. Most often it is a toilet that was running silently!

Not all leaking faucets or toilets, breaks or water softener recycling makes noise. We advise customers to put a drop of food coloring in their toilet tank at night before they go to bed. If there is no color in their tank in the morning (or a lighter color) and if no one flushed the toilet over night, then the toilet leaks a little and money is going down the drain. We also advise people to look at their meter and write down the numbers on the meter. Then don't use any water for at least 6 hours and then look at the numbers again. If they are different, there is a leak somewhere.

LEAKS ARE VERY COSTLY!

People are also amazed that even a small leak can be so costly. They forget leaks can run 24 hours a day, seven days a week. Toilets, however, can 'stick' only occasionally, which requires you check them more frequently. Repair leaks promptly.

MONEY DOWN THE DRAIN AND YOU PAY TWICE!

That's what happens when you don't fix a leak right away – it is money down the drain, twice. You pay for the water and you pay for the sewer charge. Sewer is billed on the amount of water that goes in, so it is expensive and you can help yourself by fixing leaks quickly.

- A leak as small as 1/32" wastes 170 gallons every 24 hours.
- A leak 1/16 of inch in diameter wastes 600 gallons every 24 hours
- A leak 1/8' in diameter wastes 2,500 gallons every 24 hours.

CHECK FOR LEAKS

Use your water meter to check for leaks in your home. Start by turning off all faucets and water-using appliances and make sure no one uses water during the testing period. Take a reading on your water meter, wait about 3 to 6 hours, and then take a second reading. If the dial has moved, you have a leak. You can do this overnight or when everyone leaves for a while.

CHECK FOR LEAKY TOILETS

The most common source of leaks is the toilet. Check toilets for leaks by placing a few drops of food coloring in the tank. If after 15 minutes the dye shows up in the bowl, the toilet has a leak. Or, you can put a few drops of food coloring in your toilet tank at night before going to bed. If there is no color in their tank in the morning (or a lighter color) and you did not flush the toilet over night, then the toilet leaks. Either way, money is going down the drain.

Test Your Water Knowledge

1. In the Paw Paw area and most of Van Buren County our source of drinking water comes from:
   A. Paw Paw River B. Maple Lake C. Lake Cora D. Ackley Lake
   E. Lake Michigan F. Groundwater G. All of them H. None of them
2. True / False: Groundwater comes from underground lakes and rivers.
3. True / False: Most pollutants dumped on the ground will be filtered out before it reaches groundwater.
4. True / False: If some products are not Okay to take internally (swallow), they are also Okay to flush down the toilet or pour down a drain or even dump on the ground.
5. All stormwater that runs into catch basins runs directly into rivers, lakes, or streams.
6. Storm drains can carry pollutants into rivers, lakes or streams.
7. Abandoned water wells are better left alone.
8. Changing your vehicles oil in your backyard letting the dirty oil drain into the ground is a common acceptable practice.
9. True or False: Watersheds mainly are located in mountainous regions with high rainfall.
10. Circle the correct answer. Most of the pollutants entering our waters come from the following source:
    A. Wastewater treatment B. Runoff from lawns, farm fields and streets
    C. Factories along rivers D. Backyard mechanics draining oil on the ground.
11. True or False: Once groundwater is contaminated it cannot be restored.
12. True or False: Dirt, fecal bacteria and nutrients are the most common pollutants in our waters.
13. True or False: Leaves should be raked down a storm drain so they can decompose in the stream and provide food for the fish.
14. Circle the correct answer. Nutrients that enter our ground and surface waters come from the following sources: A. Leaking septic systems B. Excess fertilizers washing off lawns
    C. Pet waste D. All of the above
15. Is it good to feed waterfowl?
    A. Yes, the poor things need my food B. Yes, the poor things need a safe place to eat
    C. Both of the above. D. None of the above.
16. True or False: The best way to get rid of old prescriptions and others pharmaceuticals is to flush them down the toilet.
17. True or False: Groundwater is the water that fills the cracks and voids between underground rocks and soil particles.
18. True or False: Every rain drop "percolates" through the soil to become groundwater.
19. True or False: Groundwater can move pretty fast.
20. True or False: Groundwater can become contaminated - polluted - only by injecting chemicals into the groundwater layer.
21. True or False. Clustering development into cities, villages or subdivisions is a good way to protect groundwater from contamination.
22. True or False. Animal waste doesn't pollute groundwater.
23. True or False. Agricultural and household herbicides, insecticides, fertilizers and other man-made solvents can't pollute groundwater.
24. True or False. Best way to make sure your drinking water is safe is to buy bottled water.
25. True or False. Residential properties don't contribute to groundwater contamination.
26. True or False. Farmers have few options in herbicide, insecticide and fertilizer applications to lessen the possibility of groundwater contamination.

Answers: 1-F (most all in VB County), 2-F, 3-F, 4-F, 5-F, 6-T, 7-F, 8-F, 9-F, 10-B, 11-F, 12-T, 13-F, 14-D, 15-D, 16-F, 17-T, 18-F, 19-F, 20-F, 21-F, 22-F, 23-F, 24-F, 25-F, and 226-F

2018 Water Quality Report for the Village of Paw Paw

This report covers the drinking water quality for the Village of Paw Paw for the 2018 calendar year. This information is a snapshot of the quality of the water that we provided to you in 2018. Included are details about where your water comes from, what it contains, and how it compares to Environmental Protection Agency (EPA) and state standards.

Your water comes from three groundwater wells, each over 110, 160, and 178 feet deep. The State performed an assessment of our source water to determine the susceptibility or the relative potential of contamination. The susceptibility rating is on a seven-tiered scale from "very-low" to "very-high" based on geologic sensitivity, well construction, water chemistry and contamination sources. The susceptibility of our source is Moderately low for wells #6 & #8, and Moderately high for back-up Well #4.

There are no significant sources of contamination in our water supply. We are making efforts to protect our sources by participating in the State of Michigan Wellhead Protection Program and following the MEGLE annual drinking water monitoring schedule.

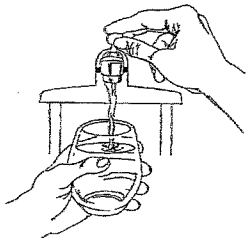
If you would like to know more about the report, please contact John Small, Department of Public Services Director, 110 Harry L. Bush Blvd, Paw Paw, Michigan, 49079, phone number 269-657-3169. Copies are available at the Paw Paw Village Hall. The report is also posted on the Village's Website, www.pawpaw.net (click on the left hand menu item titled Public Services and then click on the item titled "Consumer Confidence Report 2018". This report is not being mailed to all water customers.

- **Contaminants and their presence in water:** Drinking Water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the **EPA's Safe Drinking Water Hotline (800-426-4791)**.

- **Vulnerability of sub-populations:** Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune systems disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

- **Sources of drinking water:** The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. Our water comes from wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

- Contaminants that may be present in source water include:
  - **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
  - **Inorganic contaminants**, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
  - **Pesticides and herbicides**, which may come from a variety of sources such as agriculture and residential uses.
  - **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.
  - **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.



In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which provide the same protection for public health.

Water Quality Data

The table below lists all the drinking water contaminants that we detected during the 2018 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done January 1 – December 31, 2018. The State allows us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. All of the data is representative of the water quality, but some are more than one year old.

Terms and abbreviations used below:

Water Supplier: Define only the terms you use in the table below. Delete any you don't use.

- Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- Maximum Residual Disinfectant Level Goal (MRDLG): means the level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- N/A: Not applicable ND: not detectable at testing limit ppb: parts per billion or micrograms per liter ppm: parts per million or milligrams per liter pCi/l: picocuries per liter (a measure of radioactivity).
- Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- Level 1 Assessment: A study of the water supply to identify potential problems and determine (if possible) why total coliform bacteria have been hound in our water system.
- Level 2 Assessment: A very detailed study of the water system to identify potential problems and determine (if possible) why an *E. coli* MCL violation has occurred and/or why total coliform bacteria have been found in our water system on multiple occasions.

Regulated Contaminant	MCL	MCLG	Level Detected	Range	Year Sampled	Violation Yes / No	Typical Source of Contaminant
Arsenic (ppb)	10	0	6.4	3.9-6.4	2018	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium (ppm)	2	2	0.319	0.15-0.319	2018	No	Discharge of drilling wastes; Discharge of metal refineries; Erosion of natural deposits
Fluoride (ppm)	4	4	0.13	0.10-0.13	2018	No	Erosion of natural deposits. Discharge from fertilizer and aluminum factories.
TTHM - Total Trihalomethanes (ppb)	80	N/A	11.9	NA	2018	No	Byproduct of drinking water disinfection
HAA5 Haloacetic Acids (ppb)	60	N/A	< 2.00	NA	2018	No	Byproduct of drinking water disinfection
Chlorine* (ppm)	MRDL	MRDLG	0.38	0.12-0.71	2018	No	Water additive used to control microbes
	4	4					
Radioactive Contaminant	**MCL**	**MCLG**	**Level Detected**	**Range**	**Year Sampled**	**Violation Yes / No**	**Typical Source of Contaminant**
Combined radium (pCi/L)	5	0	1.45+/- 0.65	Na	2014	No	Erosion of natural deposits
Contaminant Subject to AL	**Action Level**	**MCLG**	**90% of Samples ≤ This Level**		**Year Sampled**	**Number of Samples Above AL**	**Typical Source of Contaminant**
Lead (ppb) **	15	0	0		2016	0	Corrosion of household plumbing systems; Erosion of natural deposits

Copper (ppb)	1.3	1.3	0.12	2016	0	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives

Special Monitoring and Unregulated Contaminant ***	Level Detected	Year Sampled	Comments
Sodium (ppm)	21.5	2018	Typical source is erosion of natural deposits

* Chlorine was calculated using the running annual average.

** 90 percent of the samples collected were at or below the level reported for our water.

*** Unregulated contaminants are those for which EPA has not established drinking water standards. Monitoring helps EPA to determine where certain contaminants occur and whether it needs to regulate those contaminants.

Information about lead: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Village of Paw Paw is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

From January 1, 2018, to March 31, 2018:

Microbial Contaminants	MCL	MCLG	Number Detected	Violation Yes / No	Typical Source of Contaminant
Total Coliform Bacteria	>1 positive monthly sample (>5.0% of monthly samples positive)	0	0	No	Naturally present in the environment
Fecal Coliform and *E. coli*	Routine and repeat sample total coliform positive, and one is also fecal or *E. coli* positive	0	0	No	Human and animal fecal waste

From April 1, 2018, to December 31, 2018:

Microbial Contaminants	MCL or TT	MCLG	Number Detected	Violation Yes / No	Typical Source of Contaminant
Total Coliform Bacteria	TT	N/A	1	No	Naturally present in the environment
E. coli in the distribution system (positive samples)	See *E. coli*[1] note below	0	0	No	Human and animal fecal waste
Fecal Indicator – *E. coli at the source (positive samples)*	TT	N/A	0	No	Human and animal fecal waste

[1] *E. coli* MCL violation occurs if: (1) routine and repeat samples total coliform-positive and either is *E. coli*-positive, or (2) supply fails to take all required repeat samples following *E. coli*-positive routine sample, or (3) supply fails to analyze total coliform-positive repeat sample for *E. coli*.

Monitoring and Reporting to the DEQ Requirements: The State and EPA require us to test our water on a regular basis to ensure its safety. We met all of the monitoring and reporting requirements for 2018.

We will update this report annually and will keep you informed of any problems that may occur throughout the year, as they happen. Copies are available at the Paw Paw Village Hall. The report is also posted on the Village's Website, www.pawpaw.net (click on the left hand menu item titled Public Services and then click on the item titled "Consumer Confidence Report 2018". This report is not being mailed to all water customers.

We invite public participation in decisions that affect drinking water quality. You may contact the Village of Paw Paw Council, which meets the second and fourth Monday of every month at 7:30 p.m. at Village Hall, 111 West Michigan Avenue. For more information about your water, or the contents of this report, contact John Small, Department of Public Services Director, 110 Harry L. Bush Blvd, Paw Paw, Michigan, 49079, phone number 269657-3169. For more information about safe drinking water, visit the U.S. Environmental Protection Agency at www.epa.gov/safewater/.

2019 Water Quality Report for the Village of Paw Paw

This report covers the drinking water quality for the Village of Paw Paw for the **2019** calendar year. This information is a snapshot of the quality of the water that we provided to you in **2019**. Included are details about where your water comes from, what it contains, and how it compares to Environmental Protection Agency (EPA) and state standards.

Your water comes from three groundwater wells, each over 110, 160, and 178 feet deep. The State performed an assessment of our source water to determine the susceptibility or the relative potential of contamination. The susceptibility rating is on a seven-tiered scale from "very-low" to "very-high" based on geologic sensitivity, well construction, water chemistry and contamination sources. The susceptibility of our source is Moderately low for wells #6 & #8, and Moderately high for back-up Well #4.

There are no significant sources of contamination in our water supply. We are making efforts to protect our sources by participating in the State of Michigan Wellhead Protection Program and following the EGLE annual drinking water monitoring schedule.

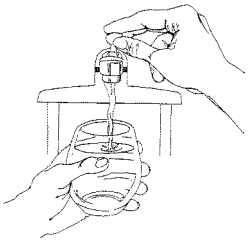
If you would like to know more about the report, please contact John Small, Department of Public Services Director, 110 Harry L. Bush Blvd, Paw Paw, Michigan, 49079, phone number 269-657-3169. Copies are available at the Paw Paw Village Hall. The report is also posted on the Village's Website, www.pawpaw.net (click on the left hand menu item titled Public Services and then click on the item titled "Consumer Confidence Report **2019**". This report is not being mailed to all water customers.

- **Contaminants and their presence in water:** Drinking Water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the **EPA's Safe Drinking Water Hotline (800-426-4791)**.

- **Vulnerability of sub-populations:** Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune systems disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

- **Sources of drinking water:** The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. Our water comes from wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

- Contaminants that may be present in source water include:
  - **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
  - **Inorganic contaminants**, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
  - **Pesticides and herbicides**, which may come from a variety of sources such as agriculture and residential uses.
  - **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.
  - **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.



In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which provide the same protection for public health.

Water Quality Data

The table below lists all the drinking water contaminants that we detected during the **2019** calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. Unless otherwise noted, the data presented in this table is from testing done January 1 – December 31, **2019**. The State allows us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. All of the data is representative of the water quality, but some are more than one year old.

Terms and abbreviations used below:

Water Supplier: Define only the terms you use in the table below. Delete any you don't use.

- Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- Maximum Residual Disinfectant Level Goal (MRDLG): means the level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- N/A: Not applicable ND: not detectable at testing limit ppb: parts per billion or micrograms per liter ppm: parts per million or milligrams per liter pCi/l: picocuries per liter (a measure of radioactivity).
- Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- Level 1 Assessment: A study of the water supply to identify potential problems and determine (if possible) why total coliform bacteria have been hound in our water system.
- Level 2 Assessment: A very detailed study of the water system to identify potential problems and determine (if possible) why an *E. coli* MCL violation has occurred and/or why total coliform bacteria have been found in our water system on multiple occasions.

Regulated Contaminant	**MCL**	**MCLG**	**Level Detected**	**Range**	**Year Sampled**	**Violation Yes / No**	**Typical Source of Contaminant**
Arsenic (ppb)	10	0	4.9	4.0-4.9	2019	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium (ppm)	2	2	0.330	0.16-0.330	2019	No	Discharge of drilling wastes; Discharge of metal refineries; Erosion of natural deposits
Fluoride (ppm)	4	4	0.160	0.11-0.160	2019	No	Erosion of natural deposits. Discharge from fertilizer and aluminum factories.
TTHM - Total Trihalomethanes (ppb)	80	N/A	2.8	NA	2019	No	Byproduct of drinking water disinfection
HAA5 Haloacetic Acids (ppb)	60	N/A	2.6	NA	2019	No	Byproduct of drinking water disinfection
Chlorine* (ppm)	**MRDL**	**MRDLG**	0.28	0.07-0.55	2019	No	Water additive used to control microbes
	4	4					
Radioactive Contaminant	**MCL**	**MCLG**	**Level Detected**	**Range**	**Year Sampled**	**Violation Yes / No**	**Typical Source of Contaminant**
Combined radium (pCi/L)	5	0	1.45+/- 0.65	Na	2014	No	Erosion of natural deposits
Contaminant Subject to AL	**Action Level**	**MCLG**	**90% of Samples ≤ This Level**		**Year Sampled**	**Number of Samples Above AL**	**Typical Source of Contaminant**
Lead (ppb) **	15	0	0		2016	0	Corrosion of household plumbing systems; Erosion of natural deposits

Copper (ppb)	1.3	1.3	0.12	2016	0	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives

Special Monitoring and Unregulated Contaminant ***	Level Detected	Year Sampled	Comments
Sodium (ppm)	23.4	2018	Typical source is erosion of natural deposits

* Chlorine was calculated using the running annual average.
** 90 percent of the samples collected were at or below the level reported for our water.
*** Unregulated contaminants are those for which EPA has not established drinking water standards. Monitoring helps EPA to determine where certain contaminants occur and whether it needs to regulate those contaminants.

Information about lead: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Village of Paw Paw is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you have a lead service line it is recommended that you run your water for at least 5 minutes to flush water from both your home plumbing and the lead service line. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://water/.epa.gov/drink/info/lead.

From January 1, 2019, to March 31, 2019:

Microbial Contaminants	MCL	MCLG	Number Detected	Violation Yes / No	Typical Source of Contaminant
Total Coliform Bacteria	>1 positive monthly sample (>5.0% of monthly samples positive)	0	0	No	Naturally present in the environment
Fecal Coliform and *E. coli*	Routine and repeat sample total coliform positive, and one is also fecal or *E. coli* positive	0	0	No	Human and animal fecal waste

From April 1, 2019, to December 31, 2019:

Microbial Contaminants	MCL or TT	MCLG	Number Detected	Violation Yes / No	Typical Source of Contaminant
Total Coliform Bacteria	TT	N/A	0	No	Naturally present in the environment
E. coli in the distribution system (positive samples)	See *E. coli*[1] note below	0	0	No	Human and animal fecal waste
Fecal Indicator – *E. coli at the source (positive samples)*	TT	N/A	0	No	Human and animal fecal waste

[1] *E. coli* MCL violation occurs if: (1) routine and repeat samples total coliform-positive and either is *E. coli*-positive, or (2) supply fails to take all required repeat samples following *E. coli*-positive routine sample, or (3) supply fails to analyze total coliform-positive repeat sample for *E. coli*.

Monitoring and Reporting to the DEQ Requirements: The State and EPA require us to test our water on a regular basis to ensure its safety. We met all of the monitoring and reporting requirements for **2019.** We will update this report annually and will keep you informed of any problems that may occur throughout the year, as they happen. Copies are available at the Paw Paw Village Hall. The report is also posted on the Village's Website, www.pawpaw.net (click on the left hand menu item titled Public Services and then click on the item titled "Consumer Confidence Report **2019**". This report is not being mailed to all water customers.

We invite public participation in decisions that affect drinking water quality. You may contact the Village of Paw Paw Council, which meets the second and fourth Monday of every month at 7:30 p.m. at Village Hall, 111 West Michigan Avenue. For more information about your water, or the contents of this report, contact John Small, Department of Public Services Director, 110 Harry L. Bush Blvd, Paw Paw, Michigan, 49079, phone number 269-657-3169. For more information about safe drinking water, visit the U.S. Environmental Protection Agency at www.epa.gov/safewater/.

APPENDIX H:

COST ESTIMATES

#	Project Description	Estimated Cost
1	S. Lagrave Street (1,175 ft. of watermain upsizing)	$ 470,898
2	Tulip Street (680 ft. of watermain upsizing)	$ 269,985
3	Lilac Street (350 ft. of watermain upsizing)	$ 165,105
4	Lily Street (420 ft. of watermain upsizing)	$ 152,748
5	Hillcrest Road/Fairfield Drive (460 ft./660 ft. of watermain upsizing)	**$ 494,625**
6	N. Dyckman Street (315 ft. of watermain upsizing)	$ 140,963
7	Hazen Street/Mather Court (1,410 ft/360 ft. of watermain upsizing)	$ 555,233
8	Commercial Avenue (S. Gremps Street to Kalamazoo Street)	$ 398,275
9	Business Park (East of Kalamazoo Street - Across from Industrial Avenue)	$ 478,885
10	Duo Tang Industrial Loop	$ 486,950
11	Bronson Hospital Service	$ 141,470
12	St. Joseph Street (480 ft. of watermain upsizing, Gremps Street to Kalamazoo Street)	$ 226,603
13	Kalamazoo Street (380 ft. of watermain upsizing, Industrial Avenue to Commercial Avenue)	$ 136,933
14	Gremps Street (1,040 ft. watermain upsizing, North of Industrial Avenue, Industrial Avenue between Gremps Street and Lake Boulevard)	$ 476,405
15	Bronson Hospital	$ 264,175
16	S. Kalamazoo Street (Industrial Avenue to Fadel Street)	$ 309,775
17	S. Kalamazoo Street (St Joseph Street to Warner Vineyards)	$ 568,200
Total - Short Term Distribution System Costs		**$ 5,737,225**
#	Project Description	Estimated Cost
1	600 LSLRs ($5000 each)	$ 3,000,000
Total - LSLR Costs		**$ 3,000,000**
#	Project Description	Estimated Cost
2	Dry Interior Partial Repaint	$ 8,750
3	Pit Piping Repaint	$ 5,000
4	Install Cathodic Protection System	$ 25,000
5	Weld Cathodic Covers	$ 2,500
6	Install Overflow Flap Gate	$ 2,500
7	Replace Wet Interior Roof Hatch	$ 3,750
8	Replace Access Tube Roof Hatch	$ 3,750
9	Replace Condensate Platform Hatch	$ 2,500
10	Install a Frost Free Roof Vent	$ 6,250
11	Replace Condensate Drain Line	$ 2,500
12	SCADA System Improvements	$ 1,875
13	SCADA Radio Modem Replacement	$ 1,188
Total - Short Term Water Storage Improvements		**$ 65,563**

#	Location Description	Estimated Cost
18	N. Van Buren Street (Oak Street to W. Michigan Avenue)	$ 84,935
19	Commercial Avenue (Lake Boulevard East to Gremps Street)	$ 161,480
20	Lakeview Terrace (Corner to Dead End)	$ 114,000
21	Business Park (East of Kalamazoo Street to Across from Fadel Street	$ 389,120
22	Commercial Avenue (Duo Tang Road to Lake Boulevard East)	$ 128,050
23	W. Michigan Avenue (Paw Paw River Crossing)	$ 118,215
24	N. Harris Street (Midblock to W. Willard Street)	$ 222,885
25	Oak Street (N. Niles Street to N. Brown Street)	$ 368,195
26	Ampey Road (Old S. Gremps Street to S. Kalamazoo Street)	$ 425,540
27	W. Willard Street (N. Harris Street to Hazen Street)	$ 348,215
28	S. Gremps Street (Midblock to E. Michigan Avenue)	$ 444,375
29	E. Michigan Avenue (S. Gremps Street to N. Van Buren Street)	$ 1,222,735
30	S. Kalamazoo Street (Michigan Avenue to Warner Vineyards)	$ 420,620
31	E. Berrien Street (Lake Boulevard to S. Kalamazoo Street)	$ 510,300
32	Hazen Street (W. Willard Street to W. Michigan Avenue)	$ 733,125
33	Harris Street (750 ft. of watermain upsizing)	$ 325,228
34	Brown Street (350 ft. of watermain upsizing, Elm Street to Pine Street)	$ 129,905
35	Elm Street (1,615 ft. of watermain upsizing, Dyckman Street to Hamilton Street)	**$ 635,828**
36	River Road (350 ft. of watermain upsizing)	$ 133,910
Total - Long Term Distribution System Improvements		**$ 6,916,660**

#	Project Description	Estimated Cost
1	SCADA System Improvements	$ 19,125
2	SCADA Radio Modem Replacement	$ 3,688
3	Well Improvements	$ 56,250
4	Pump Overhaul: Pump #4	$ 25,000
5	SCADA Central DPS System Upgrade	$ 38,125
6	SCADA Central DPS System Upgrade	$ 38,125
7	Pump Overhaul: Pump #6	$ 31,250
8	Pump Overhaul: Pump #6	$ 31,250
9	Pump Overhaul: Pump #8	$ 31,250
10	Pump Overhaul: Pump #8	$ 31,250
11	Roof Replacement: Pump House for Pump #4	$ 25,000
12	Roof Replacement: Pump House for Pump #6 and #8	$ 25,000
Total - Long Term Water Supply Improvements		**$ 355,313**

#	Project Description	Estimated Cost
1	Exterior Overcoat	$ 75,000.00
2	Install Painter's Railing	$ 5,000.00
3	Install Fall Prevention on the Dry Interior Ladders	$ 3,000.00
4	Install Fall Prevention on the Wet Interior Ladders	$ 1,000.00
5	SCADA System Improvements	$ 5,100.00
6	SCADA Radio Modem Replacement	$ 950.00
Total - Long Term Water Storage Improvements		**$ 90,050**

#	Project Description	Estimated Cost
1	175 LSLRs ($5000 Each)	$ 875,000
Total - LSLR Costs		**$ 875,000**

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Project Name: Paw Paw DWSRF Distribution Projects
Project Number: 21-0305
Updated/Compiled by: LRK
Checked by:
Date: 03/23/2021

Short-Term Distribution Projects

1: S. Lagrave Street (1,175 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	Ls	$30,000.00	$30,000.00
Pavt, Rem	1570	Syd	$10.00	$15,700.00
Machine Grading	12	Sta	$2,000.00	$24,000.00
Subbase, CIP	523	Cyd	$15.00	$7,850.00
Aggregate Base, 8 inch	1570	Syd	$10.00	$15,700.00
HMA, 13A	136	Tons	$100.00	$13,600.00
HMA, 36A	136	Tons	$100.00	$13,600.00
Traffic Control	1	Ls	$10,000.00	$10,000.00
Slope Restoration, Type B	653	Syd	$7.50	$4,897.50
Fire Hydrant	1	Ea	$5,000.00	$5,000.00
Gate Valve and Box, 8 inch	3	Ea	$2,000.00	$6,000.00
Water Main, DI, 8 inch, TR DET G	1175	Ft	$90.00	$105,750.00
Water Serv	22	Ea	$5,000.00	$110,000.00
			Construction Total	**$362,097.50**
			Contingency (15%)	**$54,400.00**
			Engineering (15%)	**$54,400.00**
			Total	**$470,897.50**

2: Tulip Street (680 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max.	1	Ls	$ 20,000.00	$20,000.00
Pavt, Rem	910	Syd	$10.00	$9,100.00
Machine Grading	7	Sta	$2,000.00	$14,000.00
Subbase, CIP	303	Cyd	$15.00	$4,550.00
Aggregate Base, 8 inch	910	Syd	$10.00	$9,100.00
HMA, 13A	79	Tons	$100.00	$7,900.00
HMA, 36A	79	Tons	$100.00	$7,900.00
Traffic Control	1	Ls	$10,000.00	$10,000.00
Slope Restoration, Type B	378	Syd	$7.50	$2,835.00
Fire Hydrant	1	Ea	$5,000.00	$5,000.00
Gate Valve and Box, 8 inch	3	Ea	$2,000.00	$6,000.00
Water Main, DI, 8 inch, TR DET G	680	Ft	$90.00	$61,200.00
Water Serv	10	Ea	$5,000.00	$50,000.00
			Construction Total	**$207,585.00**
			Contingency (15%)	**$31,200.00**
			Engineering (15%)	**$31,200.00**
			Total	**$269,985.00**

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3: Lilac Street (350 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max.	1	Ls	$ 10,000.00	$10,000.00
Pavt, Rem	470	Syd	$10.00	$4,700.00
Machine Grading	4	Sta	$2,000.00	$8,000.00
Subbase, CIP	157	Cyd	$15.00	$2,350.00
Aggregate Base, 8 inch	470	Syd	$10.00	$4,700.00
HMA, 13A	41	Tons	$100.00	$4,100.00
HMA, 36A	41	Tons	$100.00	$4,100.00
Traffic Control	1	Ls	$10,000.00	$10,000.00
Slope Restoration, Type B	194	Syd	$7.50	$1,455.00
Fire Hydrant	0	Ea	$5,000.00	$0.00
Gate Valve and Box, 8 inch	3	Ea	$2,000.00	$6,000.00
Water Main, DI, 8 inch, TR DET G	350	Ft	$90.00	$31,500.00
Water Serv	8	Ea	$5,000.00	$40,000.00
			Construction Total	**$126,905.00**
			Contingency (15%)	**$19,100.00**
			Engineering (15%)	**$19,100.00**
			Total	**$165,105.00**

4: Lily Street (420 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max.	1	Ls	$ 10,000.00	$10,000.00
Pavt, Rem	560	Syd	$10.00	$5,600.00
Machine Grading	5	Sta	$2,000.00	$10,000.00
Subbase, CIP	187	Cyd	$15.00	$2,800.00
Aggregate Base, 8 inch	560	Syd	$10.00	$5,600.00
HMA, 13A	49	Tons	$100.00	$4,900.00
HMA, 36A	49	Tons	$100.00	$4,900.00
Traffic Control	1	Ls	$5,000.00	$5,000.00
Slope Restoration, Type B	233	Syd	$7.50	$1,747.50
Fire Hydrant	0	Ea	$10,000.00	$0.00
Gate Valve and Box, 8 inch	2	Ea	$2,000.00	$4,000.00
Water Main, DI, 8 inch, TR DET G	420	Ft	$90.00	$37,800.00
Water Serv	5	Ea	$5,000.00	$25,000.00
			Construction Total	**$117,347.50**
			Contingency (15%)	**$17,700.00**
			Engineering (15%)	**$17,700.00**
			Total	**$152,747.50**

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5: Hillcrest Road/Fairfield Drive (460 ft./660 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max.	1	Ls	$ 35,000.00	$35,000.00
Pavt, Rem	1250	Syd	$10.00	$12,500.00
Machine Grading	12	Sta	$2,000.00	$23,000.00
Subbase, CIP	500	Cyd	$15.00	$7,500.00
Aggregate Base, 8 inch	1475	Syd	$10.00	$14,750.00
HMA, 13A	170	Tons	$100.00	$17,000.00
HMA, 36A	170	Tons	$100.00	$17,000.00
Traffic Control	1	Ls	$10,000.00	$10,000.00
Slope Restoration, Type B	650	Syd	$7.50	$4,875.00
Fire Hydrant	3	Ea	$10,000.00	$30,000.00
Gate Valve and Box, 8 inch	4	Ea	$2,000.00	$8,000.00
Water Main, DI, 8 inch, TR DET G	1120	Ft	$90.00	$100,800.00
Water Serv	20	Ea	$5,000.00	$100,000.00
			Construction Total	**$380,425.00**
			Contingency (15%)	**$57,100.00**
			Engineering (15%)	**$57,100.00**
			Total	**$494,625.00**

6: N. Dyckman Street (315 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max.	1	Ls	$ 10,000.00	$10,000.00
Pavt, Rem	420	Syd	$10.00	$4,200.00
Machine Grading	4	Sta	$2,000.00	$8,000.00
Subbase, CIP	140	Cyd	$15.00	$2,100.00
Aggregate Base, 8 inch	420	Syd	$10.00	$4,200.00
HMA, 13A	36	Tons	$100.00	$3,600.00
HMA, 36A	36	Tons	$100.00	$3,600.00
Traffic Control	1	Ls	$5,000.00	$5,000.00
Slope Restoration, Type B	175	Syd	$7.50	$1,312.50
Fire Hydrant	1	Ea	$10,000.00	$10,000.00
Gate Valve and Box, 8 inch	4	Ea	$2,000.00	$8,000.00
Water Main, DI, 8 inch, TR DET G	315	Ft	$90.00	$28,350.00
Water Serv	4	Ea	$5,000.00	$20,000.00
			Construction Total	**$108,362.50**
			Contingency (15%)	**$16,300.00**
			Engineering (15%)	**$16,300.00**
			Total	**$140,962.50**

7: Hazen Street/Mather Court (1,410 ft/360 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	Ls	$ 40,000.00	$40,000.00
Pavt, Rem	1881	Syd	$10.00	$18,810.00
Machine Grading	23	Sta	$2,000.00	$46,140.00
Subbase, CIP	1774	Cyd	$15.00	$26,610.00
Aggregate Base, 8 inch	1880	Syd	$10.00	$18,800.00
HMA, 13A	205	Tons	$100.00	$20,500.00
HMA, 36A	205	Tons	$100.00	$20,500.00
Traffic Control	1	Ls	$10,000.00	$10,000.00
Slope Restoration, Type B	983	Syd	$7.50	$7,372.50
Fire Hydrant	0	Ea	$10,000.00	$0.00
Gate Valve and Box, 8 inch	7	Ea	$2,000.00	$14,000.00
Water Main, DI, 8 inch, TR DET G	1770	Ft	$90.00	$159,300.00
Water Serv	9	Ea	$5,000.00	$45,000.00
			Construction Total	**$427,032.50**
			Contingency (15%)	**$64,100.00**
			Engineering (15%)	**$64,100.00**
			Total	**$555,232.50**

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8: Commercial Avenue (S. Gremps Street to Kalamazoo Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 25,000.00	$25,000.00
Traffic Control	1	LSum	$ 10,000.00	$10,000.00
Machine Grading	8	Sta	$ 2,000.00	$16,140.00
Pavt, Rem, Modified	987	Syd	$ 10.00	$9,870.00
Aggregate Base, 8 inch	987	Syd	$ 10.00	$9,870.00
Subbase, CIP	329	Cyd	$ 15.00	$4,935.00
HMA Surface	285	Ton	$ 100.00	$28,500.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$15,000.00
Gate Valve & Box, 12 Inch	3	Ea	$ 2,500.00	$7,500.00
Water Main, DI, 12 Inch, Tr Det G	807	Ft	$ 130.00	$104,910.00
Water Service	11	Ea	$ 5,000.00	$55,000.00
Curb Stop and Box	11	Ea	$ 600.00	$6,600.00
Restoration (Grass, Seed, & Topsoil)	220	Syd	$ 7.50	$1,650.00
			Construction Total	**$294,975.00**
			Contingency (15%)	**$44,300.00**
			Engineering (20%)	**$59,000.00**
			Total	**$398,275.00**

9: Business Park (East of Kalamazoo Street – Across from Industrial Avenue)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	LSum	$ 35,000.00	$ 35,000.00
Traffic Control	1	LSum	$ 15,000.00	$ 15,000.00
Machine Grading	12	Sta	$ 2,000.00	$ 23,120.00
Pavt, Rem, Modified	1413	Syd	$ 10.00	$ 14,130.00
Aggregate Base, 8 inch	1413	Syd	$ 10.00	$ 14,130.00
Subbase, CIP (12 inches)	471	Cyd	$ 15.00	$ 7,065.00
HMA Surface	408	Ton	$ 100.00	$ 40,800.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$ 15,000.00
Gate Valve & Box, 8 inch	4	Ea	$ 2,000.00	$ 8,000.00
Water Main, DI, 8 inch, Tr Det G	1156	Ft	$ 90.00	$ 104,040.00
Water Service	16	Ea	$ 5,000.00	$ 80,000.00
Curb Stop and Box	16	Ea	$ 600.00	$ 9,600.00
Restoration (Grass, Seed, & Topsoil)	320	Syd	$ 7.50	$ 2,400.00
			Construction Total	**$368,285.00**
			Contingency (15%)	**$55,300.00**
			Engineering (15%)	**$55,300.00**
			Total	**$478,885.00**

10: Duo Tang Industrial Loop				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 35,000.00	$ 35,000.00
Traffic Control	1	LSum	$ 15,000.00	$ 15,000.00
Machine Grading	10	Sta	$ 2,000.00	$ 20,520.00
Pavt, Rem, Modified	1254	Syd	$ 10.00	$ 12,540.00
Aggregate Base, 8 inch	1254	Syd	$ 10.00	$ 12,540.00
Subbase, CIP (12 Inches)	418	Cyd	$ 15.00	$ 6,270.00
HMA Surface	363	Ton	$ 100.00	$ 36,300.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$ 15,000.00
Gate Valve & Box, 12 inch	3	Ea	$ 2,500.00	$ 7,500.00
Water Main, DI, 12 inch, Tr Det G	1026	Ft	$ 130.00	$ 133,380.00
Water Service	14	Ea	$ 5,000.00	$ 70,000.00
Curb Stop and Box	14	Ea	$ 600.00	$ 8,400.00
Restoration (Grass, Seed, & Topsoil)	280	Syd	$ 7.50	$ 2,100.00
			Construction Total	**$374,550.00**
			Contingency (15%)	**$56,200.00**
			Engineering (15%)	**$56,200.00**
			Total	**$486,950.00**

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11: Bronson Hospital Service				
Item	Quantity	Unit	Unit Cost	Item Cost
Mobilization	1	LSum	$ 10,000.00	$ 10,000.00
Traffic Control	1	LSum	$ 5,000.00	$ 5,000.00
Machine Grading	4	Sta	$ 2,000.00	$ 7,620.00
Pavt, Rem, Modified	466	Syd	$ 10.00	$ 4,660.00
Aggregate Base, 8 inch	466	Syd	$ 10.00	$ 4,660.00
Subbase, CIP (12 Inches)	156	Cyd	$ 15.00	$ 2,340.00
HMA Surface	81	Ton	$ 100.00	$ 8,100.00
Fire Hydrant Assembly	1	Ea	$ 5,000.00	$ 5,000.00
Gate Valve & Box, 8 inch	2	Ea	$ 2,000.00	$ 4,000.00
Water Main, DI, 8 inch, Tr Det G	381	Ft	$ 90.00	$ 34,290.00
Water Service	4	Ea	$ 5,000.00	$ 20,000.00
Curb Stop and Box	4	Ea	$ 600.00	$ 2,400.00
Restoration (Grass, Seed, & Topsoil)	80	Syd	$ 7.50	$ 600.00
			Construction Total	**$108,670.00**
			Contingency (15%)	**$16,400.00**
			Engineering (15%)	**$16,400.00**
			Total	**$141,470.00**

12: St. Joseph Street (480 ft. of water main upsizing, Gremps Street to Kalamazoo Street)				
Item	Quantity	Unit	Unit Cost	Item Cost
Mobilization, Max	1	Ls	$ 15,000.00	$ 15,000.00
Pavt, Rem	640	Syd	$10.00	$ 6,400.00
Machine Grading	5	Sta	$2,000.00	$ 10,000.00
Subbase, CIP	213	Cyd	$15.00	$ 3,200.00
Aggregate Base, 8 inch	640	Syd	$10.00	$ 6,400.00
HMA, 13A	55	Tons	$100.00	$ 5,500.00
HMA, 36A	55	Tons	$100.00	$ 5,500.00
Traffic Control	1	Ls	$5,000.00	$ 5,000.00
Slope Restoration, Type B	267	Syd	$7.50	$ 2,002.50
Fire Hydrant	0	Ea	$5,000.00	$ -
Gate Valve and Box, 8 inch	6	Ea	$2,000.00	$ 12,000.00
Water Main, DI, 8 inch, TR DET G	480	Ft	$90.00	$ 43,200.00
Water Serv	12	Ea	$5,000.00	$ 60,000.00
			Construction Total	**$174,202.50**
			Contingency (15%)	**$26,200.00**
			Engineering (15%)	**$26,200.00**
			Total	**$226,602.50**

13: Kalamazoo Street (380 ft. of water main upsizing, Industrial Ave to Commercial Ave)				
Item	Quantity	Unit	Unit Cost	Item Cost
Mobilization, Max	1	Ls	$ 10,000.00	$ 10,000.00
Pavt, Rem	510	Syd	$10.00	$ 5,100.00
Machine Grading	4	Sta	$2,000.00	$ 8,000.00
Subbase, CIP	170	Cyd	$15.00	$ 2,550.00
Aggregate Base, 8 inch	510	Syd	$10.00	$ 5,100.00
HMA, 13A	44	Tons	$100.00	$ 4,400.00
HMA, 36A	44	Tons	$100.00	$ 4,400.00
Traffic Control	1	Ls	$5,000.00	$ 5,000.00
Slope Restoration, Type B	211	Syd	$7.50	$ 1,582.50
Fire Hydrant	1	Ea	$5,000.00	$ 5,000.00
Gate Valve and Box, 8 inch	5	Ea	$2,000.00	$ 10,000.00
Water Main, DI, 8 inch, TR DET G	380	Ft	$90.00	$ 34,200.00
Water Serv	2	Ea	$5,000.00	$ 10,000.00
			Construction Total	**$105,332.50**
			Contingency (15%)	**$15,800.00**
			Engineering (15%)	**$15,800.00**
			Total	**$136,932.50**

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14: Gremps St (1,040 ft. water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	Ls	$ 35,000.00	$ 35,000.00
Pavt, Rem	1970	Syd	$10.00	$ 19,700.00
Machine Grading	16	Sta	$2,000.00	$ 32,000.00
Subbase, CIP	658	Cyd	$15.00	$ 9,870.00
Aggregate Base, 8 inch	1970	Syd	$10.00	$ 19,700.00
HMA, 13A	170	Tons	$100.00	$ 17,000.00
HMA, 36A	170	Tons	$100.00	$ 17,000.00
Traffic Control	1	Ls	$10,000.00	$ 10,000.00
Slope Restoration, Type B	778	Syd	$7.50	$ 5,835.00
Fire Hydrant	4	Ea	$5,000.00	$ 20,000.00
Gate Valve and Box, 8 inch	14	Ea	$2,000.00	$ 28,000.00
Water Main, DI, 8 inch, TR DET G	1470	Ft	$90.00	$ 132,300.00
Water Serv	4	Ea	$5,000.00	$ 20,000.00
			Construction Total	**$366,405.00**
			Contingency (15%)	**$55,000.00**
			Engineering (15%)	**$55,000.00**
			Total	**$476,405.00**

15: Bronson Hospital				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	Ls	$ 20,000.00	$ 20,000.00
Pavt, Rem	1100	Syd	$10.00	$ 11,000.00
Machine Grading	10	Sta	$2,000.00	$ 19,600.00
Subbase, CIP	375	Cyd	$15.00	$ 5,625.00
Aggregate Base, 8 inch	1100	Syd	$10.00	$ 11,000.00
HMA, 13A	125	Tons	$100.00	$ 12,500.00
HMA, 36A	125	Tons	$100.00	$ 12,500.00
Traffic Control	1	Ls	$5,000.00	$ 5,000.00
Slope Restoration, Type B	500	Syd	$7.50	$ 3,750.00
Fire Hydrant	0	Ea	$5,000.00	$ -
Gate Valve and Box, 8 inch	2	Ea	$2,000.00	$ 4,000.00
Water Main, DI, 8 inch, TR DET G	980	Ft	$90.00	$ 88,200.00
Water Serv	2	Ea	$5,000.00	$ 10,000.00
			Construction Total	**$203,175.00**
			Contingency (15%)	**$30,500.00**
			Engineering (15%)	**$30,500.00**
			Total	**$264,175.00**

16: S. Kalamazoo Street (Industrial Avenue to Fadel Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 20,000.00	$ 20,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	6	Sta	$ 2,000.00	$ 12,000.00
Pavt, Rem, Modified	675	Syd	$ 10.00	$ 6,750.00
Aggregate Base, 8 inch	675	Syd	$ 10.00	$ 6,750.00
Subbase, CIP	225	Cyd	$ 15.00	$ 3,375.00
HMA Surface	340	Ton	$ 100.00	$ 34,000.00
Fire Hydrant Assembly	2	Ea	$ 5,000.00	$ 10,000.00
Gate Valve & Box, 8 Inch	2	Ea	$ 2,000.00	$ 4,000.00
Water Main, DI, 8 Inch, Tr Det G	600	Ft	$ 90.00	$ 54,000.00
Water Service	13	Ea	$ 5,000.00	$ 65,000.00
Curb Stop and Box	13	Ea	$ 600.00	$ 7,800.00
Restoration (Grass, Seed, & Topsoil)	600	Syd	$ 7.50	$ 4,500.00
			Construction Total	**$238,175.00**
			Contingency (15%)	**$35,800.00**
			Engineering (15%)	**$35,800.00**
			Total	**$309,775.00**

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17: S. Kalamazoo Street (St Joseph Street to Warner Vineyards)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 40,000.00	$ 40,000.00
Traffic Control	1	LSum	$ 20,000.00	$ 20,000.00
Machine Grading	10	Sta	$ 2,000.00	$ 20,000.00
Pavt, Rem, Modified	1200	Syd	$ 10.00	$ 12,000.00
Aggregate Base, 8 inch	1200	Syd	$ 10.00	$ 12,000.00
Subbase, CIP	400	Cyd	$ 15.00	$ 6,000.00
HMA Surface	550	Ton	$ 100.00	$ 55,000.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$ 15,000.00
Gate Valve & Box, 12 Inch	3	Ea	$ 2,000.00	$ 6,000.00
Water Main, DI, 12 Inch, Tr Det G	1000	Ft	$ 130.00	$ 130,000.00
Water Service	20	Ea	$ 5,000.00	$ 100,000.00
Curb Stop and Box	20	Ea	$ 600.00	$ 12,000.00
Restoration (Grass, Seed, & Topsoil)	1200	Syd	$ 7.50	$ 9,000.00
			Construction Total	**$437,000.00**
			Contingency (15%)	**$65,600.00**
			Engineering (15%)	**$65,600.00**
			Total	**$568,200.00**

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Long-Term Distribution Projects

18: N. Van Buren Street (Oak Street to W. Michigan Avenue)

Item	Quantity	Unit	Unit Cost	Item Cost
Mobilization	1	LSum	$ 5,000.00	$ 5,000.00
Traffic Control	1	LSum	$ 5,000.00	$ 5,000.00
Machine Grading	2	Sta	$ 2,000.00	$ 3,960.00
Pavt, Rem, Modified	242	Syd	$ 10.00	$ 2,420.00
Aggregate Base, 8 inch	242	Syd	$ 10.00	$ 2,420.00
Subbase, CIP	81	Cyd	$ 15.00	$ 1,215.00
HMA Surface	42	Ton	$ 100.00	$ 4,200.00
Fire Hydrant Assembly	1	Ea	$ 5,000.00	$ 5,000.00
Gate Valve & Box, 8 Inch	1	Ea	$ 2,000.00	$ 2,000.00
Water Main, DI, 8 Inch, Tr Det G	198	Ft	$ 90.00	$ 17,820.00
Water Service	2	Ea	$ 5,000.00	$ 10,000.00
Curb Stop and Box	2	Ea	$ 600.00	$ 1,200.00
Restoration (Grass, Seed, & Topsoil)	40	Syd	$ 7.50	$ 300.00
			Construction Total	**$60,535.00**
			Contingency (20%)	**$12,200.00**
			Engineering (20%)	**$12,200.00**
			Total	**$84,935.00**

19: Commercial Avenue (Lake Boulevard East to Gremps Street)

Item	Quantity	Unit	Unit Cost	Item Cost
Mobilization	1	LSum	$ 10,000.00	$ 10,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	3	Sta	$ 2,000.00	$ 6,760.00
Pavt, Rem, Modified	414	Syd	$ 10.00	$ 4,140.00
Aggregate Base, 8 inch	414	Syd	$ 10.00	$ 4,140.00
Subbase, CIP	138	Cyd	$ 15.00	$ 2,070.00
HMA Surface	120	Ton	$ 100.00	$ 12,000.00
Fire Hydrant Assembly	1	Ea	$ 5,000.00	$ 5,000.00
Gate Valve & Box, 8 Inch	1	Ea	$ 2,000.00	$ 2,000.00
Water Main, DI, 8 Inch, Tr Det G	338	Ft	$ 90.00	$ 30,420.00
Water Service	5	Ea	$ 5,000.00	$ 25,000.00
Curb Stop and Box	5	Ea	$ 600.00	$ 3,000.00
Restoration (Grass, Seed, & Topsoil)	100	Syd	$ 7.50	$ 750.00
			Construction Total	**$115,280.00**
			Contingency (20%)	**$23,100.00**
			Engineering (20%)	**$23,100.00**
			Total	**$161,480.00**

20: Lakeview Terrace (Corner to Dead End)

Item	Quantity	Unit	Unit Cost	Item Cost
Mobilization	1	LSum	$ 10,000.00	$ 10,000.00
Traffic Control	1	LSum	$ 5,000.00	$ 5,000.00
Machine Grading	3	Sta	$ 2,000.00	$ 5,200.00
Pavt, Rem, Modified	318	Syd	$ 10.00	$ 3,180.00
Aggregate Base, 8 inch	318	Syd	$ 10.00	$ 3,180.00
Subbase, CIP	106	Cyd	$ 15.00	$ 1,590.00
HMA Surface	56	Ton	$ 100.00	$ 5,600.00
Fire Hydrant Assembly	1	Ea	$ 5,000.00	$ 5,000.00
Gate Valve & Box, 8 Inch	1	Ea	$ 2,000.00	$ 2,000.00
Water Main, DI, 8 Inch, Tr Det G	260	Ft	$ 90.00	$ 23,400.00
Water Service	3	Ea	$ 5,000.00	$ 15,000.00
Curb Stop and Box	3	Ea	$ 600.00	$ 1,800.00
Restoration (Grass, Seed, & Topsoil)	60	Syd	$ 7.50	$ 450.00
			Construction Total	**$81,400.00**
			Contingency (20%)	**$16,300.00**
			Engineering (20%)	**$16,300.00**
			Total	**$114,000.00**

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21: Business Park (East of Kalamazoo Street to Across from Fadel Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 25,000.00	$ 25,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	11	Sta	$ 2,000.00	$ 22,000.00
Pavt, Rem, Modified	1103	Syd	$ 10.00	$ 11,030.00
Aggregate Base, 8 inch	1123	Syd	$ 10.00	$ 11,230.00
Subbase, CIP	375	Cyd	$ 15.00	$ 5,625.00
HMA Surface	277	Ton	$ 100.00	$ 27,700.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$ 15,000.00
Gate Valve & Box, 8 Inch	3	Ea	$ 2,000.00	$ 6,000.00
Water Main, DI, 8 Inch, Tr Det G	1129	Ft	$ 90.00	$ 101,610.00
Water Service	7	Ea	$ 5,000.00	$ 35,000.00
Curb Stop and Box	7	Ea	$ 600.00	$ 4,200.00
Restoration (Grass, Seed, & Topsoil)	470	Syd	$ 7.50	$ 3,525.00
			Construction Total	**$277,920.00**
			Contingency (20%)	**$55,600.00**
			Engineering (20%)	**$55,600.00**
			Total	**$389,120.00**

22: Commercial Avenue (Duo Tang Road to Lake Boulevard East)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 10,000.00	$ 10,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	2	Sta	$ 2,000.00	$ 4,320.00
Pavt, Rem, Modified	264	Syd	$ 10.00	$ 2,640.00
Aggregate Base, 8 inch	264	Syd	$ 10.00	$ 2,640.00
Subbase, CIP	88	Cyd	$ 15.00	$ 1,320.00
HMA Surface	77	Ton	$ 100.00	$ 7,700.00
Fire Hydrant Assembly	1	Ea	$ 5,000.00	$ 5,000.00
Gate Valve & Box, 12 Inch	1	Ea	$ 2,500.00	$ 2,500.00
Water Main, DI, 12 Inch, Tr Det G	216	Ft	$ 130.00	$ 28,080.00
Water Service	3	Ea	$ 5,000.00	$ 15,000.00
Curb Stop and Box	3	Ea	$ 600.00	$ 1,800.00
Restoration (Grass, Seed, & Topsoil)	60	Syd	$ 7.50	$ 450.00
			Construction Total	**$91,450.00**
			Contingency (20%)	**$18,300.00**
			Engineering (20%)	**$18,300.00**
			Total	**$128,050.00**

23: W. Michigan Avenue (Paw Paw River Crossing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 10,000.00	$ 10,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	1	Sta	$ 2,000.00	$ 1,180.00
Pavt, Rem, Modified	73	Syd	$ 10.00	$ 730.00
Aggregate Base, 8 inch	73	Syd	$ 10.00	$ 730.00
Subbase, CIP	25	Cyd	$ 15.00	$ 375.00
HMA Surface	34	Ton	$ 100.00	$ 3,400.00
Fire Hydrant Assembly	1	Ea	$ 5,000.00	$ 5,000.00
Gate Valve & Box, 12 Inch	1	Ea	$ 2,500.00	$ 2,500.00
Water Main, DI, 12 Inch, Tr Det G	300	Ft	$ 130.00	$ 39,000.00
Water Service	2	Ea	$ 5,000.00	$ 10,000.00
Curb Stop and Box	2	Ea	$ 600.00	$ 1,200.00
Restoration (Grass, Seed, & Topsoil)	40	Syd	$ 7.50	$ 300.00
			Construction Total	**$84,415.00**
			Contingency (20%)	**$16,900.00**
			Engineering (20%)	**$16,900.00**
			Total	**$118,215.00**

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24: N. Harris Street (Midblock to W. Willard Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 15,000.00	$ 15,000.00
Traffic Control	1	LSum	$ 5,000.00	$ 5,000.00
Machine Grading	5	Sta	$ 2,000.00	$ 9,540.00
Pavt, Rem, Modified	583	Syd	$ 10.00	$ 5,830.00
Aggregate Base, 8 inch	583	Syd	$ 10.00	$ 5,830.00
Subbase, CIP	195	Cyd	$ 15.00	$ 2,925.00
HMA Surface	102	Ton	$ 100.00	$ 10,200.00
Fire Hydrant Assembly	2	Ea	$ 5,000.00	$ 10,000.00
Gate Valve & Box, 12 Inch	2	Ea	$ 2,000.00	$ 4,000.00
Water Main, DI, 12 Inch, Tr Det G	477	Ft	$ 130.00	$ 62,010.00
Water Service	5	Ea	$ 5,000.00	$ 25,000.00
Curb Stop and Box	5	Ea	$ 600.00	$ 3,000.00
Restoration (Grass, Seed, & Topsoil)	100	Syd	$ 7.50	$ 750.00
			Construction Total	**$159,085.00**
			Contingency (20%)	**$31,900.00**
			Engineering (20%)	**$31,900.00**
			Total	**$222,885.00**

25: Oak Street (N. Niles Street to N. Brown Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 25,000.00	$ 25,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	9	Sta	$ 2,000.00	$ 18,480.00
Pavt, Rem, Modified	1130	Syd	$ 10.00	$ 11,300.00
Aggregate Base, 8 inch	1130	Syd	$ 10.00	$ 11,300.00
Subbase, CIP	377	Cyd	$ 15.00	$ 5,655.00
HMA Surface	196	Ton	$ 100.00	$ 19,600.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$ 15,000.00
Gate Valve & Box, 8 Inch	3	Ea	$ 2,000.00	$ 6,000.00
Water Main, DI, 8 Inch, Tr Det G	924	Ft	$ 90.00	$ 83,160.00
Water Service	10	Ea	$ 5,000.00	$ 50,000.00
Curb Stop and Box	10	Ea	$ 600.00	$ 6,000.00
Restoration (Grass, Seed, & Topsoil)	200	Syd	$ 7.50	$ 1,500.00
			Construction Total	**$262,995.00**
			Contingency (20%)	**$52,600.00**
			Engineering (20%)	**$52,600.00**
			Total	**$368,195.00**

26: Ampey Road (Old S. Gremps Street to S. Kalamazoo)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 30,000.00	$ 30,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	10	Sta	$ 2,000.00	$ 19,120.00
Pavt, Rem, Modified	1169	Syd	$ 10.00	$ 11,690.00
Aggregate Base, 8 inch	1169	Syd	$ 10.00	$ 11,690.00
Subbase, CIP	390	Cyd	$ 15.00	$ 5,850.00
HMA Surface	338	Ton	$ 100.00	$ 33,800.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$ 15,000.00
Gate Valve & Box, 8 Inch	3	Ea	$ 2,000.00	$ 6,000.00
Water Main, DI, 8 Inch, Tr Det G	956	Ft	$ 90.00	$ 86,040.00
Water Service	13	Ea	$ 5,000.00	$ 65,000.00
Curb Stop and Box	13	Ea	$ 600.00	$ 7,800.00
Restoration (Grass, Seed, & Topsoil)	260	Syd	$ 7.50	$ 1,950.00
			Construction Total	**$303,940.00**
			Contingency (20%)	**$60,800.00**
			Engineering (20%)	**$60,800.00**
			Total	**$425,540.00**

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27: W. Willard Street (N. Harris Street to Hazen Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 20,000.00	$ 20,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	8	Sta	$ 2,000.00	$ 16,820.00
Pavt, Rem, Modified	1028	Syd	$ 10.00	$ 10,280.00
Aggregate Base, 8 inch	1028	Syd	$ 10.00	$ 10,280.00
Subbase, CIP	343	Cyd	$ 15.00	$ 5,145.00
HMA Surface	230	Ton	$ 100.00	$ 23,000.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$ 15,000.00
Gate Valve & Box, 8 Inch	3	Ea	$ 2,000.00	$ 6,000.00
Water Main, DI, 8 Inch, Tr Det G	841	Ft	$ 90.00	$ 75,690.00
Water Service	9	Ea	$ 5,000.00	$ 45,000.00
Curb Stop and Box	9	Ea	$ 600.00	$ 5,400.00
Restoration (Grass, Seed, & Topsoil)	800	Syd	$ 7.50	$ 6,000.00
			Construction Total	**$248,615.00**
			Contingency (20%)	**$49,800.00**
			Engineering (20%)	**$49,800.00**
			Total	**$348,215.00**

28: S. Gremps Street (Midblock to E. Michigan Avenue)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 30,000.00	$ 30,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	9	Sta	$ 2,000.00	$ 17,220.00
Pavt, Rem, Modified	1053	Syd	$ 10.00	$ 10,530.00
Aggregate Base, 8 inch	1053	Syd	$ 10.00	$ 10,530.00
Subbase, CIP	351	Cyd	$ 15.00	$ 5,265.00
HMA Surface	304	Ton	$ 100.00	$ 30,400.00
Fire Hydrant Assembly	3	Ea	$ 5,000.00	$ 15,000.00
Gate Valve & Box, 12 Inch	3	Ea	$ 2,500.00	$ 7,500.00
Water Main, DI, 12 Inch, Tr Det G	861	Ft	$ 130.00	$ 111,930.00
Water Service	12	Ea	$ 5,000.00	$ 60,000.00
Curb Stop and Box	12	Ea	$ 600.00	$ 7,200.00
Restoration (Grass, Seed, & Topsoil)	240	Syd	$ 7.50	$ 1,800.00
			Construction Total	**$317,375.00**
			Contingency (20%)	**$63,500.00**
			Engineering (20%)	**$63,500.00**
			Total	**$444,375.00**

29: E. Michigan Avenue (S. Gremps Street to N. Van Buren Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 80,000.00	$ 80,000.00
Traffic Control	1	LSum	$ 50,000.00	$ 50,000.00
Machine Grading	22	Sta	$ 2,000.00	$ 44,720.00
Pavt, Rem, Modified	2733	Syd	$ 10.00	$ 27,330.00
Aggregate Base, 8 inch	2733	Syd	$ 10.00	$ 27,330.00
Subbase, CIP	911	Cyd	$ 15.00	$ 13,665.00
HMA Surface	1263	Ton	$ 100.00	$ 126,300.00
Fire Hydrant Assembly	6	Ea	$ 5,000.00	$ 30,000.00
Gate Valve & Box, 8 Inch	7	Ea	$ 2,000.00	$ 14,000.00
Water Main, DI, 8 Inch, Tr Det G	2236	Ft	$ 90.00	$ 201,240.00
Water Service	45	Ea	$ 5,000.00	$ 225,000.00
Curb Stop and Box	45	Ea	$ 600.00	$ 27,000.00
Restoration (Grass, Seed, & Topsoil)	900	Syd	$ 7.50	$ 6,750.00
			Construction Total	**$873,335.00**
			Contingency (20%)	**$174,700.00**
			Engineering (20%)	**$174,700.00**
			Total	**$1,222,735.00**

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30: S. Kalamazoo Street (Michigan Avenue to St Joseph Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 30,000.00	$ 30,000.00
Traffic Control	1	LSum	$ 20,000.00	$ 20,000.00
Machine Grading	7	Sta	$ 2,000.00	$ 13,220.00
Pavt, Rem, Modified	810	Syd	$ 10.00	$ 8,100.00
Aggregate Base, 8 inch	810	Syd	$ 10.00	$ 8,100.00
Subbase, CIP	270	Cyd	$ 15.00	$ 4,050.00
HMA Surface	370	Ton	$ 100.00	$ 37,000.00
Fire Hydrant Assembly	2	Ea	$ 5,000.00	$ 10,000.00
Gate Valve & Box, 12 Inch	2	Ea	$ 2,500.00	$ 5,000.00
Water Main, DI, 12 Inch, Tr Det G	660	Ft	$ 130.00	$ 85,800.00
Water Service	14	Ea	$ 5,000.00	$ 70,000.00
Curb Stop and Box	14	Ea	$ 600.00	$ 8,400.00
Restoration (Grass, Seed, & Topsoil)	100	Syd	$ 7.50	$ 750.00
			Construction Total	**$300,420.00**
			Contingency (20%)	**$60,100.00**
			Engineering (20%)	**$60,100.00**
			Total	**$420,620.00**

31: E. Berrien Street (Lake Boulevard to S. Kalamazoo Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 35,000.00	$ 35,000.00
Traffic Control	1	LSum	$ 10,000.00	$ 10,000.00
Machine Grading	13	Sta	$ 2,000.00	$ 26,080.00
Pavt, Rem, Modified	1594	Syd	$ 10.00	$ 15,940.00
Aggregate Base, 8 inch	1594	Syd	$ 10.00	$ 15,940.00
Subbase, CIP	532	Cyd	$ 15.00	$ 7,980.00
HMA Surface	277	Ton	$ 100.00	$ 27,700.00
Fire Hydrant Assembly	4	Ea	$ 5,000.00	$ 20,000.00
Gate Valve & Box, 8 Inch	4	Ea	$ 2,000.00	$ 8,000.00
Water Main, DI, 8 Inch, Tr Det G	1304	Ft	$ 90.00	$ 117,360.00
Water Service	14	Ea	$ 5,000.00	$ 70,000.00
Curb Stop and Box	14	Ea	$ 600.00	$ 8,400.00
Restoration (Grass, Seed, & Topsoil)	280	Syd	$ 7.50	$ 2,100.00
			Construction Total	**$364,500.00**
			Contingency (20%)	**$72,900.00**
			Engineering (20%)	**$72,900.00**
			Total	**$510,300.00**

32: Hazen Street (W. Willard Street to W. Michigan Avenue)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization	1	LSum	$ 45,000.00	$ 45,000.00
Traffic Control	1	LSum	$ 20,000.00	$ 20,000.00
Machine Grading	14.75	Sta	$ 2,000.00	$ 29,500.00
Pavt, Rem, Modified	1803	Syd	$ 10.00	$ 18,030.00
Aggregate Base, 8 inch	1803	Syd	$ 10.00	$ 18,030.00
Subbase, CIP (12 Inches)	601	Cyd	$ 15.00	$ 9,015.00
HMA Surface	521	Ton	$ 100.00	$ 52,100.00
Fire Hydrant Assembly	5	Ea	$ 5,000.00	$ 25,000.00
Gate Valve & Box, 12 Inch	5	Ea	$ 2,500.00	$ 12,500.00
Gate Valve & Box, 8 Inch	1	Ea	$ 2,000.00	$ 2,000.00
Water Main, DI, 12 Inch, Tr Det G	1115	Ft	$ 130.00	$ 144,950.00
Water Main, DI, 8 Inch, Tr Det G	360	Ft	$ 90.00	$ 32,400.00
Water Service	20	Ea	$ 5,000.00	$ 100,000.00
Curb Stop and Box	20	Ea	$ 600.00	$ 12,000.00
Restoration (Grass, Seed, & Topsoil)	400	Syd	$ 7.50	$ 3,000.00
			Construction Total	**$523,525.00**
			Contingency (20%)	**$104,800.00**
			Engineering (20%)	**$104,800.00**
			Total	**$733,125.00**

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33: Harris Street (750 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	Ls	$ 25,000.00	$ 25,000.00
Pavt, Rem	1000	Syd	$10.00	$ 10,000.00
Machine Grading	8	Sta	$2,000.00	$ 16,000.00
Subbase, CIP	333	Cyd	$15.00	$ 5,000.00
Aggregate Base, 8 inch	1000	Syd	$10.00	$ 10,000.00
HMA, 13A	87	Tons	$100.00	$ 8,700.00
HMA, 36A	87	Tons	$100.00	$ 8,700.00
Traffic Control	1	Ls	$10,000.00	$ 10,000.00
Slope Restoration, Type B	417	Syd	$7.50	$ 3,127.50
Fire Hydrant	2	Ea	$10,000.00	$ 20,000.00
Gate Valve and Box, 8 inch	3	Ea	$2,000.00	$ 6,000.00
Water Main, DI, 8 inch, TR DET G	750	Ft	$90.00	$ 67,500.00
Water Serv	12	Ea	$5,000.00	$ 60,000.00
			Construction Total	**$250,027.50**
			Contingency (15%)	**$37,600.00**
			Engineering (15%)	**$37,600.00**
			Total	**$325,227.50**

34: Brown Street (350 ft. of water main upsizing, Elm Street to Pine Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	Ls	$ 10,000.00	$ 10,000.00
Pavt, Rem	470	Syd	$10.00	$ 4,700.00
Machine Grading	4	Sta	$2,000.00	$ 8,000.00
Subbase, CIP	157	Cyd	$15.00	$ 2,350.00
Aggregate Base, 8 inch	470	Syd	$10.00	$ 4,700.00
HMA, 13A	41	Tons	$100.00	$ 4,100.00
HMA, 36A	41	Tons	$100.00	$ 4,100.00
Traffic Control	1	Ls	$5,000.00	$ 5,000.00
Slope Restoration, Type B	194	Syd	$7.50	$ 1,455.00
Fire Hydrant	0	Ea	$5,000.00	$ -
Gate Valve and Box, 8 inch	2	Ea	$2,000.00	$ 4,000.00
Water Main, DI, 8 inch, TR DET G	350	Ft	$90.00	$ 31,500.00
Water Serv	4	Ea	$5,000.00	$ 20,000.00
			Construction Total	**$99,905.00**
			Contingency (15%)	**$15,000.00**
			Engineering (15%)	**$15,000.00**
			Total	**$129,905.00**

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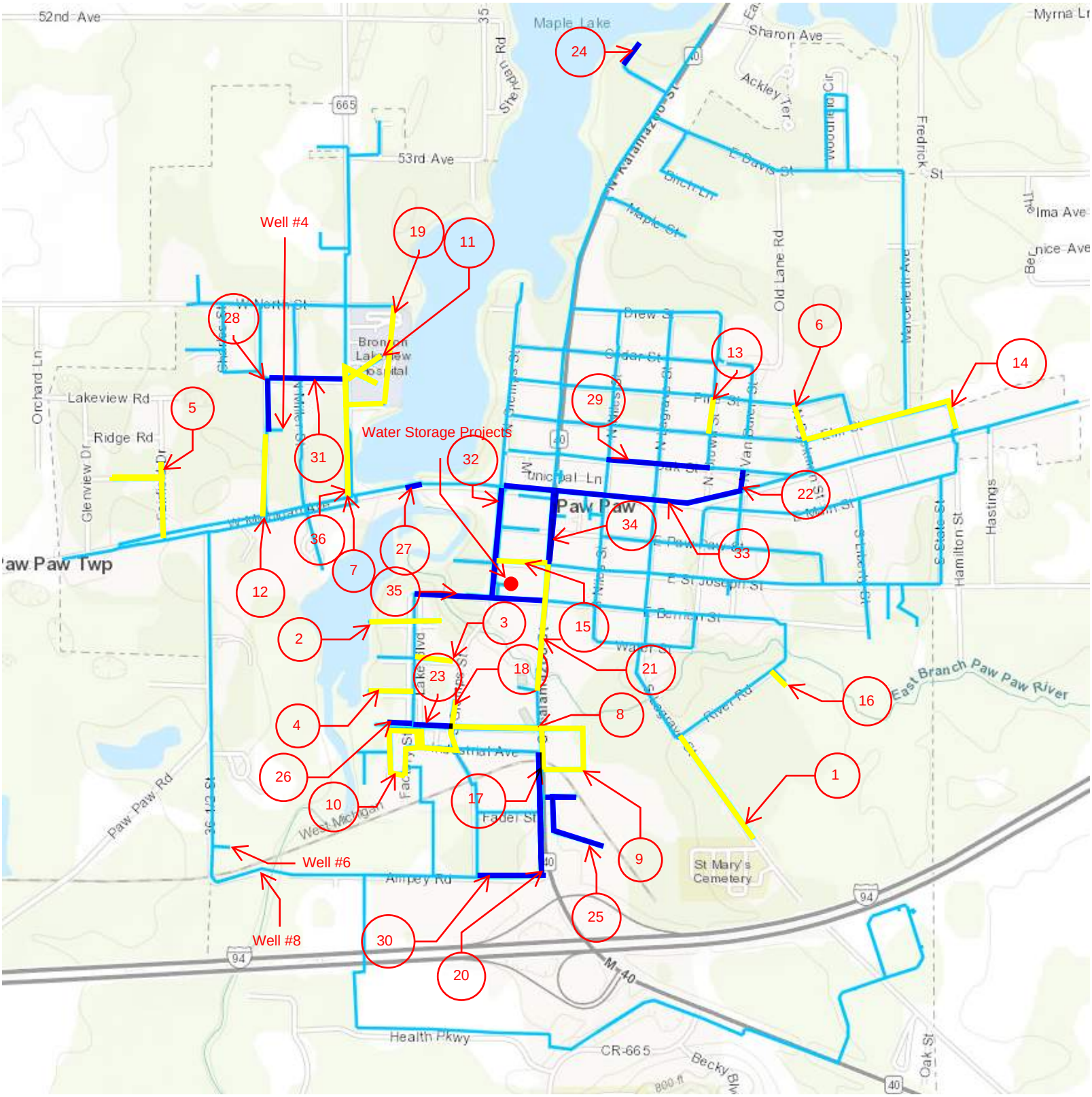
35: Elm Street (1,615 ft. of water main upsizing, Dyckman Street to Hamilton Street)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	Ls	$ 45,000.00	$ 45,000.00
Pavt, Rem	2150	Syd	$10.00	$ 21,500.00
Machine Grading	17	Sta	$2,000.00	$ 34,000.00
Subbase, CIP	717	Cyd	$15.00	$ 10,750.00
Aggregate Base, 8 inch	2150	Syd	$10.00	$ 21,500.00
HMA, 13A	186	Tons	$100.00	$ 18,600.00
HMA, 36A	186	Tons	$100.00	$ 18,600.00
Traffic Control	1	Ls	$10,000.00	$ 10,000.00
Slope Restoration, Type B	897	Syd	$7.50	$ 6,727.50
Fire Hydrant	3	Ea	$5,000.00	$ 15,000.00
Gate Valve and Box, 8 inch	6	Ea	$2,000.00	$ 12,000.00
Water Main, DI, 8 inch, TR DET G	1615	Ft	$90.00	$ 145,350.00
Water Serv	26	Ea	$5,000.00	$ 130,000.00
			Construction Total	**$489,027.50**
			Contingency (15%)	**$73,400.00**
			Engineering (15%)	**$73,400.00**
			Total	**$635,827.50**

36: River Road (350 ft. of water main upsizing)				
Item	**Quantity**	**Unit**	**Unit Cost**	**Item Cost**
Mobilization, Max	1	Ls	$ 10,000.00	$ 10,000.00
Pavt, Rem	470	Syd	$10.00	$ 4,700.00
Machine Grading	4	Sta	$2,000.00	$ 8,000.00
Subbase, CIP	157	Cyd	$15.00	$ 2,355.00
Aggregate Base, 8 inch	470	Syd	$10.00	$ 4,700.00
HMA, 13A	41	Tons	$100.00	$ 4,100.00
HMA, 36A	41	Tons	$100.00	$ 4,100.00
Traffic Control	1	Ls	$5,000.00	$ 5,000.00
Slope Restoration, Type B	194	Syd	$7.50	$ 1,455.00
Fire Hydrant	1	Ea	$5,000.00	$ 5,000.00
Gate Valve and Box, 8 inch	6	Ea	$2,000.00	$ 12,000.00
Water Main, DI, 8 inch, TR DET G	350	Ft	$90.00	$ 31,500.00
Water Serv	2	Ea	$5,000.00	$ 10,000.00
			Construction Total	**$102,910.00**
			Contingency (15%)	**$15,500.00**
			Engineering (15%)	**$15,500.00**
			Total	**$133,910.00**

APPENDIX I:

CONCEPTUAL DRAWINGS

LEGEND
Short Term CIP:
Long Term CIP:



APPENDIX J:

PUBLIC HEARING DOCUMENTS

APPENDIX K:

PUBLIC HEARING DOCUMENTS