COURTLAND TOWNSHIP, MI

WASTEWATER SYSTEM

ASSET MANAGEMENT PLAN

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I. Executive Summary

Courtland Township received a SAW grant in 2013 and was able to collect information about its sanitary sewer system. The information collected was used to make an inventory of the existing sanitary sewer system in the township. The sanitary sewer system is comprised of manholes, gravity sewer pipe, laterals, dry-pit lift stations, submersible grinder pump stations, house grinder pumps, force mains, cleanouts, and valves. These components are operated and maintained by Main-Tech Services, the system's contract operator. The value of the assets in the system is $11.4 million. As part is this study, an analysis was performed to assess what level of service this system provides. Using visual and televised inspection methods, many of the assets in the township were given a condition rating. Assuming all structures not inspected are in good condition, the results show that 3.5% of the sewer system is in poor condition, 7.5% is in fair condition, and 89.0% is in good condition. Using this condition rating, a capital improvement plan (CIP) was created. This takes into account both the likelihood of failure of each asset as well as the overall consequence of failure. The CIP proposed approximately $76,000 of work in the next 1-2 years, $78,000 in 3-5 years, $112,000 in 5-10 years, $54,000 in 10-15 years, and $64,000 in 15-20 years. Based on the revenue structure used by the township, these improvements should be accomplished within the time frames specified.

II. Introduction

Courtland Township was awarded a Stormwater, Asset Management Plan, and Wastewater Grant in 2013. The township used the grant funds to locate, inspect, and inventory is sanitary sewer system. The work began with making a GIS map of the system based on As-Built plans and aerial images. Next, much of the sewer and many of the manholes constructed before 1993 were inspected to give a representation of the system's condition. All the inspection data was compiled into the GIS map. The map shows all sanitary manholes, gravity pipes, lift stations, grinder pump stations, house grinder pumps, force mains, clean outs, and air release valves. Each asset has attributes stored in the map such as pipe length, material, condition, year installed, etc.

III. Asset Inventory

Courtland Township has a wastewater system consisting of force main, gravity sewer, laterals, manholes, lift stations, grinder pump stations, house grinder pumps, and force main valves and clean outs. The system is maintained by Main-Tech Services, the contract operator. The system assets are shown in more detail in Table 1. Table 1 also shows the estimated value of all the assets. The components were located and recorded based on construction records and aerial images. The information was imported into and maintained by ArcGIS. Each component was assigned an ID Tag coded to provide specific information about it.

Table 1: Courtland Township Assets

Type	Amount	Unit	Price	Value
1.25-inch Force Main	3869	ft	$30	$116,000
2-inch Force Main	3174	ft	$30	$95,000
2.5-inch Force Main	689	ft	$30	$21,000
3-inch Force Main	1333	ft	$35	$47,000
4-inch Force Main	6738	ft	$40	$270,000
6-inch Force Main	3927	ft	$50	$196,000
8-inch Force Main	6241	ft	$60	$374,000
8-inch Sanitary	41316	ft	$50	$2,066,000
Sanitary Laterals	19536	ft	$40	$781,000
Manholes	206	ea	$3,000	$618,000
Force Main Valve/Clean Out	13	ea	$4,000	$52,000
Lift Stations	10	ea	$400,000	$4,000,000
Grinder Pump Stations	3	ea	$200,000	$600,000
House Grinder Pumps	44	ea	$50,000	$2,200,000
			Total	**$11,436,000**

Sanitary Sewer and Manholes

The gravity sewer is made up of three different materials. Most of the sewer is polyvinyl chloride, but one stretch of pipe along the edge of Brower Lake is vitrified clay. Every section of pipe that discharges into a manhole is cement-lined ductile iron. The pipe materials are laid out in the Table 2.

Table 2: Gravity Pipe Materials

Material	Length of Pipe [ft]
DI	747
PVC	40885
VCP	516

The sewer was installed over a range of years. The first part of the system was installed in 1978. This comprised most of the sewer that encircles the lakes. More projects were completed in 1985, 1990, 1995, 2003, 2012, 2013, and 2017. The amount of pipe installed with each project is shown in Table 3.

Table 3: Age of Sewer Pipe

Year Installed	Length of Pipe [ft]
1978	27593
1985	141
1990	1640
1995	1158
2003	7011
2012	1716
2013	2255
2017	635

Pump Stations

Courtland Township owns and maintains 10 submersible-pump lift stations. This style of lift station has a buried, cylindrical concrete wet well that the wastewater enters through gravity pipe. Submerged pumps in the bottom operate based on the water level in the wet well. The pumps pull wastewater from the wet well and force it through a force main that exits the wet well. The force mains from these lift stations are PVC with ductile iron pipe where valves or cleanouts are located. There is a valve vault adjacent to the wet well that the force main runs through. This provides an area to have isolation valves and a bypass connection. A local control panel is mounted above ground to control the pump operation and provide a generator hookup. These lift stations are inspected on a weekly basis by Main-Tech Services. During inspections, notes are taken on the condition of the concrete, control panel, wet well, and valve vault. Furthermore, run times are recorded, the force mains are flushed, and any general comments about performance are noted.

Grinder Pump Stations

The township also owns 3 duplex grinder-pump stations. These are very similar in operation to the submersible-pump lift stations but have grinder pumps in the wet well. The wet wells are small fiberglass cans rather than concrete chambers. The force mains from these lift stations are PVC with ductile iron pipe where valves or cleanouts are located. These stations are also inspected weekly.

House Grinder Pumps

When a house is located at a lower elevation than the sewer main, or if a house discharges directly into a force main, it requires its own grinder pump. There are 44 houses in Courtland Township that have a grinder pump. These stations have a small, underground can with a grinder pump inside. The can stores wastewater from the house, and the grinder pump discharges it to the main sewer as it fills. There is a local control panel that controls this. These pump stations are inspected and cleaned annually.

The house grinder pumps are located at the following addresses: #9812, #9768, #9756, #9610, #9770, #9776, #9796, #9802, #9808 Myers Lake Ave; #7520 Hessler Dr; #8450, #8480, #8484, #8488, #8530, #8650, #8672, #8686, #8810 Brower Lake Ave; and #8369, #8405, #8415,

#8423, #8431, #8619, #8635, #8645, #8651, #8659, #8669, #8679, #8685, #8689, #8693, #8697, #8705, #8843, #8851, #8861, #8869, #8887, #8893, #8909, #8925 Je-Ne-Be Ave.

All sanitary pump station data is summarized in Table 4.

Table 4: Lift Station Data

Lift Station Name	Type	Year Built	Pumps Replaced	Rim Elev. [ft]	Depth [ft]	Wet Well Dia. [ft]	Operating Range [ft]	Influent Inv. Elev. [ft]	Discharge Pipe Elev. [ft]	Force Main Size [in]	Force Main Length [ft]
PS1	Submersible Pump	1978	2005	910.00	21.9	6.5	2.00	894.13	903.00	8	14,868
PS2	Submersible Pump	1978		903.50	15.9	6.5	0.55	893.63	897.00	4	708
PS3	Submersible Pump	1978		904.50	18.6	6.5	0.50	891.90	896.50	4	760
PS4	Submersible Pump	1978		904.50	18.1	6.5	0.50	892.36	896.00	4	1,630
PS5	Submersible Pump	1978		901.50	19.1	6.5	0.50	888.43	894.00	5	656
PS6	Submersible Pump	1978	2005	900.00	14.7	6.5	1.09	891.32	896.20	6	2,023
PS7	Submersible Pump	1978	2005	901.50	21.2	6.5	1.00	886.31	891.00	6	1,249
PS8	Submersible Pump	1978	2005	896.50	25.8	6.5	0.80	876.70	890.50	4	867
PS9	Submersible Pump	1978	2005	886.00	16.4	6.5	0.71	875.62	879.50	4	216
PS10	Submersible Pump	1978	2005	879.00	16.5	6.5	0.53	868.49	872.00	4	2,556
GPS1	Grinder Pump	1978		900.75	10.4	3.0	6.00	893.87	895.00	2	380
GPS2	Grinder Pump	1978		907.75	13.9	3.0	6.00	897.35	897.40	2	35
GPS4	Grinder Pump	1978		879.50	11.8	4.0	6.00	871.20	874.00	2	2,633

IV. Condition Assessment

Much of the sanitary sewer was televised and many of the manholes were visually inspected in order to assign them a condition rating. Almost all of the sewer constructed in 1978 was inspected with this project. The manhole upstream of each lift station wet well and 2 manholes downstream of each force main discharge were also inspected. This gives a good indication of the condition of the worst parts of the system. Each component was given a condition rating on a 1 to 5 scale. A rating of 1 means the structure is in “like new” condition. A rating of 5 indicated that the structure has failed and needs immediate repair. Table 5 shows a summary of the results of the inspections. It is assumed that any pipe not included in this study is in good condition.

Table 5: Condition Assessment of Sanitary System

Condition	Number of Pipes	Length of Pipe [ft]	Number of Manholes
Not Inspected	115	23554	173
1	16	3374	12
2	54	10597	20
3	13	3164	1
4	7	1276	0
5	1	184	0

The lift stations were also individually inspected as part of this project. During inspection, notes were taken on the condition of the site including concrete, control panel enclosures, hatches, and access. The wet well was opened and visually inspected for grease buildup, cracks, slide rail condition, and float operation. The general condition of the valve vault was assessed. Any performance problems of the pumps and general station comments were noted. Lift station reports are attached to this report.

Figures 1 through 25 show examples of structural defects and the pipe condition with which they correlate.

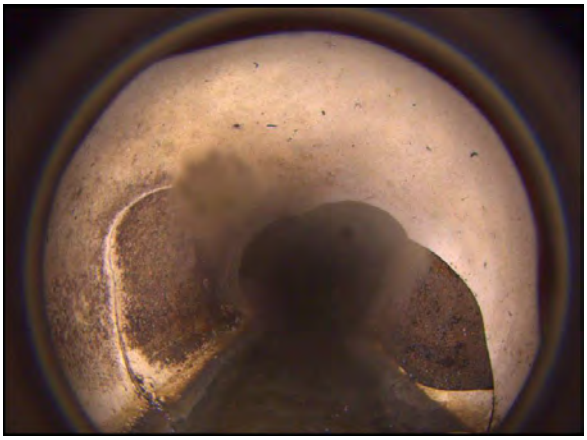


Figure 1: LS5_P077A; Condition: 5; Hole: Spot Repair

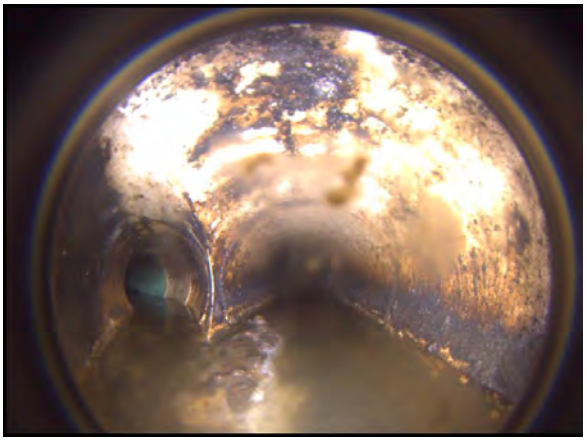


Figure 3: LS7_P044; Condition: 4; Deposits: Water Jet

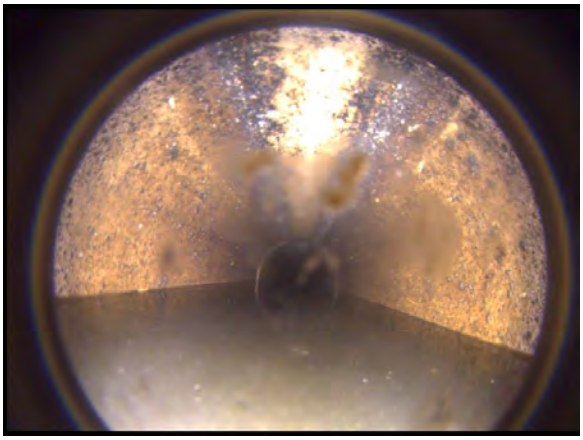


Figure 2: LS7_P044; Condition: 0; Water Level: Water Jet

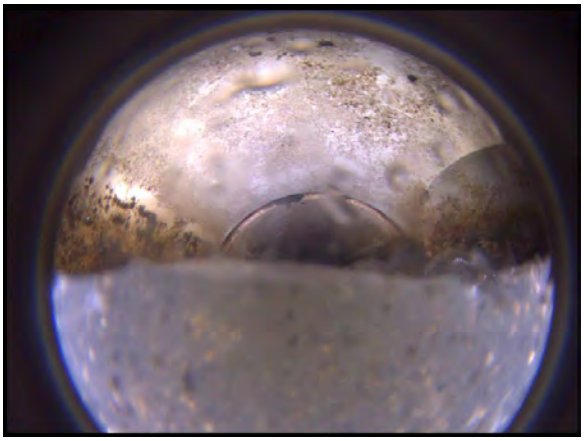


Figure 4:LS8_P048; Condition: 4; Water Level

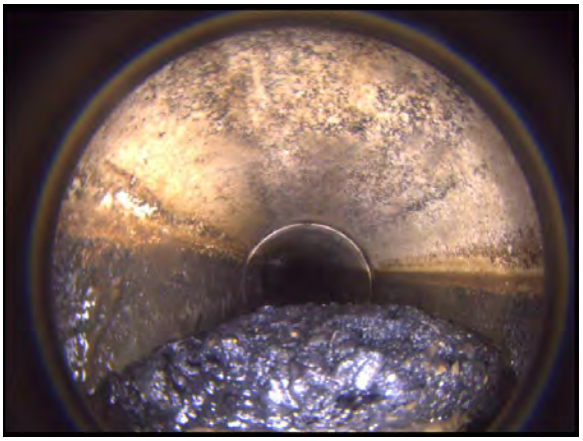


Figure 5: LS2_P099; Condition: 4; Obstacle: Water Jet

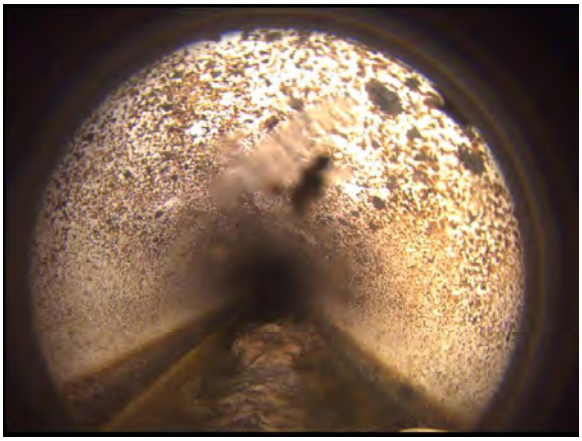


Figure 8: GP4_P084; Condition: 4; Deposits: Water Jet

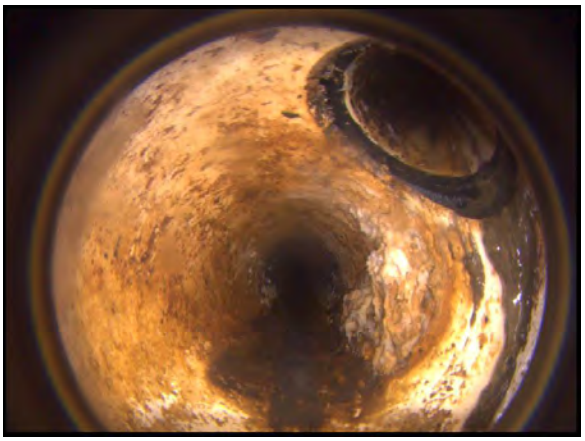


Figure 6: LS4_P121; Condition: 4; Deposits: Water Jet

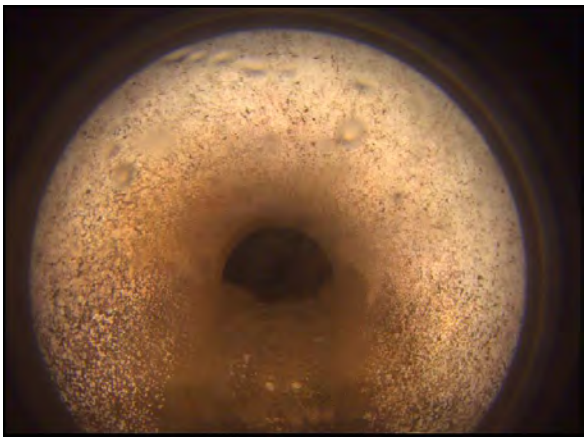


Figure 9: LS2_P098; Condition:4; Deposits: Water Jet

Figure 7: GP2_P019; Condition: 4; Deposits: Water Jet

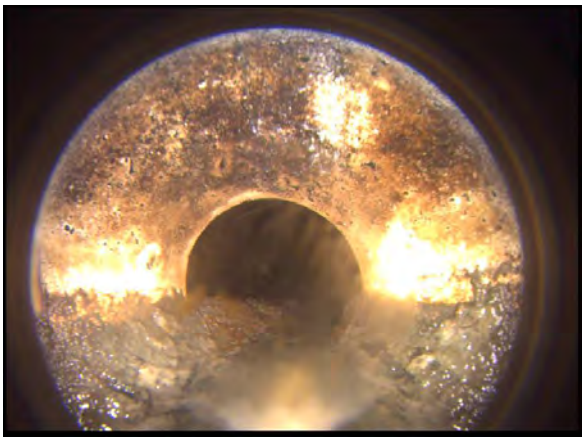


Figure 10: LS6_P023; Condition: 3: Deposits: Water Jet

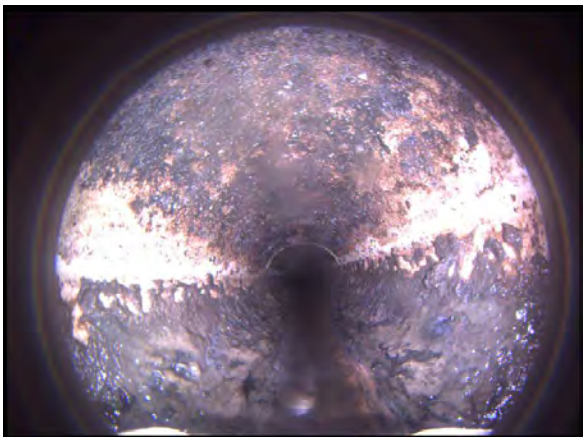


Figure 11: LS7_P036B; Condition: 3; Deposits: Water Jet

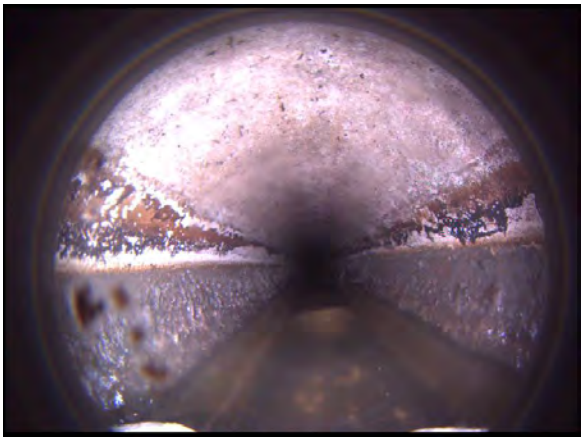


Figure 14: LS2_P100; Condition: 3; Deposits: Water Jet

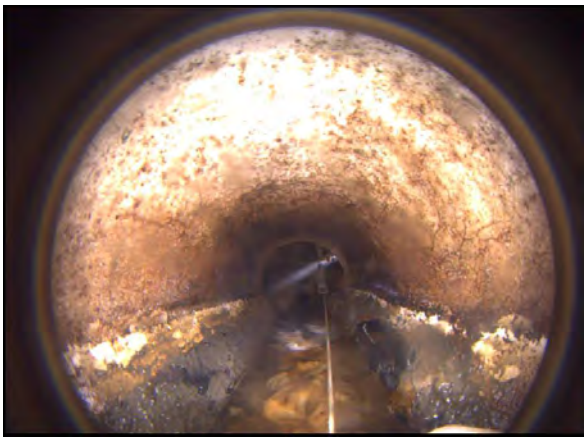


Figure 12: LS9_P055; Condition: 3; Deposits: Water Jet

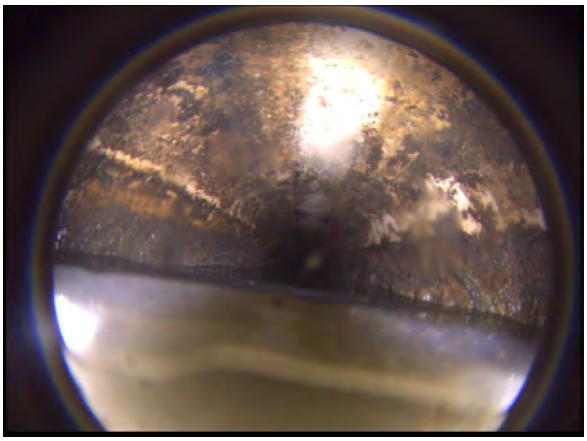


Figure 15: LS7_P043; Condition: 3; Deposits: Water Jet

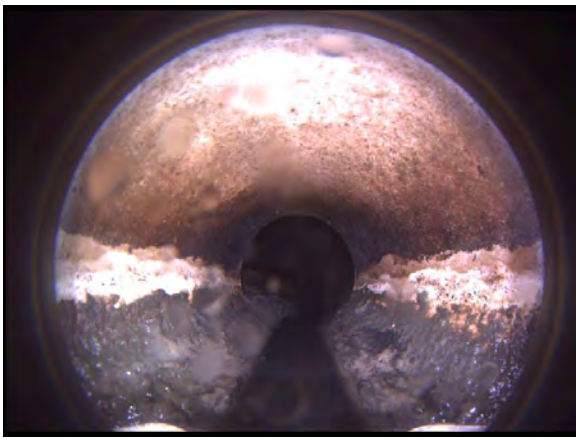


Figure 13: LS8_P050; Condition: 3; Deposits: Water Jet

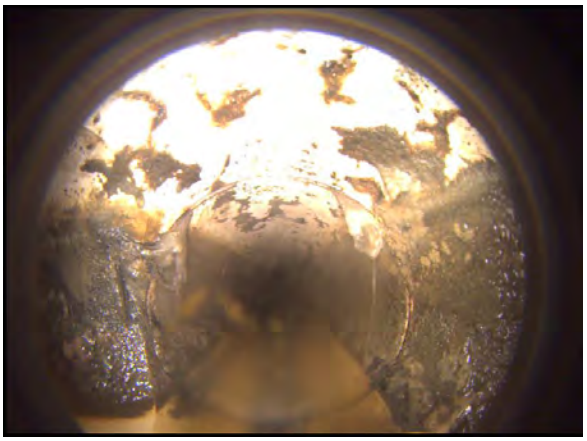


Figure 16: LS6_P024; Condition: 3; Deposits: Water Jet

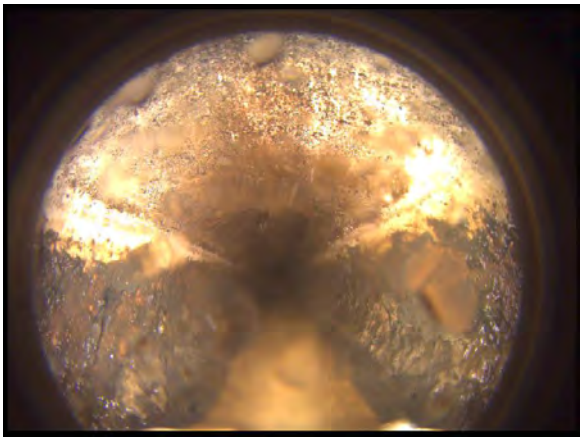


Figure 17: LS1_P002; Condition: 3; Deposits: Water Jet

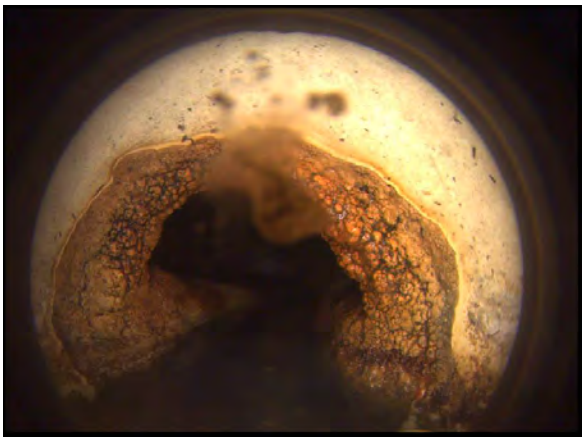


Figure 18: LS5_P031; Condition: 3; Encrustation

Figure 19: LS10_P065; Condition: 3; Spiral Crack

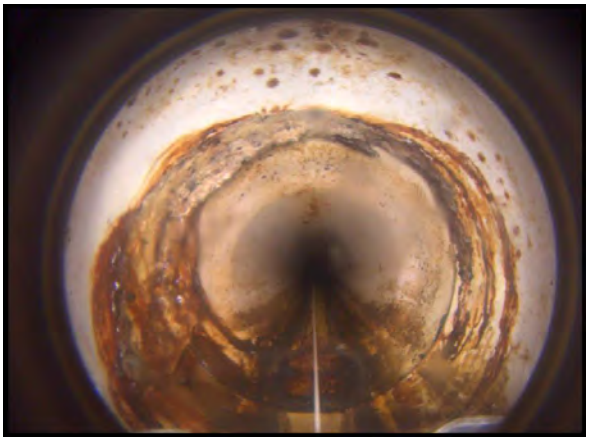


Figure 20: LS10_082A: Condition: 3; Encrustation

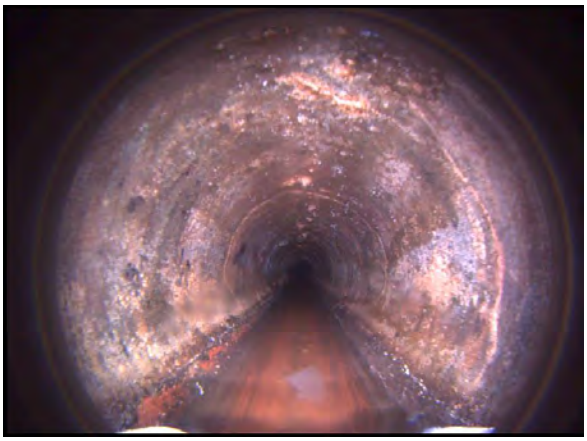


Figure 21: LS4_P114; Condition: 3; Crack Multiple: CIPP

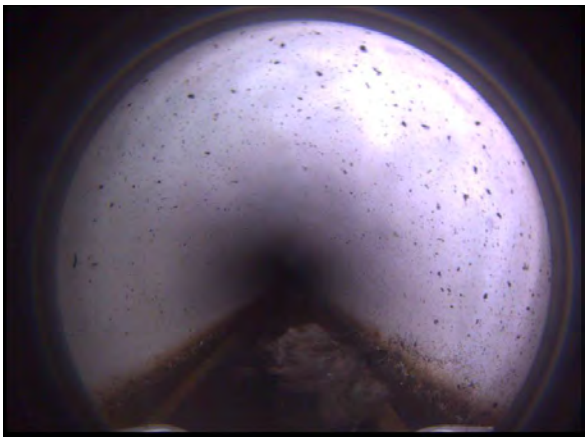


Figure 22: LS5_P033A; Condition: 3; Obstacle: Water Jet

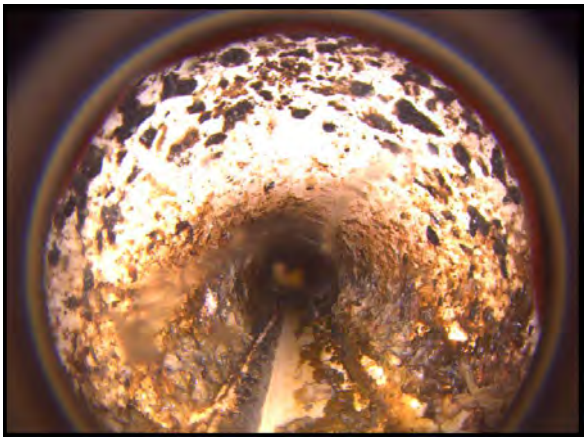


Figure 23: LS6_P021; Condition: 3, Deposits: Water Jet

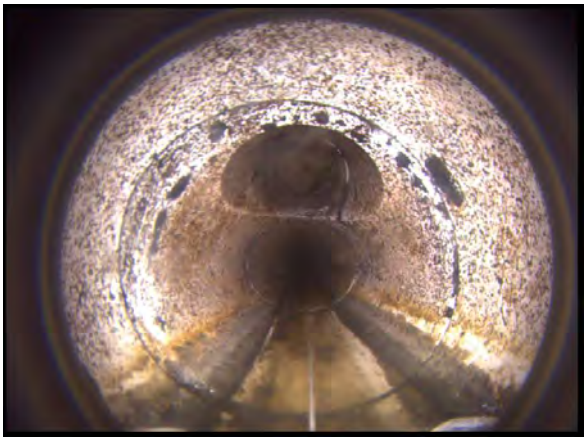


Figure 25: GP2_P016; Condition: 0; Tap Factory

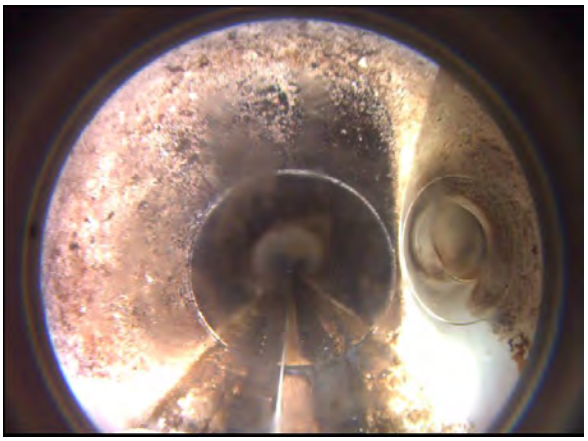


Figure 24: LS4_P120; Condition: 2; Deposits Fine: Water Jet

V. Critical Assets

An assessment was performed to determine which parts of the system are critical. This assessment started with assigning each sewer pipe an "importance" factor based on the consequence associated with its failure. Sewer pipes that serve less than 10 properties were assigned a 1 rating. Pipes that serve more than about 25% of the system were assigned a 5 rating. This rating system was extending to the manholes, lift stations, and force mains using the same criteria. To assign assets a criticality rating, both the asset's condition and importance were taken into account. In this way, both the likelihood and consequence of failure were considered.

The most important lift stations to keep maintained are LS1, LS6, LS7, LS8, and LS9. These handle most of the flow in the system. LS2, LS3, LS4, LS5, and LS10 handle less waste but are still important. The three grinder pump stations handle very little waste. House grinder pumps each only handle one house. These are the least important to keep maintained. When deciding which lift stations are in the most critical condition, both the condition of the lift station and the importance were considered.

VI. Level of Service Required

The sewer system operates 24 hours per day, 7 days per week, 365 days per year. Each part of the system is functional at all times except when it is down for maintenance. The goal of the township is to maintain the system well enough and monitor it so that backups never occur. In order to make sure this is possible, specific measures have been put into place. Each lift station has a generator connection, so a generator can be hooked up to run the lift station when power is out. Each lift station has a known amount of storage capacity, so if the downstream system is shut down, the lift station can be shut off for a known amount of time before backups begin. Each lift station also has a valve vault with a bypass connection. If a lift station is inoperable due to a component failure, bypass pumps or tanker trucks can be used to keep it functional. Each lift station is equipped with high level alarms and is inspected weekly by Main-Tech Services. Main-Tech is on call at all times if there is a problem.

In the Summer, the sewer system handles about 82,000 gallons of water per day on average. In the winter, this flow drops to around 72,000 gallons per day. This water is collected in laterals before flowing or being pumped by grinder pumps into trunk lines. The trunk lines discharge into Pump Stations which convey all the wastewater in sequence to Pump Station 1. This station discharges the water to the North Kent Sewer Authority.

VII. Revenue Structure

The revenue for the sanitary sewer fund comes from sewer rates charged to township residents who are sewer users. The township sewer board reviews these rates on yearly basis. When reviewing the rates, the board keeps in mind the annual costs of running the system and paying Main-Tech services to operate and maintain it. They also look at future growth and expansion and save money for future projects and ongoing maintenance costs. Table 6 shows the current rates and fees for Courtland Township Sewer.

Table 6: Courtland Township Sewer Fees

Trunkage (Hook-up)	$2,600 per unit plus $3,420.00 North Kent Sewer Authority Fee
Availability	$3,700.00 per unit
DPW Inspection Fee	$74.00 per hour
Quarterly Usage	$165.00 per quarter (in advance)

All money collected from these rates and fees goes into the sanitary sewer fund. The fund is used to pay for sewer system operation and maintenance, debt service, and capital improvements. In the 2016-2017 budget, $152,098 was paid to operation and maintenance, $33,577 was paid to debt service, and $152,000 was paid to capital improvements.

VIII. Capital Improvement Plan with Funding Gap Analysis.

Based on this study, a recommended capital improvement plan was created. It breaks down the work that needs to be done based on the likelihood and consequence of failure. These are based on the criticality ratings of the components. When creating the improvement schedule, structural defects in structures were more crucial than operation and maintenance improvements. Furthermore, the structures with a higher importance factor were given

priority to get fixed first. The plan shown in Table 7 breaks down the recommended work for the next 20 years. It includes repairing all structural and operation and maintenance deficiencies as well as inspecting the rest of the sewer system not included in this project.

Table 7: Recommended Improvement Plan Costs

Time Frame	Action	Amount	Unit	Price	Cost	Time Frame Sum
1-2 Years	Spot Repair	2	ea	$5,000	$10,000	$76,000
1-2 Years	Pipe Lining (CIPP)	516	ft	$100	$52,000	
1-2 Years	Manhole Repairs	3	ea	$4,500	$914,000	
3-5 Years	Pipe Water Jetting	4624	ft	$3	$12,000	$78,000
3-5 Years	Wet Well Coating	1	ea	$15,000	$15,000	
3-5 Years	Level Control Panels	2	ea	$6,000	$12,000	
3-5 Years	Paint Control Panels	13	ea	$3,000	$39,000	
5-10 Years	Pipe Water Jetting	10597	ft	$3	$26,000	$112,000
5-10 Years	Manhole Repairs	19	ea	$4,500	$86,000	
10-15 Years	Pipe Evaluation	10780	ea	$5	$54,000	$54,000
15-20 Years	Pipe Evaluation	12774	ft	$5	$64,000	$64,000
*All values in 2018 dollars					**Total**	$384,000

The overall cost of the 1-2 year plan is $76,000. This includes fixing all the structural problems with the gravity pipe in the township and repairing manholes in poor condition. The 3-5 year plan will cost about $78,000 and will fix all sewers in fair condition and repair known problems with pump stations. The 5-10 year plan will cost about $112,000 and will resolve any operation and maintenance deficiencies of the gravity sewer and repair any manholes not in good condition. The 10-15 year plan includes televising the rest of the sewer that was built before 1992. This plan will cost about $54,000. The 15-20 year plan will cost about $64,000 and will cover inspecting the rest of the sanitary sewer in the township. The current funding source should be adequate to pay for these improvements within the time frames specified.

Appendix A

Courtland Township Wastewater System Map

Courtland Township

Wastewater Collection System

Legend

- Valves
- Manholes
- Grinder Pump House
- Grinder Pump Station
- Submersible Pump Station

Force Main

- 1.25
- 2
- 2.5
- 3
- 4
- 6
- 8

Sewer Main

- 8"

williams&works
engineers | surveyors | planners

0 175 350 700 Feet

1 inch = 350 feet

Stoner Lake

Little Myers Lake

Myers Lake

Little Brower Lake

Brower Lake

12 MILE

11 MILE

10 MILE

MYERS LAKE

PENINSULA

ORLIN

EVA

HESSLER

CREST CIRCLE

STONE VIEW

LOVELESS

WALNUT GROVE

BROWER LAKE

RUSSET TRAIL

FOWLER

BUSH

YOUNG

WHIT

SQUIR

AR

CO

Appendix B

Pump Station Reports

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Grinder Pump Station 1
Year Built:	1978
Location:	North End of Je-Ne-Be Dr Ne
Type:	Grinder Pump Station

Physical Characteristics

Wet Well

Type:	Grinder Pump
Material:	Fiberglass
Dia.:	3.0'
Depth:	10.4'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	30" x 18" Steel Door
Vent:	None
Interior Coating:	None
Pipe Condition:	Good
Overall Condition:	Fair (Cover Corrosion)

Electrical and Controls

Incoming Power:	240V, 1 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

Brand:	Myers		
Location:	Wet Well		
Number:	2		
Power:	240V, 1 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	40 gpm	40 gpm	
TDH:	30'	30'	
Hp:	2	2	
Replaced/Rebuilt:			
Actual Flow:	25 gpm	25 gpm	
Run Hours:	516	532	

Valve Vault

Type:	None
Material:	N/A
Diameter:	N/A
Discharge Angle:	180°
Access Hatch:	N/A
Interior Coating:	N/A
Sump Pump:	None
Isolation Valves:	PVC Ball Valves
Check Valves:	Duckbill Style on Pump Discharge
Bypass:	None
Pipe Condition:	Good

Site and Forcemain

Access Road:	Pull-off
Site Layout:	Road Edge
Forcemain Size:	2"
Forcemain Type:	PVC
Forcemain Length:	380'
Discharge Point:	PS4_SMH121

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Corrosion on lid

Can too small

Planned Upgrades:

Wet Well Steel Replacement

General Comments:

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Grinder Pump Station 2
Year Built:	1978
Location:	Across from 8760 Brower Lake Dr NE
Type:	Grinder Pump Station

Physical Characteristics

Wet Well

Type:	Grinder Pump
Material:	Fiberglass
Dia.:	3.0'
Depth:	13.9'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	30" x 18" Steel Door
Vent:	None
Interior Coating:	None
Pipe Condition:	Good
Overall Condition:	Fair (Cover Corrosion)

Electrical and Controls

Incoming Power:	240V, 1 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

Brand:	Myers		
Location:	Wet Well		
Number:	2		
Power:	240V, 1 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	40 gpm	40 gpm	
TDH:	47'	47'	
Hp:	2	2	
Replaced/Rebuilt:			
Actual Flow:			
Run Hours:	2000	5907	

Valve Vault

Type:	None
Material:	N/A
Diameter:	N/A
Discharge Angle:	180°
Access Hatch:	N/A
Interior Coating:	N/A
Sump Pump:	None
Isolation Valves:	PVC Ball Valves
Check Valves:	Duckbill Style on Pump Discharge
Bypass:	None
Pipe Condition:	Good

Site and Forcemain

Access Road:	Pull-off
Site Layout:	Road Edge
Forcemain Size:	2"
Forcemain Type:	PVC
Forcemain Length:	35'
Discharge Point:	Forcemain from PS5 and PS6

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Corrosion on lid

Planned Upgrades:

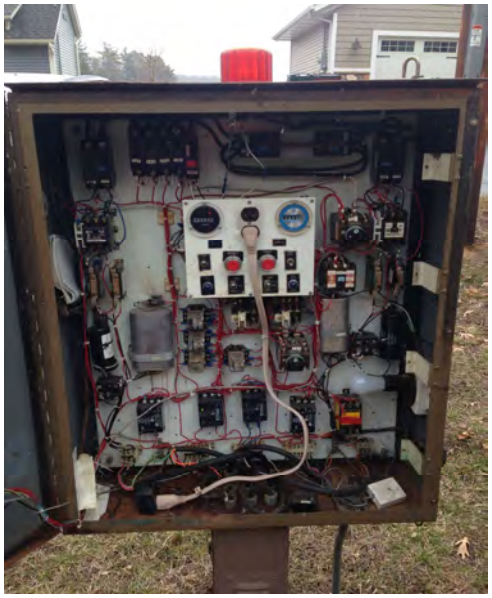
Pedastal Replacement

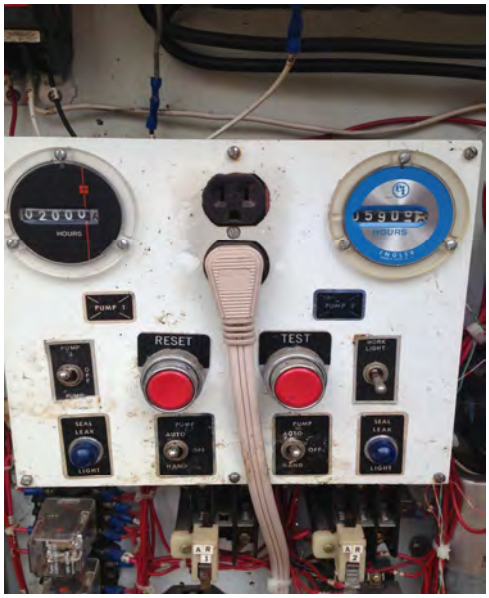
General Comments:

Rails have been replaced

Floats have been replaced

Worst of the duplex grinder pump stations




HOURS
PUMP 1
RESET
TEST
SEAL LEAK
LIGHT

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Grinder Pump Station 4
Year Built:	1978
Location:	Edge of Lake behind 7121 Eva Dr NE
Type:	Grinder Pump Station

Physical Characteristics

Wet Well

Type:	Grinder Pump
Material:	Fiberglass
Dia.:	4.0'
Depth:	13.9'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	30" x 18" Steel Door
Vent:	None
Interior Coating:	None
Pipe Condition:	Good
Overall Condition:	Fair (Cover Corrosion)

Electrical and Controls

Incoming Power:	240V, 1 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

Brand:	Myers		
Location:	Wet Well		
Number:	2		
Power:	240V, 1 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	40 gpm	40 gpm	
TDH:	25'	25'	
Hp:	2	2	
Replaced/Rebuilt:			
Actual Flow:			
Run Hours:	2474	2725	

Valve Vault

Type:	None
Material:	N/A
Diameter:	N/A
Discharge Angle:	180°
Access Hatch:	N/A
Interior Coating:	N/A
Sump Pump:	None
Isolation Valves:	PVC Ball Valves
Check Valves:	Duckbill Style on Pump Discharge
Bypass:	None
Pipe Condition:	Good

Site and Forcemain

Access Road:	Grass
Site Layout:	Edge of Myers Lake
Forcemain Size:	2"
Forcemain Type:	PVC
Forcemain Length:	2633'
Discharge Point:	PS7_SMH044

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Corrosion on lid

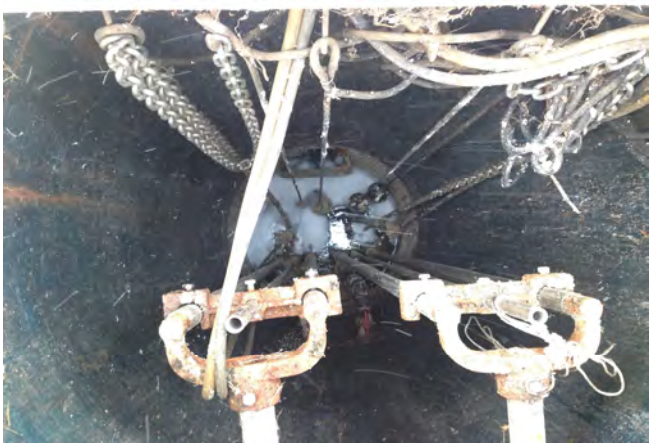
Rusted Steel Baffle Plate

Planned Upgrades:

General Comments:

Far From Road

Piping has been replaced with PVC



Courtland Township
Sanitary Pump Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 1
Year Built:	1978
Location:	Near 9000 Brower Lake Dr NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	21.9'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	Blower with Distant discharge
Interior Coating:	Yes
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Yes
Flow Meter:	None
Panel Condition:	Fair: Gaskets Torn, Rusty Bottom

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	617 gpm	429 gpm	
TDH:	97'	71'	
Hp:	28	20	
Replaced/Rebuilt:	2005	2005	
Actual Flow:			
Run Hours:	6960	8974	

Valve Vault

Type:	Oval Chamber
Material:	Concrete
Diameter:	5.7' x 9'
Discharge Angle:	180°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	4" Butterfly Valve for Firehose Conn.
Pipe Condition:	Good

Site and Forcemain

Access Road:	Pull-Off
Site Layout:	Road Edge
Forcemain Size:	8"
Forcemain Type:	PVC
Forcemain Length:	14868'
Discharge Point:	MH @ Myers Lake Ave and Weller Ave

Other Equipment

Bioxide:	Yes
Desulfinator:	No
Mission System:	Yes

Known Problems:

Planned Upgrades:

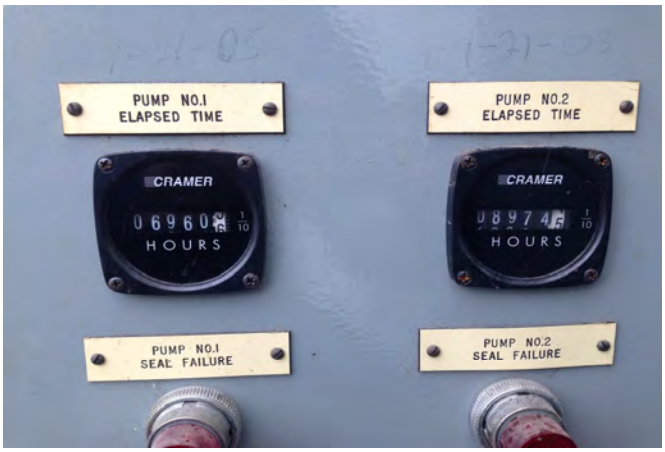
General Comments:

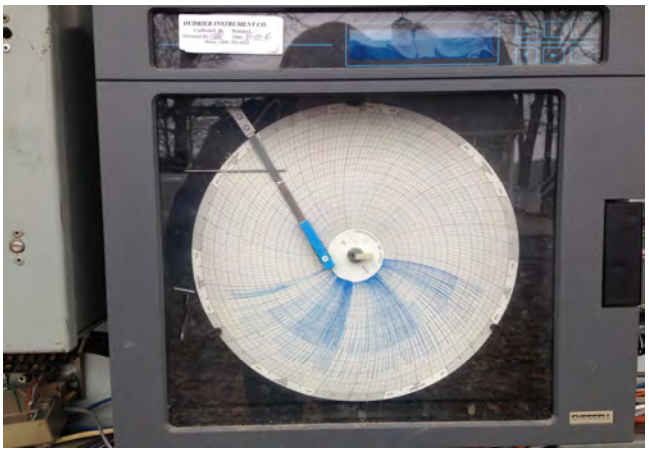
PVC Inlet Baffle

Conduits Replaced

Air Flush Forcemain Monthly

One Pump sized to flush force main on a weekly basis


PUMP NO.1
ELAPSED TIME
CRAMER
HOURS
PUMP NO.2
ELAPSED TIME
CRAMER
HOURS
PUMP NO.1
SEAL FAILURE
PUMP NO.2
SEAL FAILURE




DO NOT FILL
ABOVE THIS LINE
MAX. CAPACITY
700 GALLONS
BIOXIDE

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 2
Year Built:	1978
Location:	Near 8314 Je-Ne-Be Dr NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	15.9'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	None
Interior Coating:	Yes
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

	Pump 1	Pump 2	Pump 3
Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
Rated Flow:	110 gpm	110 gpm	
TDH:	48'	48'	
Hp:	20	20	
Replaced/Rebuilt:	2017	2017	
Actual Flow:			
Run Hours:	2339	2566	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	180°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	Camlock (missing cover)
Pipe Condition:	Good

Site and Forcemain

Access Road:	Pull-off
Site Layout:	Road Edge
Forcemain Size:	4"
Forcemain Type:	PVC
Forcemain Length:	708'
Discharge Point:	PS1_SMH010

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Planned Upgrades:

General Comments:

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 3
Year Built:	1978
Location:	Near 8488 Je-Ne-Be Dr NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	18.6'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	None
Interior Coating:	Yes
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	240V, 1 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	Rotophase "Add-a-phase"
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	80 gpm	80 gpm	
TDH:	22'	22'	
Hp:	20	20	
Replaced/Rebuilt:			
Actual Flow:			
Run Hours:	1937	1738	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	180°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	Camlock
Pipe Condition:	Good

Site and Forcemain

Access Road:	Pull-off
Site Layout:	Road Edge
Forcemain Size:	4"
Forcemain Type:	PVC
Forcemain Length:	760'
Discharge Point:	PS2_SMH102

Other Equipment

Bioxide:	No
Desulfinator:	Yes (in Summer)
Mission System:	No

Known Problems:

Age/Corrosion

Planned Upgrades:

General Comments:

Feed desufinator in the summer (eliminates hydrogen sulfide in all of East Brower Lake system)

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 4
Year Built:	1978
Location:	Near 8768 Je-Ne-Be Dr NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	18.1'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	Yes
Interior Coating:	None
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	80 gpm	80 gpm	
TDH:	51'	51'	
Hp:	20	20	
Replaced/Rebuilt:			
Actual Flow:			
Run Hours:	16791	16743	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	180°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug (Leaking)
Check Valves:	Swing Check
Bypass:	Camlock
Pipe Condition:	Good

Site and Forcemain

Access Road:	Grass
Site Layout:	Road Edge
Forcemain Size:	4"
Forcemain Type:	PVC
Forcemain Length:	1630'
Discharge Point:	PS3_SMH108

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Age/Corrosion

Planned Upgrades:

Remove Vent

Replace Rails

General Comments:

Float replaced in winter needs to be tied into panel with conduit

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 5
Year Built:	1978
Location:	Near 8900 Brower Lake Dr NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	19.1'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	None
Interior Coating:	None
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	80 gpm	80 gpm	
TDH:	57'	57'	
Hp:	20	20	
Replaced/Rebuilt:			
Actual Flow:			
Run Hours:	3750	3883	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	180°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	Camlock
Pipe Condition:	Good

Site and Forcemain

Access Road:	Pull-off
Site Layout:	Road Edge
Forcemain Size:	4"
Forcemain Type:	PVC
Forcemain Length:	656'
Discharge Point:	PS1_SMH006

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Age/Corrosion

Planned Upgrades:

General Comments:

New Guide Rails

Pumps rebuilt

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 6
Year Built:	1978
Location:	Across from 8928 Loveless Dr NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	14.7'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	None
Interior Coating:	Yes
Pipe Condition:	Good
Overall Condition:	Fair (Concrete damage)

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	286 gpm	286 gpm	
TDH:	50.4'	50.4'	
Hp:	6.62	6.62	
Replaced/Rebuilt:	2005	2005	
Actual Flow:			
Run Hours:	9688	9967	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	90°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	Camlock
Pipe Condition:	Good

Site and Forcemain

Access Road:	Gravel
Site Layout:	Road Edge
Forcemain Size:	6"
Forcemain Type:	PVC
Forcemain Length:	2023'
Discharge Point:	PS1_SMH006

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Age/Corrosion

Planned Upgrades:

General Comments:

Some surface concrete damage

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 7
Year Built:	1978
Location:	Near 8551 Brower Lake Rd NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	21.2'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	None
Interior Coating:	Yes
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	253 gpm	253 gpm	
TDH:	22.6'	22.6'	
Hp:	2.82	2.82	
Replaced/Rebuilt:	2005	2005	
Actual Flow:			
Run Hours:	10816	11389	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	180°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	Camlock
Pipe Condition:	Good

Site and Forcemain

Access Road:	Pull-off
Site Layout:	Road Edge
Forcemain Size:	6"
Forcemain Type:	PVC
Forcemain Length:	1249'
Discharge Point:	PS6_SMH024

Other Equipment

Bioxide:	No
Desulfinator:	Yes
Mission System:	No

Known Problems:

Age/Corrosion

Cross bar on bottom of slide rails catches rags and causes pump clogs

Planned Upgrades:

General Comments:

Feed desulfinator in summer (takes care of West side of system)

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 8
Year Built:	1978
Location:	Near 7621 Hessler Dr NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	25.8'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	None
Interior Coating:	Yes
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Poor (Sinking)

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	236 gpm	236 gpm	
TDH:	61'	61'	
Hp:	6.91	6.91	
Replaced/Rebuilt:	2005	2005	
Actual Flow:			
Run Hours:	6529	6967	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	180°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	Camlock
Pipe Condition:	Good

Site and Forcemain

Access Road:	Gravel
Site Layout:	Road Edge
Forcemain Size:	4"
Forcemain Type:	PVC
Forcemain Length:	867'
Discharge Point:	PS7_SMH043

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Age/Corrosion

Control Panel is settling, severely tilted

Pump slide rail is not straight

Dry pit cover crumbing

Planned Upgrades:

General Comments:

New pump discharge elbow

Only 2' of operating range

Extra alarm light and loud bell for extra protection

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 9
Year Built:	1978
Location:	Near 7562 Hessler Dr NE
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	16.4'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	None
Interior Coating:	None
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Good

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	212 gpm	212 gpm	
TDH:	34.9'	34.9'	
Hp:	3.32	3.32	
Replaced/Rebuilt:	2005	2005	
Actual Flow:			
Run Hours:	6242	5972	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	90°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	Camlock
Pipe Condition:	Good

Site and Forcemain

Access Road:	Grass
Site Layout:	Road Edge
Forcemain Size:	4"
Forcemain Type:	PVC
Forcemain Length:	216'
Discharge Point:	PS8_SMH052

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Age/Corrosion

Planned Upgrades:

Wet Well Coating

General Comments:

All downstream pump stations have been coated

Courtland Township
Sanitary Lift Station Review Sheet

Inspection Date: Monday, April 9, 2018

Name:	Pump Station 10
Year Built:	1978
Location:	Southeast Corner of Myers Lake Park
Type:	Submersible Pump Station

Physical Characteristics

Wet Well

Type:	Submersible Pump
Material:	Concrete
Dia.:	6.5'
Depth:	16.5'
Inlet Pipe:	8" Ductile Iron
Access Hatch:	Bilco 54"x36" and 24"x30"
Vent:	None
Interior Coating:	None
Pipe Condition:	Good
Overall Condition:	Good

Electrical and Controls

Incoming Power:	480V, 3 Ph
Backup Power:	MTS and Generator Connection
Over/Underground:	Underground
Phase Convertor:	None
Pump Controller:	Warrick Controls ISR
Level Control:	Floats
Backup Level Control:	Floats
Pump Alternator:	Manual
Flow Meter:	None
Panel Condition:	Fair (Settling)

Pumps

Brand:	ABS / Sulzer		
Location:	Wet Well		
Number:	2		
Power:	480V, 3 Ph		
	Pump 1	Pump 2	Pump 3
Rated Flow:	102 gpm	102 gpm	
TDH:	40.9'	40.9'	
Hp:	2.77	2.77	
Replaced/Rebuilt:	2005	2005	
Actual Flow:			
Run Hours:	7617	7997	

Valve Vault

Type:	Cylidrical Chamber
Material:	Concrete
Diameter:	6.5'
Discharge Angle:	90°
Access Hatch:	Bilco 42"x42"
Interior Coating:	None
Sump Pump:	Yes
Isolation Valves:	Plug
Check Valves:	Swing Check
Bypass:	Camlock
Pipe Condition:	Good

Site and Forcemain

Access Road:	Gravel Parking Lot
Site Layout:	Edge of Parking lot
Forcemain Size:	4"
Forcemain Type:	PVC
Forcemain Length:	2556'
Discharge Point:	PS9_SMH056

Other Equipment

Bioxide:	No
Desulfinator:	No
Mission System:	No

Known Problems:

Age/Corrosion

Panel Settling

Planned Upgrades:

Wet Well Coating

General Comments:

Storage Shed on Site for possible chemical addition

Must clean out every 3 months because of wipes, grease, scum

Same impeller as PS1 but clogs a lot more