

COUNTY OF WETASKIWIN
REPORT NUMBER: 181-10883-00

NEPL WASTEWATER & INFRASTRUCTURE ASSESSMENT FINAL DRAFT

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CONFIDENTIAL





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PROJECT NO.: 181-10883-00
DATE: MAY 01, 2019

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1 EXECUTIVE SUMMARY

The existing NEPL collection system has been in operation for approximately 30 years. The system has had minor upgrades over the years including lift station improvements, gravity main updates, and lagoon expansions.

Over the years, the County has not had many issues with the existing gravity system, with no notable problem areas as of this report. The County's only concern with the collection system is the high probability of inflow and infiltration during the wet months, and seeing some of their lift stations operating at a higher than usual capacity, with some needing vac truck assistance to keep up.

Most of the Lift Stations were originally constructed in 1989 and 1990. The primary shortcomings of the existing 15 lift stations are their age, and safety issues associated with their operation and maintenance due to the system not complying with current codes and regulations. There is insufficient space for new equipment and general modifications because the existing lift station physical footprints are small and compact. If upgrades on the capacity of the lift stations are required, based on the age of the equipment in the stations and their restrictive footprint, this report is recommending the design of replacement facilities that provide modern controls and monitoring, improved redundancy, provisions for future growth, and increased operator safety.

It is recommended that new facilities be located in close proximity to the existing lift stations, to minimize the underground utility changes required to connect the new facilities to the existing force main and gravity main piping systems. To save operational energy and cost, new pumps are recommended to be equipped with Variable Frequency Drives (VFDs) to allow the pumps to optimize their energy output and flow rate. Also, the lift stations should be equipped with standby generators which will have sufficient standby power to handle existing and future pumps.

The run time data available for most of the stations shows that the pumps operate up to 3 hours a day, based on records from the past 3 to 5 years. This low run time for each pump confirms that the pumps are sufficient for current wet weather flows. Without detailed flow data or cycle time information, it cannot be determined if the pumps are too large for low flows. If the pumps frequently start and stop, or if the wet well remains stagnant for long periods of time, a small jockey pump or VFDs may be recommended to help accommodate low flow conditions.

WSP recommends that flow monitoring be installed on all the lift stations, to verify flows to accurately determine the required capacity of each lift station for optimal efficiency. Please refer to the **Appendix D** to find further information on the signature flow meter.

Additionally, WSP recommends that flow monitoring on Inflow and Infiltration (I/I) in the NEPL system be conducted to determine the magnitude of its contribution during the wet weather conditions. The manholes and manhole characteristics should be further inspected to determine any rehabilitation required to reduce the I/I contributions.

The I/I flows can be significant contributors to capacity issues to some aged collection systems, and implementing an I/I Reduction Program could alleviate some of these issues.

Recommendations from this study include:

- Repair any manholes with damaged frames and covers
- Investigate if Residential sumps are connected to sanitary lines
- Inspect all gravity sewers by closed-circuit television (CCTV)
- Develop and implement a comprehensive and integrated upgrade plan to address the I/I issue and pipe deficiencies
- Continue with regular maintenance of all manholes and sanitary sewer lines.

WSP has found that most of the downstream lift stations have lower annual flows than their immediate upstream contributing lift stations, based solely on the straight operation hours and the originally designed capacity of the lift station pumps. This inconsistency could be the result of several factors:

1. The pumps are not operating at their originally designed duty flow rates, due to worn out impellers or the build up of grease. WSP has found many lift stations require frequent degrease programs, which is often indicated by the pump not performing properly.
2. There is a break/leak in the upstream header or forcemain that is reducing flow being received in the downstream lift stations.
3. Inaccurate Upstream records

Further to the flow monitoring programs recommended above, WSP also suggests setting up a dynamic computer model. The dynamic computer model is used in the assessment of the complex existing systems, as it accounts for flow routing within the system, backwater effects, and provides information regarding surcharge levels. It can further evaluate the existing capacity of not only the lift stations, but also the associated forcemains. Together with the data collected during the flow monitoring program regarding the inflow and infiltration, the dynamic model will reflect the most up to date calibration of the existing NEPL System.

2 INTRODUCTION

2.1 BACKGROUND

The County of Wetaskiwin (the County) engaged WSP Canada Inc. (WSP) to provide an engineering assessment, upgrade options, and related cost estimates for the North East Pigeon Lake (NEPL) Collection System being managed on behalf of the North Pigeon Lake Wastewater Commission and the South Pigeon Lake Wastewater Commission, mainly focused on the Lift Stations. This technical report sets out a mechanical process assessment and condition assessment related to the 15 lift stations listed below, and a general overview of the associated collection systems:

- Itaska #1, #2 Lift Stations
- Golden Days #1, #2, & #3 Lift Stations
- Argentia Beach #1, #2, & #3 Lift Stations
- Silver Beach #1, #2, & #3 Lift Stations
- Sandholm Main (also called Mainlift #1)
- Argentia Main (also known as Mainlift #2)
- Mulhurst #1 Lift Station
- Mulhurst #2 (also known as Mulhurst Main)

The Capacity assessment of these lift stations is based on Alberta Environment Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems issued by the Alberta Government March 2013.

2.2 PROJECT OBJECTIVES

The site visit and visual assessment of the NEPL Lift Stations was conducted on September 27 and September 28, 2018 by:

- Dawn Stigant, Operator (County of Wetaskiwin)
- Steve Aucoin, Senior Municipal Inspector (WSP)
- Yujing Li, P.Eng., Wastewater Engineer (WSP)

The assessment included a visual assessment of the wet well, pump installation, valves, and piping. A summary of the condition assessment for each lift station can be found in Appendix B. Photos and notes were collected to identify deficiencies. Construction and as-built drawings were provided by the County of Wetaskiwin. The pump curves provided by Xylem were used to assess the Capacity of each lift station.

The scope of work included the following:

- Review existing reports and data;

- Review pictures taken during the site visit;
- Evaluate existing system flows;
- Determine Theoretical Flow Capacity of each System;
- Outline improvements required based on the visual assessment;
- Provide capacity analysis and required upgrades based on existing systems operations; and a
- Provide a probable cost estimate.

Excluded from this project:

- A CCTV inspection of any of the gravity main systems;
- Condition assessment of existing manholes;
- Capacity analysis of existing gravity mains; and
- Shut down inspections of any of the lift stations.

3 CAPACITY ASSESSMENT AND CONDITION ASSESSMENT

3.1 CAPACITY ASSESSMENT

3.1.1 ASSESSMENT CRITERIA ON WASTEWATER FLOWS

The population projection for each of the Lift Stations is based on parcel mapping gathered from land titles, and it is summarized in Appendix A.

The following design criteria has been established in the report and it is based on both County Design Guidelines and Construction Standards, Issued September 2010, and the Alberta Environmental Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems, March 2013 Edition.

- Wastewater flow generation: 340 L/cap/day (Average Sewage Flow)
- 4.0 persons/dwelling
- Peaking Factor by Harmon Formula
 - Peak Factor = $1 + 14/(4+P^{0.5})$
 - Where P = the population in 1000's.
 - The maximum peaking factor shall be the larger of 2.5 or Harmon's Peaking Factor.
- General Infiltration Allowance:
 - Residential Areas: 0.28 L/s/ha
 - Other Areas: 0.28 L/s/ha
 - Sag Manholes: 0.40 L/s/sag manhole

It is assumed 20% of the manholes are sag manholes which results in a general allowance of 0.08 L/s to be applied to each manhole. Sag manhole allowances will not be applied to the future development areas.

Please see attached routing maps in Appendix C of the existing collection systems, which was compiled from survey provided by both the County and WSP, as well as historical plans.

3.1.2 ASSESSMENT CRITERIA ON WET WELLS

The wet well should have sufficient effective volume to enable the efficient operation of the pumps. Also, the water depth in the wet wells should be controlled to avoid flooding and cavitation from occurring in the pumps.

The following criteria are used to determine the effective volumes and water elevations in the wet well:

- The effective volume should be large enough to supply at least 2 minutes of pump run time under the wet weather peak flow conditions;
- The effective volume should be large enough to enable a pump cycle (running and filling) longer than 5 to 10 minutes; and
- The low water level elevation (lead pump stop level) should be high enough to guarantee the available Net Positive Suction Head (NPSH) is greater than the required Net Positive Suction Head to avoid pump cavitation.

The raw sewage in the NEPL Lift Stations will be predominately received from the other system upstream of the lift stations. Because the system will be buffered from the continuous flow rate of the communities, sizing the wet well for an average flow rate is not applicable for the NEPL Lift Stations. Instead, the governing parameter in the wet well design is the minimum volume (V1) for 2 minutes of pump running time.

3.1.3 PROJECTED FLOWS VS EXISTING PUMP CAPACITY (THEORETICAL)

The operation principle of each lift station should be to have one pump running and one pump on stand-by at all times. This principle ensures that when one pump is down the other will have the capacity to handle the peak flows.

To save operational energy and costs, pumps are recommended to be equipped with Variable Frequency Drives (VFDs), to allow the pumps to optimize their energy output and flow rate. Also, it is recommended that the lift stations be equipped with a standby generator, which should have sufficient standby power to handle the existing and future pumps.

Based on the criteria listed above, WSP produced the **Projected Peak Wet Weather Flow Rates Table** (PWWF) (see Appendix A) to provide a summary of the Peak Wet Weather Flow Rates based on planned users, catchment area, the number of manholes, and the area calculations based off the parcel maps. The table compares the designed capacity of each lift station.

3.1.4 HISTORICAL FLOW ANALYSIS & FUTURE FLOW PROJECTION (PRACTICAL)

Annual Flow Logs

The County's Annual Service Reports were entered electronically and analyzed to obtain data trends. Values were averaged annually over the years of 2015 – 2018. Because development is quite stable over the evaluation period, WSP was able to use the historical flow data to get the Average Daily Demand (ADD) to address the objectives mentioned earlier in this report. Also, operational hour meter readings were referenced to double check the accuracy of inconsistent data obtained from the Annual Service Reports.

It should be noted that Annual Reporting does not allow for a high level of accuracy in determining peak flow values including peak wet weather flows, and the severity of a rainfall event would be diminished when divided proportionally over a time period (annually).

Please refer to the Historical Flow Summary for Lift Stations Table in Appendix A for further information.

3.1.5 FUTURE FLOW PROJECTION

Based on the historical annual flow data, the Total Peak Wet Weather Flow (PWWF) to the lift stations was calculated by using the two flow components: Peak Day Dry Weather Wastewater Flow and Inflow/Infiltration. The Peak Day Wet Weather Flow values were calculated using the following two assumptions:

- Peak Day Dry Weather Flow = $3.5 \times \text{ADD}$
- Inflow and Infiltration is considered as $2 \times \text{PWWF}$ to get Peak Day Wet Weather Flows.

The design values, as calculated above, can be conservative as they reflect the ultimate equivalent populations. Peaking factor may differ as population changes occur during the years, and they do not account for flow routing effects within the system.

It should also be noted that the proposed peak design value is doubled because of the inflow/infiltration effect, as the inflow/infiltration data has never been monitored, there is no way to provide an accurate estimate on the contribution from inflow and infiltration.

3.2 CONDITION ASSESSMENT

3.2.1 CONDITION ASSESSMENT CRITERIA

A site inspection was completed on all lift stations to verify the current condition of the sites. Each Site review consisted of a visual inspection of:

- Layout,
- Wet wells and pump lifting equipment,
- Access hatches,
- Platforms,
- Access ladders,
- Pump guide rails,
- Process equipment, and
- Electrical and controls.

Pictures were taken of each site as well as a survey of the site location and layout. WSP consulted the County's operational staff to identify any known problem areas or requirements for immediate upgrades. Each item was reviewed and commented on as well as graded on a scale of 1-3: 1 being very good condition, no action required; 2 being medium condition, continuous observation required; and 3 poor condition, immediate action required. Also, a cost estimate was completed based on the items' condition and its estimated required upgrade time frame.

4 ASSESSED LIFT STATIONS

4.1 GENERAL

It should be noted that during the assessment of the pumping capacity, it is assumed that one pump should be sized to address the current wet weather peak flow, with the second identical pump on standby. The Wet Well Storage Upgrade Requirements is the difference between the Required Wet Well Storage and the Existing Wet Well Storage.

4.2 ITASKA NO.1 LIFT STATION SYSTEM

Existing Pumping System

The existing Itaska No.1 lift station is situated as the first lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag). Analysis suggests the lift station has the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is designed to provide pumping capacities of 4.7 L/s @ 7.0 meters Total Dynamic Head (TDH);
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 1.7 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.1 Itaska No.1 Lift Station Summary

CHARACTERISTIC	ITASKA NO.1
Existing Wet Well Storage (L)	480
Existing Capacity of One Pump (L/s)	4.7
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	600
Required Capacity of One Pump (L/s)	1.7
Wet Well Storage Upgrade Requirements (L)	120
Required Standby power (kW)	10

4.3 ITASKA NO.2 LIFT STATION SYSTEM

Existing Pumping System

The existing Itaska Lift Station No. 2 is situated as the 2nd lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), and the lift station has the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 12.6 L/s @ 5.5 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided;
- The current wet weather peak flow is anticipated at 9.0 L/s; and
- Lift Station # 2 discharges all flow to a gravity manhole connected to Golden Days No. 1 Lift Station.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.2 Itaska No.2 Lift Station Summary

CHARACTERISTIC	ITASKA NO.2
Existing Wet Well Storage (L)	530
Existing Capacity of One Pump (L/s)	12.6
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	1500
Required Capacity of One Pump (L/s)	9.0
Wet Well Storage Upgrade Requirements (L)	970
Required Standby Power (kW)	10

4.4 GOLDEN DAYS NO.1 LIFT STATION SYSTEM

Existing Pumping System

The existing Golden Days Lift Station No.1 is situated as the 3rd lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), however this lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 9.5 L/s @ 3.5 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 13.9 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.3 Golden Days No.1 Lift Station Summary

CHARACTERISTIC	GOLDEN DAYS NO.1
Existing Wet Well Storage (L)	550
Existing Capacity of One Pump (L/s)	9.5
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	1650
Required Capacity of One Pump (L/s)	13.9
Wet Well Storage Upgrade Requirements (L)	1100
Required Standby Power (kW)	10

4.5 GOLDEN DAYS NO.2 LIFT STATION SYSTEM

Existing Pumping System

The existing Golden Days Lift Station No.2 is situated as the 4th lift station in the North Leg of the overall NEPL Assessment. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), however the lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 7.9 L/s @ 6.0 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 12.0 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.4 Golden Days No.2 Lift Station Summary

CHARACTERISTIC	GOLDEN DAYS NO.2
Existing Wet Well Storage (L)	530
Existing Capacity of One Pump (L/s)	7.9
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	1500
Required Capacity of One Pump (L/s)	12.0
Wet Well Storage Upgrade Requirements (L)	970
Required Standby Power (kW)	10

4.6 GOLDEN DAYS NO.3 LIFT STATION SYSTEM

Existing Pumping System

The existing Golden Days Lift Station No.3 is situated as the 5th lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), however this lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 6.3 L/s @ 7 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 9.4 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.5 Golden Days No.3 Lift Station Summary

CHARACTERISTIC	GOLDEN DAYS NO.3
Existing Wet Well Storage (L)	530
Existing Capacity of One Pump (L/s)	6.3
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	1150
Required Capacity of One Pump (L/s)	9.4
Wet Well Storage Upgrade Requirements (L)	620
Required Standby Power (kW)	10

4.7 SANDHOLM MAIN (MAIN LIFT STATION NO.2) SYSTEM

Existing Pumping System

The existing Main Lift Station No. 2 is situated as the 6th lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), however this lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 20.5 L/s @ 10.5 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 23.2 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.6 Main Lift Station No.2 Lift Station Summary

CHARACTERISTIC	MAIN LIFT STATION NO.2
Existing Wet Well Storage (L)	2260
Existing Capacity of One Pump (L/s)	20.5
Existing pumps power (kW)	3.7
Required Wet Well Storage (L)	2800
Required Capacity of One Pump (L/s)	23.2
Wet Well Storage Upgrade Requirements (L)	540
Required Standby Power (kW)	10

4.8 ARGENTIA BEACH LIFT STATION NO.1 SYSTEM

Existing Pumping System

The existing Argentia Beach Lift Station No.1 is situated as the 7th lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), however this lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 18.9 L/s @ 4.0 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 30.6 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.7 Argentia Beach Lift Station No.1 Lift Station Summary

CHARACTERISTIC	ARGENTIA BEACH NO.1
Existing Wet Well Storage (L)	900
Existing Capacity of One Pump (L/s)	18.9
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	3600
Required Capacity of One Pump (L/s)	30.6
Wet Well Storage Upgrade Requirements (L)	2700
Required Standby Power (kW)	10

4.9 ARGENTIA BEACH LIFT STATION NO.2 SYSTEM

Existing Pumping System

The existing Argentia Beach Lift Station No.2 is situated as the 8th lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), however this lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 18.9 L/s @ 4.5 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 25.4 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.8 Argentia Beach Lift Station No.2 Lift Station Summary

CHARACTERISTIC	ARGENTIA BEACH NO.2
Existing Wet Well Storage (L)	1220
Existing Capacity of One Pump (L/s)	18.9
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	3000
Required Capacity of One Pump (L/s)	25.4
Wet Well Storage Upgrade Requirements (L)	1780
Required Standby Power (kW)	10

4.10 ARGENTIA BEACH LIFT STATION NO.3 SYSTEM

Existing Pumping System

The existing Argentia Beach Lift Station No.3 is situated as the 9th lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), this lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 18.9 L/s @ 3.0 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 28.1 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.9 Argentia Beach Lift Station No.3 Lift Station Summary

CHARACTERISTIC	ARGENTIA BEACH NO.3
Existing Wet Well Storage (L)	950
Existing Capacity of One Pump (L/s)	18.9
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	3350
Required Capacity of One Pump (L/s)	28.1
Wet Well Storage Upgrade Requirements (L)	2400
Required Standby Power (kW)	10

4.11 ARGENTIA MAIN (MAIN LIFT STATION NO.1) SYSTEM

Existing Pumping System

The existing Main Lift Station No.1 is situated as the 10th lift station in the North Leg of the overall NEPL system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), however this lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 25 L/s @ 80 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 42.6 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.10 Argentia Main Lift Station No.1 Lift Station Summary

CHARACTERISTIC	ARGENTIA MAIN NO.1
Existing Wet Well Storage (L)	1580
Existing Capacity of One Pump (L/s)	25
Existing pumps power (kW)	66
Required Wet Well Storage (L)	5000
Required Capacity of One Pump (L/s)	42.6
Wet Well Storage Upgrade Requirements (L)	3420
Required Standby Power (kW)	200

4.12 MULHURST LIFT STATION NO.1 SYSTEM

Existing Pumping System

The existing Mulhurst Lift Station No.1 is situated as the 1st lift station (southward pumping) in the South Leg of the overall NEPL system. It discharges to Mulhurst Lift Station No.2. The lift station was constructed in 1985 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), and this lift station has the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 17 L/s @ 5 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 1.3 L/s;

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.11 Mulhurst Lift Station No.1 Lift Station Summary

CHARACTERISTIC	MULHURST NO.1
Existing Wet Well Storage (L)	1730
Existing Capacity of One Pump (L/s)	17.0
Existing pumps power (kW)	2.2
Required Wet Well Storage (L)	2040
Required Capacity of One Pump (L/s)	1.3
Wet Well Storage Upgrade Requirements (L)	310
Required Standby Power (kW)	10

4.13 SILVER BEACH LIFT STATION NO.3 SYSTEM

Existing Pumping System

The existing Silver Beach Lift Station No.3 is situated as the 1st lift station (northward pumping) in the South Leg of the overall NEPL System. Pumps collected sewage to a gravity manhole in the Silver Beach area. The lift station was improved in 1994 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), and the lift station has the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 4.7 L/s @ 5.0 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 0.5 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.12 Silver Beach Lift Station No.3 Lift Station Summary

CHARACTERISTIC	SILVER BEACH NO.3
Existing Wet Well Storage (L)	510
Existing Capacity of One Pump (L/s)	4.7
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	600
Required Capacity of One Pump (L/s)	0.5
Wet Well Storage Upgrade Requirements (L)	90
Required Standby Power (kW)	10

4.14 SILVER BEACH LIFT STATION NO.2 SYSTEM

Existing Pumping System

The existing Silver Beach Lift Station No.2 is situated as the 2nd lift station on the South Leg of the overall NEPL system. It is pumping the sewage collected to a gravity manhole in the Silver Beach Lift Station No.1 system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), the lift station has the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 4.7 L/s @ 4.0 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 1.2 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.13 Silver Beach Lift Station No.2 Lift Station Summary

CHARACTERISTIC	SILVER BEACH NO.2
Existing Wet Well Storage (L)	510
Existing Capacity of One Pump (L/s)	4.7
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	600
Required Capacity of One Pump (L/s)	1.2
Wet Well Storage Upgrade Requirements (L)	90
Required Standby Power (kW)	10

4.15 SILVER BEACH LIFT STATION NO.1 SYSTEM

Existing Pumping System

The existing Silver Beach Lift Station No.1 is situated as the 3rd lift station on the South Leg of the overall NEPL system. It is pumping the sewage collected to a gravity manhole in the Silver Beach Lift Station No.1 system. The lift station was constructed in 1989 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), and the lift station has the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 4.7 L/s @ 4.0 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 1.2 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.14 Silver Beach Lift Station No.1 Lift Station Summary

CHARACTERISTIC	SILVER BEACH NO.1
Existing Wet Well Storage (L)	1130
Existing Capacity of One Pump (L/s)	4.7
Existing pumps power (kW)	1.6
Required Wet Well Storage (L)	600
Required Capacity of One Pump (L/s)	1.2
Wet Well Storage Upgrade Requirements (L)	No Upgrade Requirement
Required Standby Power (kW)	10

4.16 MULHURST LIFT STATION NO.2 SYSTEM

Existing Pumping System

The existing Mulhurst Lift Station No.2 is situated as the last lift station on the south leg of the overall NEPL Assessment. It is pumping the sewage collected from its gravity manholes, together with the flows from Silver Beach No.1 and Mulhurst Lift Station No.1 to the Mulhurst Sewage Lagoon. The lift station was improved in 1994 with the items listed below. The lift station houses two pumps, with one pump on standby (lead and lag), however this lift station does not have the capacity to pump the theoretical peak flows.

- Each of the two existing pumps is to provide pumping capacities of 40 L/s @ 70 meters TDH;
- No VFD controllers were installed for the two pumps;
- No stand-by Emergency Power provided; and
- The current wet weather peak flow is anticipated at 56.2 L/s.

Please refer to the associated Condition Assessment and related pictures in Appendix B.

Existing Lift Station Summary

A summary of the existing lift station characteristics and required upgrades are shown in the table below.

Table 4.15 Mulhurst Lift Station No.2 Lift Station Summary

CHARACTERISTIC	MULHURST NO.2
Existing Wet Well Storage (L)	6000
Existing Capacity of One Pump (L/s)	40
Existing pumps power (kW)	66
Required Wet Well Storage (L)	6800
Required Capacity of One Pump (L/s)	56.2
Wet Well Storage Upgrade Requirements (L)	800
Required Standby Power (kW)	200

5 SUMMARY OF FINDINGS

5.1 OPTIONS & PROBABLE COST ESTIMATE

In Appendix B, individualized for each lift station, improvement estimates have been detailed with cost estimates. The conditional assessment estimates are based on 2018 costs, and are high level estimates. These costs could be different depending on the potential type of construction. This does not include engineering costs.

The life expectancy of the equipment is an estimate, maintenance could prolong the existing equipment's life. Wet well base conditions have not been verified as the lift stations were in operation during the inspection. Most of the sites are coming to the end of their life expectancy and will require additional costs to maintain operation.

There are various options for upgrades, depending on if the wet well meets current capacity or if it is undersized.

Potential repair options if the wet well meets current capacity can include:

- Removal and replacement of all interior components as well as installation of a new electrical and controls system.
- Drop a fiberglass kit lift station insert into the existing wet well.
- Remove and replace entire wet well and all components.

If the wet well does not meet current capacity, then the entire wet well and all components will need to be replaced.

The following upgrades are recommended based on the above mentioned Capacity and Condition Assessment.

ITASKA LIFT STATION #1

- The current pump has sufficient capacity to handle the proposed peak design flows.
- Sewer inlet to lift station is surcharged before the 1st pump is in operation. Investigate where the surcharged flow would back into, and whether there are basements in the surrounding developments to prevent risk of flooding. (based off of asbuilts)
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Install a standby generator to provide power in the event of a power failure.

ITASKA LIFT STATION #2

- The current pump has sufficient capacity to handle proposed peak design flows.
- Services a similar development area as Itaska No.1 but the pumping hours indicate 5 times the annual sewage flows, and undersized pump capacity.
- Flow monitoring should be installed to establish the actual flows to appropriately size the required capacity of this lift station for optimal efficiency.

- Flow monitoring on Inflow and infiltration (I/I) should be conducted to find its contribution during the wet weather conditions. The manholes and manhole characteristics should be inspected to find if any rehabilitation is required to reduce the I/I contributions.
- Comments on the wet well sizing can be provided once more accurate flow data is established.

GOLDEN DAYS LIFT STATION #1

- The current pump has insufficient capacity to handle proposed peak design flows.
- Sewer inlet to lift station is surcharged before the 1st pump is in operation. Investigate where the surcharged flow would back into, and whether there are basements in the surrounding developments to prevent risk of flooding. (based off of asbuilts)
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring should be installed to establish the actual flows to appropriately size the required capacity of this lift station for optimal efficiency.
- Flow monitoring on Inflow and Infiltration (I/I) should be conducted to find its contribution during the wet weather conditions. The manholes and manhole characteristics should be inspected to find if any rehabilitation is required to reduce the I/I contributions.
- Install a standby generator to provide power in the event of a power failure.

GOLDEN DAYS LIFT STATION #2

- The current pump has insufficient capacity to handle proposed peak design flows.
- Sewer inlet to lift station is slightly surcharged before the 1st pump is in operation. Investigate where the surcharged flow would back into, and whether there are basements in the surrounding developments to prevent risk of flooding. (based off of asbuilts)
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring should be installed to establish the actual flows to appropriately size the required capacity of this lift station for optimal efficiency.
- Flow monitoring on Inflow and infiltration (I/I) should be conducted to find its contribution during the wet weather conditions. The manholes and manhole characteristics should be inspected to find if any rehabilitation is required to reduce the I/I contributions.
- Install a standby generator to provide power in the event of a power failure.

GOLDEN DAYS LIFT STATION #3

- The current pump has insufficient capacity to handle proposed peak design flows.
- Sewer inlet to lift station is surcharged before the 1st pump is in operation. Investigate where the surcharged flow would back into, and whether there are basements in the surrounding developments to prevent risk of flooding. (based off of asbuilts)
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring should be installed to establish the actual flows to appropriately size the required capacity of this lift station for optimal efficiency.

- Flow monitoring on Inflow and infiltration (I/I) should be conducted to find its contribution during the wet weather conditions. The manholes and manhole characteristics should be inspected to find if any rehabilitation is required to reduce the I/I contributions.
- Install a standby generator to provide power in the event of a power failure.

SANDHOLM MAIN LIFT STATION

- The current pump has insufficient capacity to handle proposed peak design flows. Replace the existing pumps with a new submersible sewage pump with a capacity of 23.5 L/s.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring should be installed to establish the actual flows to appropriately size the required capacity of this lift station for optimal efficiency.
- Install a standby generator to provide power in the event of a power failure.

ARGENTIA BEACH LIFT STATION #1

- The current pump has insufficient capacity to handle proposed peak design flows. Replace the existing pumps with a new submersible sewage pump with a capacity of 30.6 L/s.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring should be installed to establish the actual flows to appropriately size the required capacity of this lift station for optimal efficiency.
- Install a standby generator to provide power in the event of a power failure.

ARGENTIA BEACH LIFT STATION #2

- The current pump has insufficient capacity to handle proposed peak design flows. Replace the existing pumps with a new submersible sewage pump with a capacity of 25.5 L/s.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring should be installed to establish the actual flows to appropriately size the required capacity of this lift station for optimal efficiency.
- Install a standby generator to provide power in the event of a power failure.

ARGENTIA BEACH LIFT STATION #3

- The current pump has insufficient capacity to handle proposed peak design flows. Replace the existing pumps with a new submersible sewage pump with a capacity of 28.5 L/s.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring should be installed to establish the actual flows to be able to appropriately size the required capacity of this lift station for optimal efficiency.
- Install a standby generator to provide power in the event of a power failure.

ARGENTIA MAIN LIFT STATION

- The current pump has insufficient capacity to handle proposed peak design flows. Replace the existing pumps with a new submersible sewage pump with a capacity of 43.0 L/s.

- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring should be installed to establish the actual flows to appropriately size the required capacity of this lift station for optimal efficiency.
- Install a standby generator to provide power in the event of a power failure.
- Install proper safety grating on hatches to maintain safe pump removal.

MULHURST LIFT STATION #1

- The current pump has sufficient capacity to handle proposed peak design flows.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Install a standby generator to provide power in the event of a power failure.

SILVER BEACH LIFT STATION #3

- The current pump has sufficient capacity to handle proposed peak design flows.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Install a standby generator to provide power in the event of a power failure.

SILVER BEACH LIFT STATION #2

- The current pump has sufficient capacity to handle proposed peak design flows.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Install a standby generator to provide power in the event of a power failure.

SILVER BEACH LIFT STATION #1

- The current pump has sufficient capacity to handle proposed peak design flows.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Install a standby generator to provide power in the event of a power failure.
- Install a new generator to replace the existing one;

MULHURST MAIN LIFT STATION #2

- Replace the existing pump with a new submersible dry-pit sewage pump with a capacity of 56.5 L/s.
- Increase the storage volume inside the wet well to accommodate the 2 minutes of pump running time.
- Flow monitoring from Mullhurst No.1 Lift Station and Silver Beach No.1 should be installed to establish the actual contributing flows to appropriately size the required capacity of this lift station for optimal efficiency.
- Flow monitoring on Inflow and Infiltration (I/I) should be conducted to find its contribution during the wet weather conditions. The manholes and manhole characteristics should be inspected to find if any rehabilitation is required to reduce the I/I contributions
- Install a standby generator to provide power in the event of a power failure.
- Install proper safety grating on hatches to maintain safe pump removal.

Note: An example of the flow monitoring device and safety gratings described above is located in Appendix D. While a flow monitoring device hasn't been recommended for all lift stations, it would be prudent to install flow monitoring devices throughout the entire system.

6 CONCLUSION

Further to the capacity assessment costs based on the 2+, 5+ and 10+ year upgrades, we have also reviewed the site as a whole and prioritized our recommended next steps for investigation and repair:

STEP 1

Complete additional investigations to the leg of lift stations from Itaska 1-2, Golden Days 1-3, Sandholm Main, Argentia Beach 1-3 and Argentia Main. These stations were found to have inconsistent hour and annual inspection data which may mistakenly create the potential for them to be labeled as under capacity. This leg of lift stations pumps into one another accumulating as it passes through the stations from Itaska to Argentia Main. After review of the capacity data, it was found that some upstream stations were pumping more volume than the related downstream station. This cannot be possible unless the pump is wearing out, has a grease build up or has a leak in the force main that is causing it to run longer.

Our recommendation would be to complete the following items to confirm why the inconsistencies are happening:

- Calibrate hour meters to confirm they are reading correctly;
- Complete a flow analysis on each site by
 - A pump draw-down test (initial high-level test)
 - Install a temporary rented flow meter on the outlet of the force main to collect flow data (accurate low-level test)
- Complete CCTV inspection of the gravity lines to confirm if there are any infiltration issues, or breaks in the gravity mains;
- Complete a dynamic computer model of the system.

STEP 2

Mulhurst Main station 2 has been confirmed by the County operation staff as a problem lift Station. In the wet weather months, this station is not able to keep up with its incoming flows, which causes the County to have to hire vac trucks to assist in the collection. Also, this site has damages to pumps due to the constant running and violent vibration of the pump caused by an unsecured mounting base.

Our recommendation is to:

- Confirm capacity by:
 - Collecting flow meter data from the ultra sonic flow meter connected to the force main.
 - Completing CCTV camera inspection of the gravity mains to confirm any infiltration into the existing collection system;
- Remove and replace the lift station and repair any gravity line issues over the next couple of years as it will continue to cost more and more to maintain the site;

- Repair any gravity line issues found during the CCTV inspection.

STEP 3

Replace any stations that were confirmed under capacity, in order of the most under capacity to least under capacity, in order to minimize risk.

Replacement could be completed by:

- replacing the entire lift station;
- or, reconfiguring the lift station and adding larger pumps.

STEP 4

Complete repairs or upgrades to existing lift stations and collection systems that are slowly deteriorating.

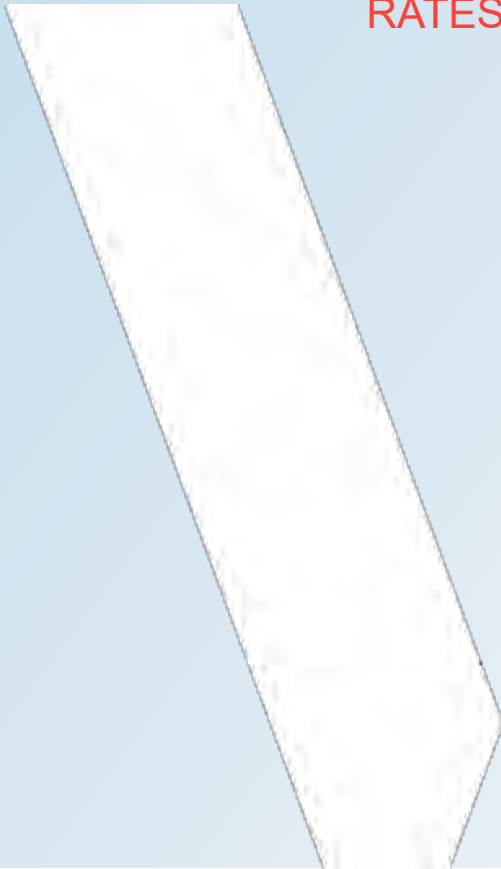
STEP 5

Complete CCTV inspection of remaining gravity lines and update lift stations that have not been corrected as a part of the previous steps.

APPENDIX

A

HISTORICAL FLOW SUMMARY AND
PROJECTED PEAK WET WEATHER FLOW
RATES



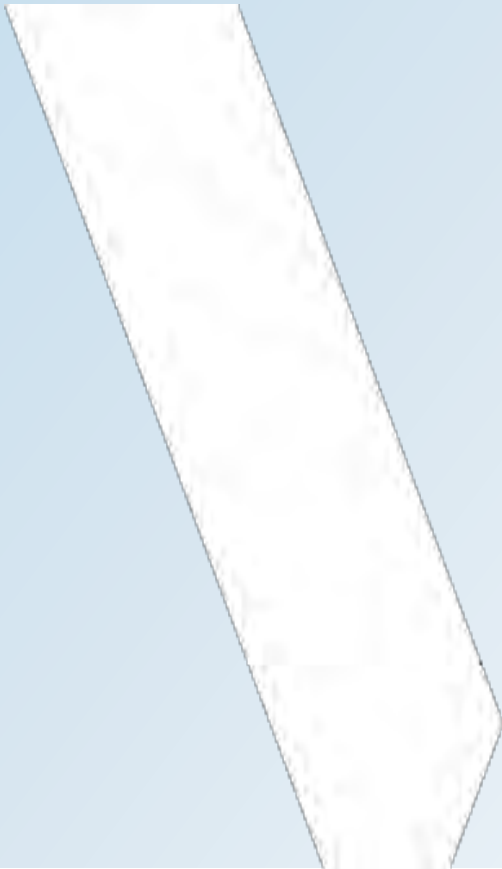
Lift Station ID	Dwelling	Population	Area (Ha)	Manhole	I/I (l/s)	ADF (L/s)	Harmon's Peaking Factor	Required PDF (L/s)	Required PWWF (L/s)	Required PWWF (L/s)	Required Total PWWF (L/s)	Existing Pump Capacity (L/s)
		(20% Increase)				Average Day Flow (From its Own Serviced Area)	Larger of 2.5 or Harmon's Peaking Factor	(From Its Own Serviced Area)	(From Its Own Serviced Area)	(From Its Upstream Lift Station)	(Total Flow to be Handled)	(Total Flow to be Handled)
Itaska L.S No.1	47	226	79.46	7	22.81	0.89	3.54	3.15	25.96	N/A	25.96	4.70
Itaska L.S No.2	34	163	3.918	8	1.74	0.64	3.65	2.35	4.08	25.96	30.04	12.6
Golden Days L.S No.1	56	269	14.92	11	5.06	1.06	3.48	3.68	8.74	30.04	38.78	9.5
Golden Days L.S No.2	63	302	16.435	13	5.64	1.19	3.44	4.09	9.73	38.78	48.51	7.90
Golden Days L.S No.3	109	523	17.09	17	6.15	2.06	3.23	6.64	12.79	48.51	61.30	6.3
Sandholm Main	73	350	15.85	11	5.32	1.38	3.38	4.67	9.98	61.30	71.29	20.5
Argentia Beach L.S No.1	36	173	10.3	6	3.36	0.68	3.63	2.47	5.84	71.29	77.12	18.90
Argentia Beach L.S No.2	23	110	6.45	6	2.29	0.43	3.77	1.64	3.92	77.12	81.05	18.9
Argentia Beach L.S No.3	34	163	4.65	6	1.78	0.64	3.65	2.35	4.13	81.05	85.18	18.9
Argentia Main	34	163	5.6	8	2.21	0.64	3.65	2.35	4.55	81.05	85.60	25.00
Silver Beach L.S No.3	20	96	5.68	6	2.07	0.38	3.81	1.44	3.51	N/A	3.51	4.7
Silver Beach L.S No.2	39	187	9.65	5	3.10	0.74	3.61	2.66	5.76	3.51	9.27	4.7
Silver Beach L.S No.1	48	230	6.05	5	2.09	0.91	3.54	3.21	5.30	9.27	14.57	4.70
Mulhurst L.S No.1	30	144	20.5	24	7.66	0.57	3.69	2.09	9.75	N/A	9.75	17
Mulhurst L.S No.2	298	1,430	89.16	45	28.56	5.63	2.80	15.76	44.32	24.32	68.64	40

Lift Station Name	2015			2016			2017			2018			Total Run Hours in 2016	Total Run Hours in 2017	Total Run Hours in 2018	Average Annual Hours	Existing Pump Capacity (L/s)	Total Volume Pumped (m3/year)	Proposed Pump Capacity (L/s) Anticipated PWWF (L/s)
	Pump 1	Pump 2	Both	Pump 1	Pump 2	Both	Pump 1	Pump 2	Both	Pump 1	Pump 2	Both							
Itaska #1	6506.87	6072.33	590.87	6743.57	6323.46	590.88	7093.6	6433.7	591	7395.2	6520.12	592.56	487.85	460.51	391.14	446.5	4.7	7,554.78	1.7
Itaska #2	3222.64	12371.74	871.74	3579.22	12710.34	872.82	3993.3	13094.5	876.4	4325.22	13443.29	877	697.34	805.4	681.91	728.2	12.6	33,031.91	9.0
Golden Days #1	16169.82	9127.1	724.51	16780.14	9362.48	724.91	17455.4	9635.9	724.91	18011.68	9858.79	728.99	846.5	948.68	787.33	860.8	9.5	29,440.61	13.9
Golden Days #2	85.33	20288.92	2047.39	110.08	20761.57	2048.53	650.4	21381.05	2051.5	1103.43	21835.62	2056.05	499.68	1165.74	916.7	860.7	7.9	24,478.50	12.0
Golden Days #3	16032.45	2877.23	1027.94	16364.12	3281.26	1028.07	16773.3	3719.3	1029.4	17136.73	4118.44	1029.87	735.96	849.88	763.51	783.1	6.3	17,761.09	9.4
Sandholm Main	9188.76	10945.36	280.34	9575.66	11736.73	280.5	9575.66	11736.73	280.5	9575.66	11736.73	280.5	1178.59	0	Data Invalid	1178.6	20.5	86,979.94	23.2
Argentia #1	12986.5	2527.59	32.16	13439.5	2908.8	32.19	13848.7	3273.1	33.2	14172.86	3579.78	37.55	834.27	775.52	639.54	749.8	18.9	51,014.80	30.6
Argentia #2	12516.55	9081.26	225.06	12928.04	486.37	225.09	13438.2	985.34	225.67	13870.71	1406.77	226.65	Data Invalid	1010.29	855.9	933.1	18.9	63,487.78	25.4
Argentia #3	14679.92	9069.39	228.09	15096.06	9491.05	228.09	15691.5	10008.68	228.09	16099.14	10433.22	228.09	837.8	1113.07	832.18	927.7	18.9	63,119.57	28.1
Argentia Main	7800.24	8250.61	759.65	9524.28	8867.44	760	9890.5	9451	761.5	10684.3	9654.3	761.5	2341.57	952.78	997.1	1430.5	25.0	128,743.50	42.6
Silver Beach #3	1021.05	2910.55	75.22	1021.05	2910.55	75.22	1104.18	2990.31	75.24	1157.06	3040.07	75.39	Data Invalid	162.93	102.94	132.9	4.7	2,249.26	0.5
Silver Beach #2	4547.71	12700.91	349.55	4606.28	12818.04	349.61	4692.42	12918.16	349.95	4767.78	13006.87	349.99	175.82	186.94	164.15	175.6	4.7	2,971.77	1.2
Silver Beach #1	6592.04	239.56	357.21	6635.5	248.98	357.22	6701.14	374.25	358.4	6749.82	424.7	385.47	52.9	193.27	153.27	133.1	4.7	2,252.84	1.2
Mulhurst #1	2261.1	2619.1	199.5	No data	No data	No data	2373.8	2710.1	200	2420.7	2749.4	200.4	No Data	102	87	94.5	17.0	5,783.40	1.3
Mulhurst Main #2	3040.73	3468.33	299.03	4214.67	4041.88	313.52	4583.1	5181	337.08	4583.1	5181	337.08	1776.47	1554.67	Data Invalid	1665.6	40.0	239,842.08	56.2

APPENDIX

B

CONDITION ASSESMENT AND PHOTOS



ITASKA LIFT STATION #1		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2 years	Estimated costs in next 5 years	Estimated costs in 10+ years
2018	Component	Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flygt package lift station, drawings are available	drawings are dated 1990						
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence and roof are in good condition	N/A	10+	2	5+	\$2,000.00	
		Site location	Located on the edge of Beach Ave edge of the road right of way, has a small gravel pad pull out for service truck parking.	Recommend bollards be installed on road side to protect the site				\$1,000.00		
	Wet Well information	Dimensions	The wet well is 1.5m inside diameter, and total depth is 5.955m from lid to WW floor. Active storage depth is 0.47m	N/A						
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, chain for lifting arm is rusted should be changed	1990	25+	1	10+	\$100.00	\$3,000.00
		Access	There is an access hatch for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access						
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1990	30+	1	10+	\$80,000.00	
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel with aluminum stay bar.	Overall access hatches appear to be in good condition. Slight rusting around access cover stay.	1990	25+	2	5+	\$15,000.00	
		Hatch connections	hatch connections are galvanized steel	appear to be in good condition	1990	25+	2	5+		
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	platform has minor iodization	1990	25+	2	10+	\$15,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1990	25+	2	10+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is in good condition	1990	25+	2	5+	\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition	1990	25+	2	5+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	appear to be in good condition	1990	25+	2	10+	\$10,000.00	
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1990	25+	2	10+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition, hooks appear to be in good condition some hardware is rusting, may not be SS.	N/A	25+	2	10+		\$2,000.00
	Process header	Piping	4" Galvanized Steel	pipe has oxidisation on it, minor rusting	1990	20-25	2	2+	\$15,000.00	
		hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	bolts have oxidation on them	N/A	20-25	2	2+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1990	20-25	2	2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been operated in a few years, not sure if they seal	1990	20-25	2	2+	\$6,000.00	
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	not working	1990	10+	3	0	\$10,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed	FIR	10+	2	2+	\$24,000.00	
		Pump type and size	Flygt/ xylem pumps, each are 2.2hp, Model 3085							
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	updates to communications and controls and tie to scada system	1990	25+	FIR	2	\$35,000.00	
					Estimated Total Cost			\$63,100.00	\$160,000.00	\$5,000.00
					ALL Year Total			\$228,100.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required

Date & Time: Mon, Sep 24, 2019 10:18:24 AM
Position: +052.961082° / -114.002687°
Altitude: 856m
Datum: WGS-84
Azimuth/Bearing: 111° S69E 1973mils (True)
Elevation Grade: -016%
Horizon Grade: +006%
Zoom: 1X
NEPL Lift Station # 1 Itaska

WARNING
SEWAGE
LIFT STATION
ITASKA #1
COUNTY OF WISCONSIN
PHONE: 768-3557-0000
NO PARKING

Date & Time: Mon, Sep 24, 2019 10:18:24 AM
Datum: WGS-84
Azimuth/Bearing: 302° N56W 5369mils (True)
Elevation Grade: -089%
Horizon Grade: +001%
Zoom: 1X
NEPL Lift Station # 1 Itaska

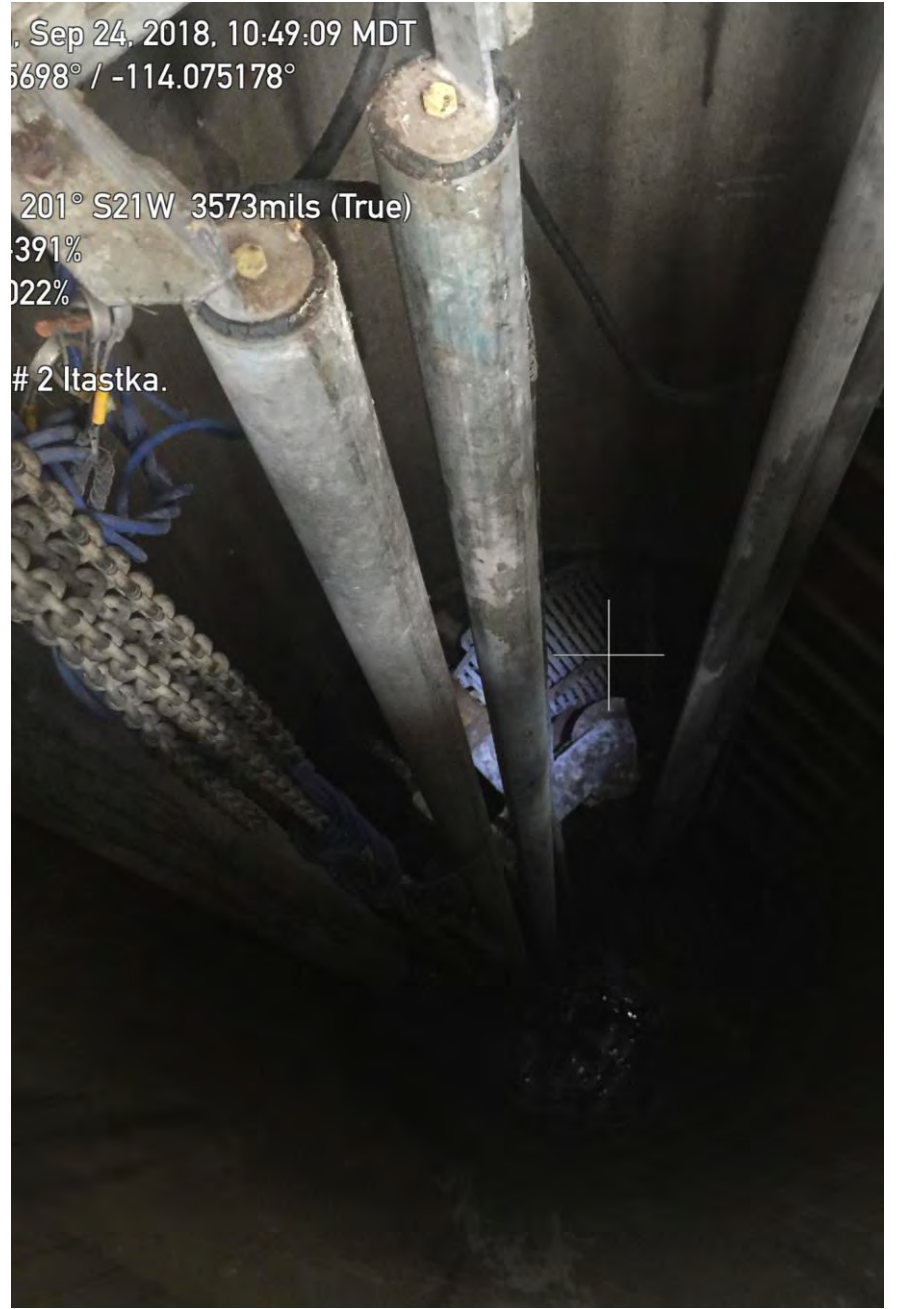
NEPL Lift Station # 1 Itaska

Date & Time: Mon, Sep 24, 2019 10:18:24 AM
Position: +053.071547° / -114.078533°
Altitude: 859m
Datum: WGS-84
Azimuth/Bearing: 269° S89W 4782mils (True)
Elevation Grade: -864%
Horizon Grade: +044%
Zoom: 1X
NEPL Lift Station # 1 Itaska

ITASKA LIFT STATION #2		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	Confidence Index	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments								
Sanitary Lift Station Assessment	Layout	Drawings	Flygt package lift station, drawings are available	drawings are dated 1990							
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence and roof are in good condition	N/A	10+	1		5+		
		Site location	Located on the west side of Beach Ave in utility right of way, there is a small gravel service vehicle access. Chain link fence and gate on access side only	N/A							
	Wet Well information	Dimensions	The wet well is 1.5m inside diameter, and total depth is 6.48m from lid to WW floor. Active storage depth is 0.80m	N/A							
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition	1990	25+	1		10+		\$3,000.00
		Access	There is an access hatch for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access							
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1990	30+	1		10+	\$80,000.00	
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel with aluminum stay bar.	Overall access hatches appear to be in good condition. Some rusting around access cover stay.	1990	25+	1		10+	\$15,000.00	
		Hatch connections	hatch connections are galvanized steel	appear to be in good condition	1990	25+	1		10+		
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	platform has some corrosion	1990	25+	2		10+	\$15,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1990	25+	2		10+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is in good condition	1990	25+	2		5+	\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition	1990	25+	2		5+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	appear to be in good condition	1990	25+	2		10+		\$10,000.00
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1990	25+	2		10+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition, hooks appear to be in good condition some hardware is rusting, may not be SS.	N/A	25+	2		10+		
	Process header	Piping	4" Galvanized Steel	pipe has oxidation on it, some rusting	1990	20-25	2		2+	\$15,000.00	
		hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	bolts have oxidation on them	N/A	20-25	2		2+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1990	20-25	2		2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been operated in a few years, not sure if they seal	1990	20-25	2		2+	\$6,000.00	
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	not working	190	10+	3		0	\$10,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed						\$24,000.00	
		Pump type and size	Flygt/ xylem pumps, each are 2.2hp, Model 3085		FIR	10+	2		2+		
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	updates to communications and controls and tie to scada system	1990	25+	FIR		2	\$35,000.00	
					Estimated Total Cost				\$62,000.00	\$150,000.00	\$15,000.00
					ALL Year Total				\$227,000.00		

N/A: Not applicable,
 NR: Not Required at this time,
 SS: Stainless steel

Condition Rating
 1-3:
 3 - bad condition and an immediate action required,
 2 - medium condition and a continuous observation required,
 1 - very good condition and no action is needed.
 FIR - Further Investigation Required



GOLDEN DAYS LIFT STATION #1		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	Confidence Index	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments								
Sanitary Lift Station Assessment	Layout	Drawings	Flygt package lift station, drawings are available	drawings are dated 1990							
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence and roof are in good condition	N/A	10+	1		5+		
		Site location	Located at the north west intersection of Beach Ave and Golden Cres	Recommend bollards be installed on road side to protect the site						\$1,000.00	
	Wet Well information	Dimensions	The wet well is 1.5m inside diameter, and total depth is 7.045m from lid to WW floor. Active storage depth is 0.84m	N/A							
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, davit chain is rusted and needs to be replaced	1990	25+	1		10+		\$3,000.00
		Access	There is an access hatch for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access							
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1990	30+	1		10+		\$80,000.00
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel with aluminum stay bar.	Overall access hatches appear to be in good condition. Significant rusting of access cover stay.	1990	25+	2		5+		\$15,000.00
		Hatch connections	hatch connections are galvanized steel	appear to be in good condition, some rusting	1990	25+	2		5+		
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	platform has some iodization, and corrosion	1990	25+	2		10+		\$15,000.00
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1990	25+	2		10+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is in good condition,	1990	25+	2		5+		\$3,000.00
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition	1990	25+	2		5+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	appear to be in good condition. Some oxidization	1990	25+	2		10+		\$10,000.00
		Guard rail connections	Connections are galvanized steel	appear to be in medium condition, need minor maintenance, replacement of rusty bolts	1990	25+	2		10+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition, hooks appear to be in good condition some hardware is rusting, may not be SS.	N/A	25+	2		10+		
	Process header	Piping	4" Galvanized Steel	pipe has oxidization on it, minor rusting	1990	20-25	2		2+	\$15,000.00	
		hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	bolts have oxidation on them, Victaulic coupler is rusting	N/A	20-25	2		2+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1990	20-25	2		2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been operated in a few years, not sure if they seal	1990	20-25	2		2+	\$6,000.00	
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	not working	190	10+	3		0	\$10,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed							
		Pump type and size	Flygt/ xylem pumps, each are 2.2hp, Model 3085		FIR	10+	2		2+	\$24,000.00	
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	updates to communications and controls and tie to scada system	1990	25+	FIR		2		\$40,000.00
					Estimated Total Cost				\$63,000.00	\$155,000.00	\$15,000.00
					ALL Year Total				\$233,000.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required

Mon, Sep 24, 2018, 11:18:37 MDT

Position: +053.059902° / -114.068420°

Altitude: 859m

Datum: WGS-84

Azimuth/Bearing: 057° N57E 1013mils (True)

Elevation Grade: -001%

Horizon Grade: +005%

Zoom: 1X

NEPL Lift Station #1 Golden Days

WARNING
SEWAGE
LIFT STATION
GOLDEN
DAYS #1
COUNTY OF WETASKAMUN #10
PHONE: 780-852-0006
NO PARKING

Date & Time: Mon, Sep 24, 2018, 11:17:20 MDT
Position: +053.059824° / -114.068702°
Altitude: 859m
Datum: WGS-84
Azimuth/Bearing: 195° S15W 3467mils (True)
Elevation Grade: -1096%
Horizon Grade: +080%
Zoom: 1X
NEPL Lift Station #1 Golden Days

Date & Time: Mon, Sep 24, 2018, 11:16:38 MDT
Position: +053.059959° / -114.068512°
Altitude: 859m
Datum: WGS-84
Azimuth/Bearing: 106° S74E 1884mils (True)
Elevation Grade: -379%
Horizon Grade: -031%
Zoom: 1X
NEPL Lift Station #1 Golden Days

GOLDEN DAYS LIFT STATION #2		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	Confidence Index	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments								
Sanitary Lift Station Assessment	Layout	Drawings	Flygt package lift station, drawings are available								
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	N/A	10+	1		5+		\$2,000.00	
		Site location	Located on the south end of Beach Ave on the utility right of way, has a gravel pad area for a service truck.								
	Wet Well information	Dimensions	The wet well is 1.5m inside diameter, and total depth is 5.900m from lid to WW floor. Active storage depth is 1.0m								
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	1990	25+	1		10+	\$100.00		\$3,000.00
		Access	There is an access hatch for removal of each pump. Ladder is installed in one access hatch								
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	1990	30+	1		10+		\$80,000.00	
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel with aluminum stay bar.	1990	25+	1		10+		\$15,000.00	
		Hatch connections	hatch connections are galvanized steel	1990	25+	1		10+			
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	1990	25+	2		5+		\$15,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	1990	25+	2		5+			
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	1990	25+	2		5+		\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	1990	25+	2		5+			
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	1990	25+	2		5+			\$10,000.00
		Guard rail connections	Connections are galvanized steel	1990	25+	2		5+			
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	N/A	25+	2		10+			\$2,000.00
	Process header	Piping	4" Galvanized Steel	1990	20-25	2		5+	\$15,000.00		
		hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	N/A	20-25	2		5+			
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	1990	20-25	2		5+	\$7,000.00		
		Check valves	2 - 4 inch cast iron check valves	1990	20-25	2		5+	\$6,000.00		
		Mix flush valve	1- cast iron mix/flush valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	190	10+	3		0	\$10,000.00		
		Pump configuration	2 submersible pumps set up with a lead lag control	FIR	10+	2		2+	\$24,000.00		
		Pump type and size	Flygt/ xylem pumps, each are 2.2hp, Model 3085								
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	1990	25+	FIR		2		\$40,000.00	
				Estimated Total Cost					\$62,100.00	\$155,000.00	\$15,000.00
				ALL Year Total					\$232,100.00		

N/A: Not applicable, **NR:** Not Required at this time, **SS:** Stainless steel

Condition Rating 1-3: **3** - bad condition and an immediate action required, **2** - medium condition and a continuous observation required, **1** - very good condition and no action is needed. **FIR** - Further Investigation Required

Date & Time: Tue, Sep 25, 2018, 11:11:40 MDT
Position: +053.055940° / -114.062987°
Altitude: 855m
Datum: WGS-84
Azimuth/Bearing: 033° N33E 0587mils (True)
Elevation Grade: -944%
Horizon Grade: +033%
Zoom: 1X
NEPL Lift #2 Station Golden Days

Date & Time: Tue, Sep 25, 2018, 11:11:26 MDT
Position: +053.055943° / -114.062972°
Altitude: 855m
Datum: WGS-84
Azimuth/Bearing: 037° N37E 0658mils (True)
Elevation Grade: -498%
Horizon Grade: +005%
NEPL Lift #2 Station Golden Days

Date & Time: Tue, Sep 25, 2018, 11:11:32 MDT
Position: +053.055959° / -114.062954°
Altitude: 855m
Datum: WGS-84
Azimuth/Bearing: 027° N27E 0480mils (True)
Elevation Grade: -1132%
Horizon Grade: -293%
NEPL Lift #2 Station Golden Days

GOLDEN DAYS LIFT STATION #3		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	Confidence Index	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments								
Sanitary Lift Station Assessment	Layout	Drawings	Flygt package lift station, drawings are available	drawings are dated 1990							
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence and roof are in good condition. Roof has been bent in spots	N/A	10+	1		5+		
		Site location	Located on the intersection of Bernice Ave and Poplar St	Recommend bollards be installed on road side to protect the site						\$1,000.00	
	Wet Well information	Dimensions	The wet well is 1.5m inside diameter, and total depth is 5.900m from lid to WW floor. Active storage depth is 1.34m	N/A							
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition. Lifting chain is rusted and should be replaced	1990	25+	1		10+	\$100.00	\$3,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access							
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1990	30+	2		10+		\$80,000.00
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel with aluminum stay bar.	Overall access hatches appear to be in medium condition. Rusting around access cover stay, calcification. Maintenance required on stay connections	1990	25+	2		5+	\$15,000.00	
		Hatch connections	hatch connections are galvanized steel	appear to be in good condition, some rust	1990	25+	2		5+		
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	platform has minor iodization	1990	25+	1		5+	\$15,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1990	25+	1		5+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is in good condition	1990	25+	2		5+	\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition	1990	25+	2		5+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	appear to be in good condition	1990	25+	2		5+	\$10,000.00	
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1990	25+	2		5+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition, hooks appear to be in good condition some hardware is rusting, may not be SS.	N/A	25+	2		5+		\$2,000.00
	Process header	Piping	4" Galvanized Steel	pipe has oxidation on it, minor rusting	1990	20-25	2		5+	\$15,000.00	
		hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	bolts have oxidation on them	N/A	20-25	2		5+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1990	20-25	2		5+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been operated in a few years, not sure if they seal	1990	20-25	2		5+	\$6,000.00	
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	not working	190	10+	3		0	\$10,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed	FIR	10+	2		2+	\$24,000.00	
		Pump type and size	Flygt/ xylem pumps, each are 2.2hp, Model 3085								
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	updates to communications and controls and tie to scada system	1990	25+	FIR		2		\$40,000.00
					Estimated Total Cost				\$63,100.00	\$165,000.00	\$5,000.00
					ALL Year Total				\$233,100.00		

N/A: Not applicable,
 NR: Not Required at this time,
 SS: Stainless steel

Condition Rating 1-3:
 3 - bad condition and an immediate action required,
 2 - medium condition and a continuous observation required,
 1 - very good condition and no action is needed.
 FIR - Further Investigation Required

Date & Time: Tue, Sep 25, 2018, 10:47:22 MDT
Position: +053.048856° / -114.055594°
Altitude: 854m
Datum: WGS-84
Azimuth Bearing: 156° S24E 2773mils (True)
Elevation Grade: -599%
Horizon Grade: +107%
Zoom: 1X
NEPL Lift # 3 Station Golden Days



Date & Time: Tue, Sep 25, 2018, 10:46:30 MDT
Position: +053.048882° / -114.055610°
Altitude: 854m
Datum: WGS-84
Azimuth Bearing: 142° S38E 2524mils (True)
Elevation Grade: -070%
Horizon Grade: +017%
Zoom: 1X
NEPL Lift # 3 Station Golden Days



Date & Time: Tue, Sep 25, 2018, 10:44:38 MDT
Position: +053.048826° / -114.055547°
Altitude: 851m
Datum: WGS-84
Azimuth Bearing: 742° S62W 4302mils (True)
Elevation Grade: +024%
Horizon Grade: +026%
Zoom: 1X
NEPL Lift # 3 Station Golden Days



SANDHOLM MAIN LIFT STATION		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	drawings are dated 1990						
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence and roof are in good condition	N/A	10+	1	5+	\$2,000.00	
		Site location	Located just off Wicks Street on a utility right of way, set back from the road with a small gravel service access	N/A						
	Wet Well information	Dimensions	The wet well is 1.65m inside diameter, and total depth is 6.09 m from lid to WW floor. Active storage depth is 1.79m	N/A						
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, davit arm chain is rusted and needs to be replaced	1990	25+	2	10+		\$3,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access						
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1990	30+	1	10+	\$80,000.00	
	Access hatch or WW lid	Hatch description	Access hatch is just below ground level and is galvanized steel with aluminum stay bar. Barrel has a large culvert around it to act as a retaining wall.	Overall access hatches appear to be in good condition. Slight rusting around access cover stay.	1990	25+	2	10+	\$15,000.00	
		Hatch connections	hatch connections are galvanized steel	appear to be in good condition, minor corrosion	1990	25+	1	10+		
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	platform has minor iodization	1990	25+	3	2+	\$15,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1990	25+	3	2+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is rusting	1990	25+	2	5+	\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition	1990	25+	2	5+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	some rusting on guide rails	1990	25+	2	5+	\$10,000.00	
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1990	25+	2	5+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition minor rust on chain, hooks appear to be in good condition some hardware is rusting, may not be SS	N/A	25+	2	5+	\$500.00	\$1,500.00
	Process header	Piping	4" Galvanized Steel	pipe is rusting	1990	20-25	2	2+	\$15,000.00	
		Hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	bolts have oxidization on them, coupler is rusting	N/A	20-25	2	2+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1990	20-25	2	2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been operated in a few years, not sure if they seal	1990	20-25	2	5+	\$6,000.00	
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	not working	1990	15	3	0	\$8,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed	NFI	10+	2	2+	\$20,000.00	
		Pump type and size	Flyght/ xylem pumps, each are 2.2hp, Model 3102							
	Electrical and controls	All electrical and controls	Flyte/ xylem kit panel	Access to the control panel is limited, Cannot open the panel door all the way due to shed panel being to close. Updates to communications and controls and tie to scada system	1990	25+	FIR	5+	\$35,000.00	
					Estimated Total Cost			\$71,000.00	\$145,500.00	\$4,500.00
				ALL Year Total			\$221,000.00			

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required



ARGENTIA BEACH LIFT STATION #1		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	drawings are dated 1989						
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence and roof are in good condition	N/A	10+	1	5+	\$2,000.00	
		Site location	Located just off 59th Ave on the edge of the road right of way.	N/A						
	Wet Well information	Dimensions	The wet well is 1.65m inside diameter, and total depth is 6.09 m from lid to WW floor. Active storage depth is 1.79m	N/A						
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, davit arm chain is rusted and needs to be replaced	1989	25+	2	10+	\$100.00	\$3,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access						
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1989	30+	1	5+	\$2,000.00	\$80,000.00
	Access hatch or WW lid	Hatch description	Access hatch is just below ground level and is galvanized steel with aluminum stay bar. Barrel has a large culvert around it to act as a retaining wall.	Overall access hatches appear to be in good condition. Slight rusting around access cover stay.	1989	25+	2	5+	\$15,000.00	
		Hatch connections	hatch connections are galvanized steel	appear to be in good condition, minor corrosion	1989	25+	2	5+		
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	platform is corroding	1989	25+	2	5+	\$15,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	Corroding	1989	25+	2	5+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is rusting	1989	25+	2	5+	\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition	1989	25+	2	5+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	some rusting on guide rails	1989	25+	2	5+	\$10,000.00	
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1989	25+	2	5+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition minor rust on chain, hooks appear to be in good condition some hardware is rusting, may not be SS	1989	25+	2	5+	\$500.00	\$1,500.00
	Process header	Piping	4" Galvanized Steel	pipe is rusting	1989	20-25	2	2+	\$15,000.00	
		Hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	bolts have oxidization on them, coupler is rusting	N/A	20-25	2	2+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1989	20-25	2	2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been operated in a few years, one of the chck vavlves was changed recently due to a hole blown out the side	1989	20-25	2	2+	\$6,000.00	
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	not working	1989	10+	3	0	\$8,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed	NFI	10+	2	2+	\$20,000.00	
		Pump type and size	Flyght/ xylem pumps, each are 2.2hp, Model CP-3085							
	Electrical and controls	All electrical and controls	Flyte/ xylem kit panel	updates to communications and controls and tie to scada system	1989	25+	FIR	5+	\$35,000.00	
					Estimated Total Cost			\$58,100.00	\$160,500.00	\$4,500.00
					ALL Year Total			\$223,100.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required

Elevation Grade: -171%
Horizon Grade: -016%
Zoom: 1X
NEPL Lift Station #1 Argentina



Date & Time: Mon, Sep 24, 2018, 13:53:14 MDT
Position: +053.050755° / -114.032728°
Altitude: 859m
Datum: WGS-84
Azimuth/Bearing: 043° N43E 0764mils (True)
Elevation Grade: +051%
Horizon Grade: -002%
Zoom: 1X
NEPL Lift Station # 1 Argentina



Altitude: 841m
Datum: WGS-84
Azimuth/Bearing: 306° N54W 5440mils (True)
Elevation Grade: -005%
Horizon Grade: +003%
Zoom: 1X
NEPL Argentina #1 Lift Station Parking



Date & Time: Mon, Sep 24, 2018, 13:54:54 MDT
Position: +053.050755° / -114.032783°
Altitude: 855m
Datum: WGS-84
Azimuth/Bearing: 195° S15W 3467mils (True)
Elevation Grade: -1407%
Horizon Grade: +112%
Zoom: 1X
NEPL Lift Station #1 Argentina

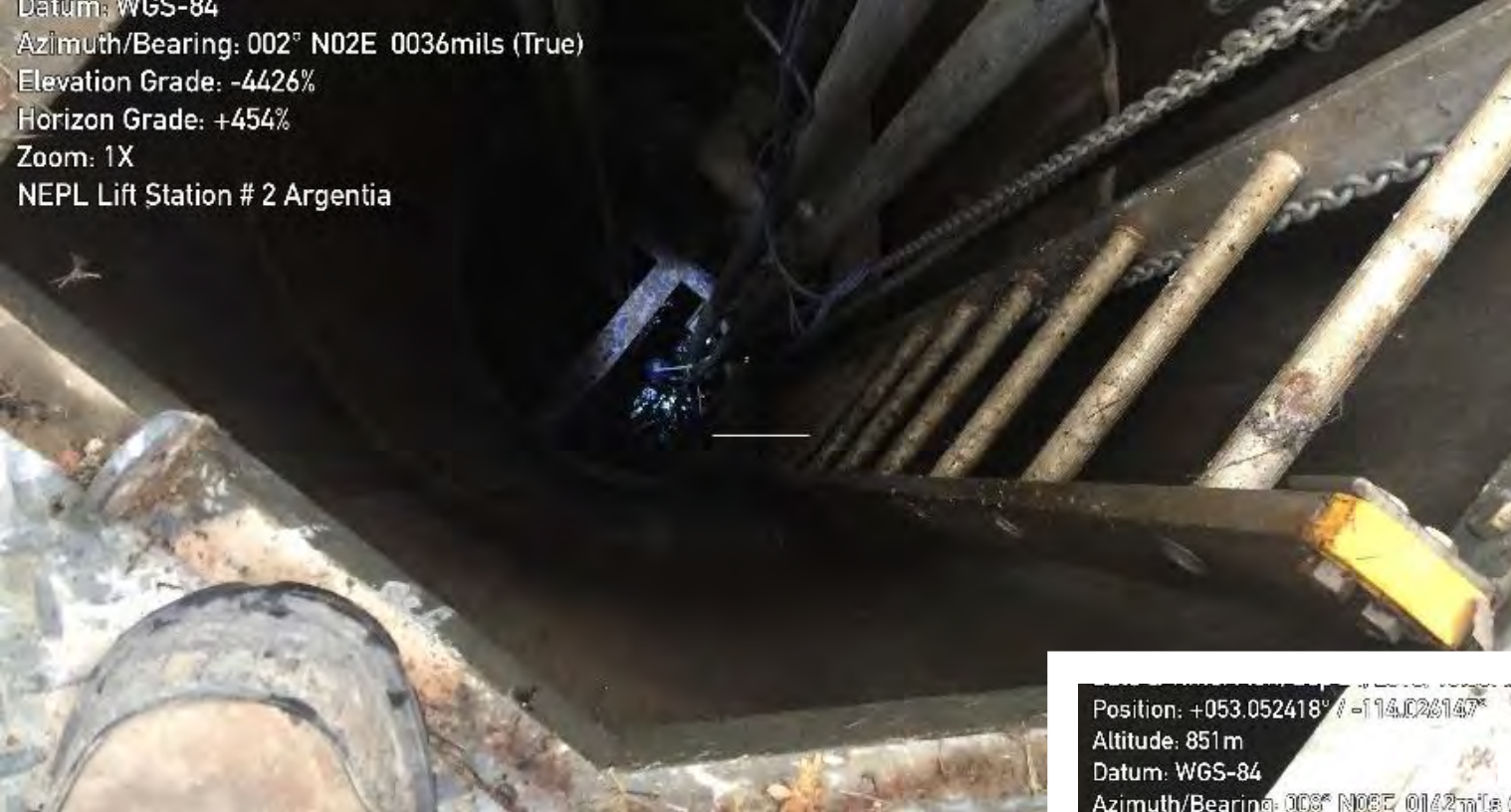


ARGENTIA BEACH LIFT STATION #2		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	drawings are dated 1989						
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence and roof are in good condition	N/A	10+	2	5+	\$2,000.00	
		Site location	Located just off 59th Ave on the south side of the road on a undeveloped road right of way	N/A						
	Wet Well information	Dimensions	The wet well is 1.65m inside diameter, and total depth is 6.09 m from lid to WW floor. Active storage depth is 1.79m	N/A						
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, davit arm chain is rusted and needs to be replaced	1989	25+	2	10+	\$100.00	\$3,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access						
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1989	30+	1	5+	\$80,000.00	
	Access hatch or WW lid	Hatch description	Access hatch is just below ground level and is galvanized steel with aluminum stay bar. Barrel has a large culvert around it to act as a retaining wall.	Overall access hatches appear to be in good condition. Slight rusting around access cover stay.	1989	25+	2	5+	\$15,000.00	
		Hatch connections	hatch connections are galvanized steel	appear to be in good condition, minor corrosion	1989	25+	2	5+		
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	platform is corroding	1989	25+	2	5+	\$15,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	Corroding	1989	25+	2	5+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is rusting	1989	25+	2	5+	\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition	1989	25+	2	5+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	some rusting on guide rails	1989	25+	2	5+	\$10,000.00	
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1989	25+	2	5+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition minor rust on chain, hooks appear to be in good condition some hardware is rusting, may not be SS	1989	25+	2	5+	\$500.00	\$1,500.00
	Process header	Piping	4" Galvanized Steel	pipe is rusting	1989	20-25	2	2+	\$15,000.00	
		Hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	bolts have oxidization on them, coupler is rusting	N/A	20-25	2	2+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1989	20-25	2	2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been operated in a few years, not sure if they seal	1989	20-25	2	2+	\$6,000.00	
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	not working	1989	10+	3	0	\$8,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed	NFI	10+	2	2+	\$20,000.00	
		Pump type and size	Flyght/ xylem pumps, each are 2.2hp, Model CP-3085							
	Electrical and controls	All electrical and controls	Flyte/ xylem kit panel	updates to communications and controls and tie to scada system	1989	25+	FIR	5+	\$35,000.00	
					Estimated Total Cost			\$91,100.00	\$125,500.00	\$4,500.00
					ALL Year Total			\$221,100.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required

Datum: WGS-84
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Elevation Grade: -4426%
Horizon Grade: +454%
Zoom: 1X
NEPL Lift Station # 2 Argentina

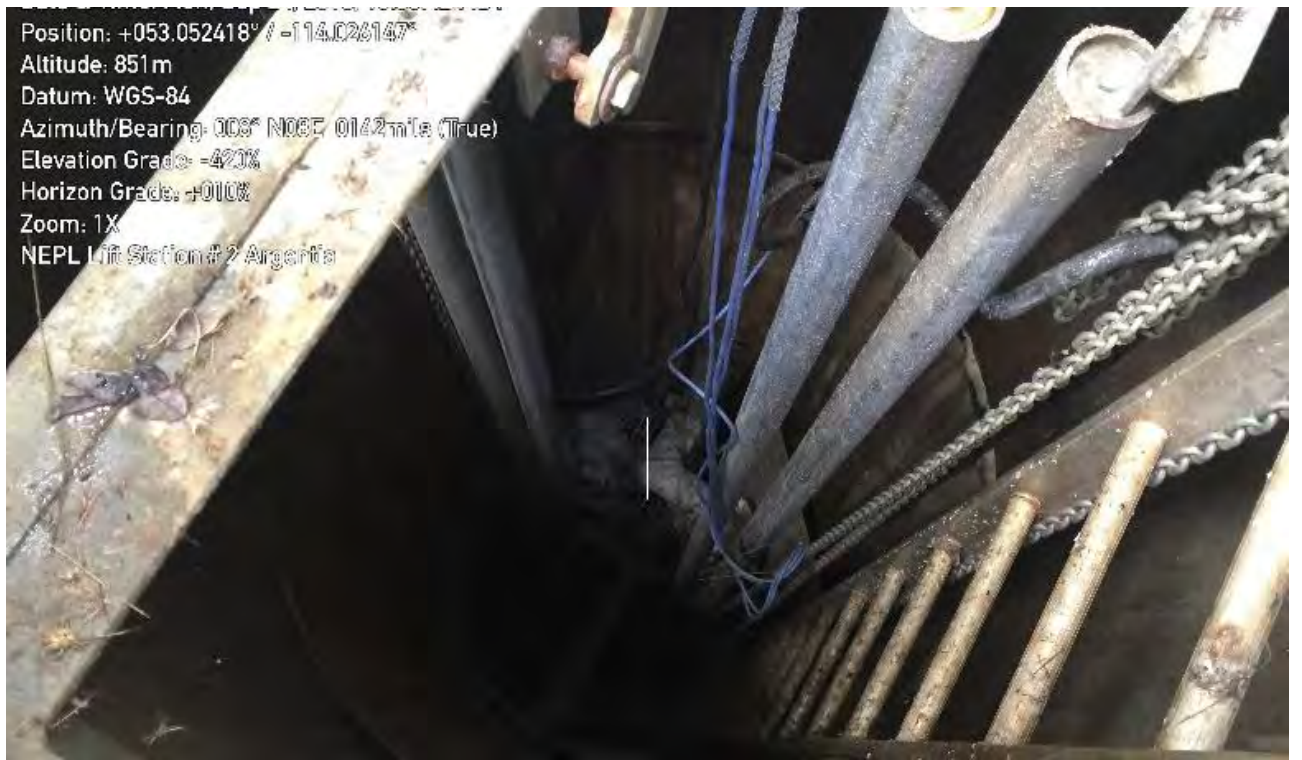


Date & Time: Mon, Sep 24, 2018, 13:33:47 MDT
Position: +053.052408° / -114.026170°
Altitude: 853m
Datum: WGS-84
Azimuth/Bearing: 323° N37W 5742mils (True)
Elevation Grade: +5744%
-∞ %
Zoom: 1X
NEPL Lift Station # 2 Argentina

Datum: WGS-84
Azimuth/Bearing: 134° S46E 2382mils (True)
Elevation Grade: -011%
Horizon Grade: +005%
Zoom: 1X
NEPL Lift Station # 2 Argentina



Position: +053.052418° / -114.026147°
Altitude: 851m
Datum: WGS-84
Azimuth/Bearing: 008° N08E 0142mils (True)
Elevation Grade: -420%
Horizon Grade: +010%
Zoom: 1X
NEPL Lift Station # 2 Argentina

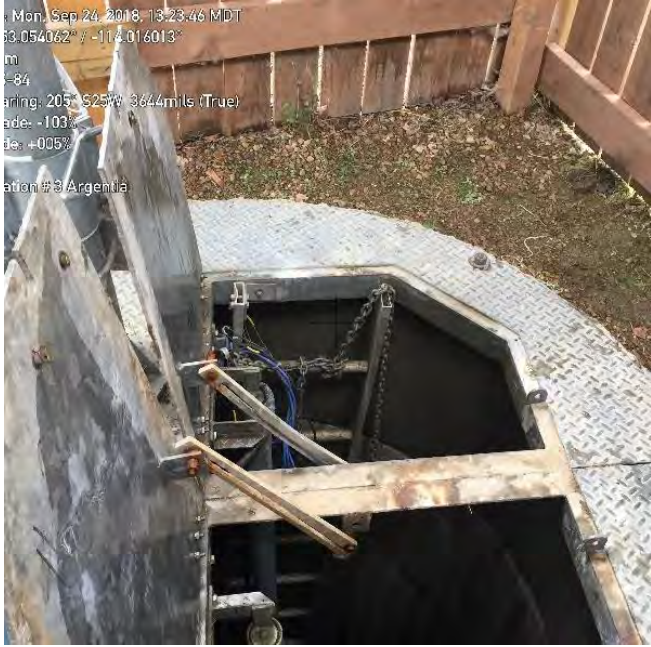


ARGENTIA BEACH LIFT STATION #3				County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment				Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018		Component	Description	Comments										
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	drawings are dated 1989										
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence and roof are in good condition	N/A	10+	2	5+		\$2,000.00				
		Site location	Located just off 59th Ave on the edge of the road right of way.	existing barriers installed										
	Wet Well information	Dimensions	The wet well is 1.65m inside diameter, and total depth is 6.09 m from lid to WW floor. Active storage depth is 1.79m	N/A										
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, davit arm chain is rusted and needs to be replaced	1989	25+	2	10+	\$100.00		\$3,000.00			
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access										
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling, ther is chipping and a gap just below the lid of the barrel, repair required	1989	30+	1	5+	\$2,000.00	\$80,000.00				
	Access hatch or WW lid	Hatch description	Access hatch is just below ground level and is galvanized steel with aluminum stay bar. Barrel has a large culvert around it to act as a retaining wall.	Overall access hatches appear to be in good condition. Slight rusting around access cover stay.	1989	25+	2	5+		\$15,000.00				
		Hatch connections	hatch connections are galvanized steel	appear to be in good condition, minor corrosion	1989	25+	2	5+						
	Platforms	Platforms description	Intermediate platform grating is galvanized steel, there are removable access hatches in the grating for pump pass through	platform is corroding	1989	25+	2	5+		\$15,000.00				
		Platform connections	Connections are galvanized steel with stainless steel hardware	Corroding	1989	25+	2	5+						
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is rusting	1989	25+	2	5+		\$3,000.00				
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition, some bolts are rusting	1989	25+	2	5+						
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	good condition	1989	25+	2	5+		\$10,000.00				
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1989	25+	2	5+						
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition minor rust on chain, hooks appear to be in good condition some hardware is rusting, may not be SS	1989	25+	2	5+		\$500.00	\$1,500.00			
	Process header	Piping	4" Galvanized Steel	pipe is oxidized	1989	20-25	2	5+	\$2,000.00	\$13,000.00				
		Hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	bolts have oxidization on them, coupler is rusting	N/A	20-25	2	5+						
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1989	20-25	2	2+	\$7,000.00					
		Check valves	2 - 4 inch cast iron check valves	has not been operated in a few years, not sure if they seal	1989	20-25	2	2+	\$6,000.00					
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
		Blower Heater	Flygt	not working	1989	10+	3	0	\$8,000.00					
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed	NFI	10+	2	2+	\$20,000.00					
		Pump type and size	Flyght/ xylem pumps, each are 2.2hp, Model CP-3085											
	Electrical and controls	All electrical and controls	Flyte/ xylem kit panel	updates to communications and controls and tie to scada system	1989	25+	FIR	5+		\$35,000.00				
						Estimated Total Cost			\$45,100.00	\$173,500.00	\$4,500.00			
						ALL Year Total			\$223,100.00					

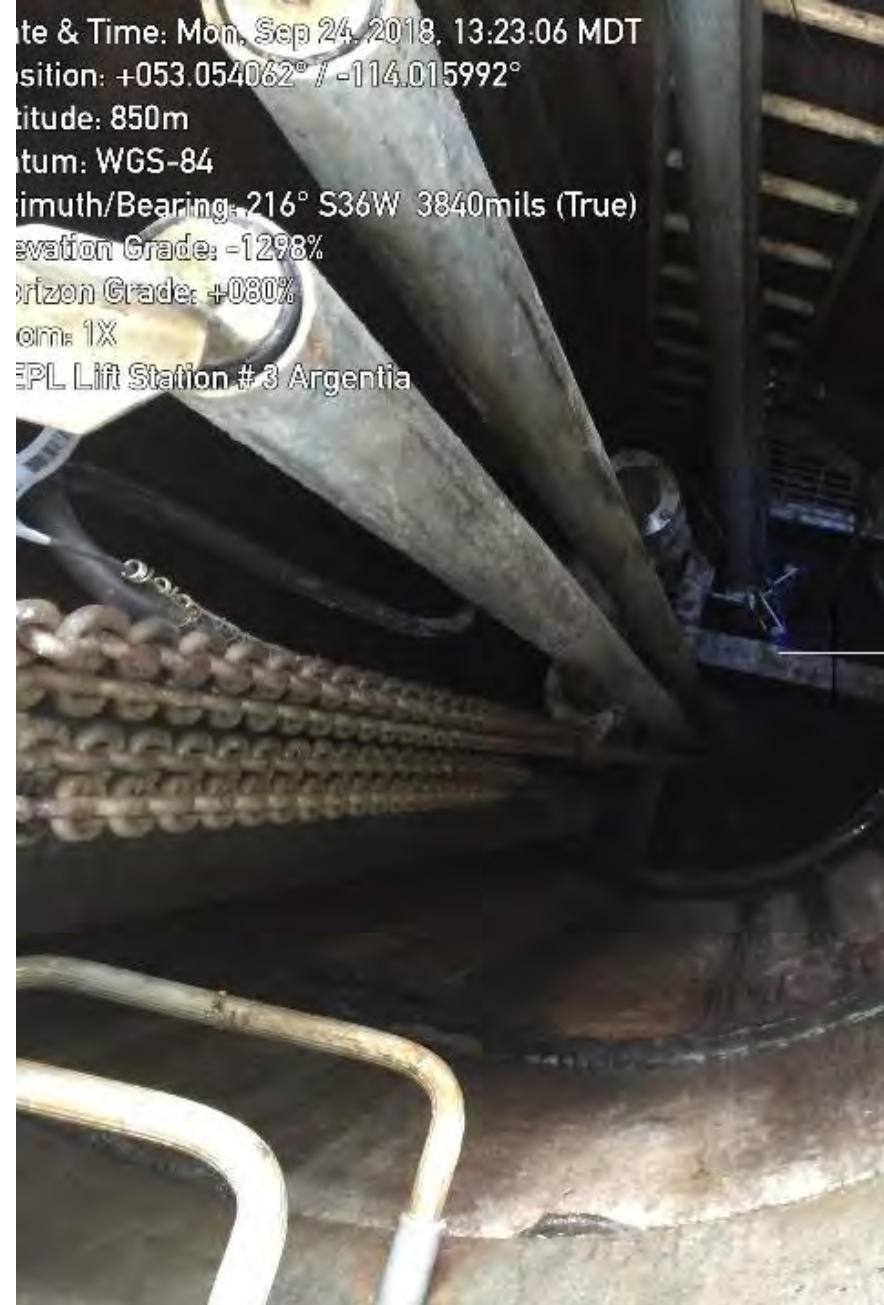
N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required

Mon, Sep 24, 2018, 13:23:46 MDT
+053.054062° / -114.016013°
m
-84
aring: 205° S25W 3844mils (True)
ade: +103
de: +005%
ation #3 Argentina



ate & Time: Mon, Sep 24, 2018, 13:23:06 MDT
osition: +053.054062° / -114.015992°
titude: 850m
tut: WGS-84
imuth/Bearing: 216° S36W 3840mils (True)
levation Grade: -1298%
rizon Grade: +080%
om: 1X
EPL Lift Station # 3 Argentina



ARGENTIA MAIN LIFT STATION		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flygt package lift station, drawings are available	drawings are dated 1989						
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a metal frame shelter with metal cladding consisting of four walls and an open gable ends roof. The is a service entrance with tow large doors as well as a smaller man door	metal frame has minor rusting other wise shelter is in good condition	N/A	10+	1	10+		\$20,000.00
		Site location	Located on the north west quadrant of the intersection of 59 Ave and 52 Street. The Lift Station is on a lot.	The access road could use some grading and gravel, other wise in good condition						
	Wet Well information	Dimensions	The wet well is 1.65m inside diameter, and total depth is 6.09 m from lid to WW floor. Active storage depth is 1.79m	Active storage depth was not on the plans so it was estimated by other elevations on the plans						
		Pump Lifting Davit/Monorail	Lift ing davit is galvanized steel A-frame with I-beam cross bar. It has a 2 ton hoist and trolley	appears to be in good condition, davit arm chain is rusted and needs to be replaced	1989	25+	FIR	FIR		\$10,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access						
		Wet well construction	wet well is a concrete barrel with approx. 500mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1989	30+	1	10+	\$80,000.00	
	Access hatch or WW lid	Hatch description	Access hatch just above ground is checker plate stainless steel with aluminum stay bar.	Lift station has updated access hatches, The county would like to have safety grating installed, in side exiting hatches.	1989	25+	2	10+	\$6,000.00	\$30,000.00
		Hatch connections	hatch connections are galvanized steel and stainless	appear to be in good condition, hatch is corroding slightly	1989	25+	1	10+		
	Platforms	Platforms description	Intermediate platform is checker plate galvanized steel, there are removable access hatches in the grating for pump pass through	platform has corrosion	1989	25+	2	5+		\$12,000.00
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1989	25+	2	5+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is rusting	1989	25+	2	10+		\$3,000.00
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition	1989	25+	2	10+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	some oxidization on guide rails	1989	25+	2	5+		\$10,000.00
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1989	25+	2	5+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	there is are no lifting chains	N/A	25+	2	5+	\$3,000.00	
	Process header	Piping	6" Galvanized Steel	pipe has some corrosion	1989	20-25	2	2+	\$15,000.00	
		Hardware type	Stainless Steel nuts and bolts, 6 inch Victaulic coupling	bolts have oxidization on them, coupler is rusting	N/A	20-25	2	2+		
		Isolation valves	2- 150mm cast iron plug valve with a cast iron handle	has not been operated in a few years, not sure if they seal	1989	20-25	2	2+	\$8,000.00	
		Check valves	2 - 150mm cast iron check valves	has not been operated in a few years, not sure if they seal	1989	20-25	2	2+	\$8,000.00	
		Mix flush valve	1- cast iron mix/flush valve	removed	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A
		Blower Heater	Flygt	not working	1989	10+	3	0	\$15,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have been updated as needed	NFI	10+	2	2+	\$80,000.00	
		Pump type and size	Flygt/ xylem pumps, each are 85 model 3301 and 88 hp, Modl 3300							
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	Existing control panel is mounted to high, operators has to stand on a barrel to reach it.updates to communications and controls to tie to radio system. Add a generator for back up power.	1989	25+	FIR	5+	\$20,000.00	\$45,000.00
					Estimated Total Cost			\$152,000.00	\$150,000.00	\$63,000.00
					ALL Year Total			\$365,000.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

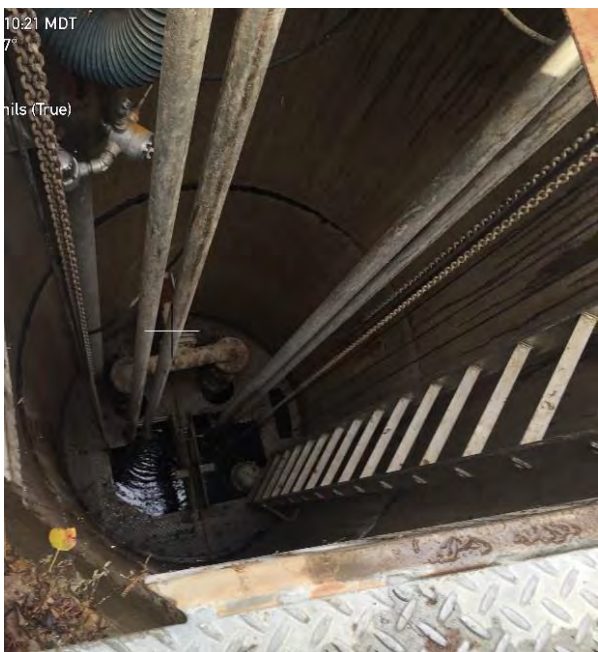
Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required



MULHURST LIFT STATION #1		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	drawings are dated 1985						
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	has a tall wood fence , no roof on top. Fence has man gate as well as two large swinging gates with service truck access	Fence is in reasonable condition	N/A	10+	1	5+	\$1,500.00	
		Site location	Located on its on lot at the intersection of 52 Street and 59th Ave, has a small gravel access, with trees on the north and east side	Recommend bollards be installed on road side to protect the site				\$1,000.00		
	Wet Well information	Dimensions	The wet well is 1.8m inside diameter, and total depth is 7.28m from underside of lid to WW floor. Active storage depth is 1.08m	N/A						
		Pump Lifting Davit/Monorail	There is a lifting davit mounted on the tank lid made of galvanized steel.	Lifting davit appears to be in good condition, Chain for davit arm is rusted and needs replacement	1985	25+	2	5+	\$100.00	\$3,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access						
		Wet well construction	wet well is a concrete barrel with approx.250mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1985	25+	2	5+	\$60,000.00	
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel the, there are no stay bars	Overall access hatches appear to be in ok condition. Slight rusting around access opening	1985	25+	2	5+	\$1,000.00	\$10,000.00
		Hatch connections	hatch connections are galvanized steel	the hinge is rusting and may need replacement	1985	25+	2	5+		
	Platforms	Platforms description	Intermediate platform is galvanized checker plate steel, there are removable access hatches in the grating for pump pass through	platform has minor iodization	1985	25+	2	5+		\$15,000.00
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1985	25+	2	5+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is in good condition	1985	25+	2	10+		\$800.00
		Ladder connections	ladder is bolted to the concrete wall below the top lid and just above the intermediate platform	connections appear to be in good condition	1985	25+	2	10+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	appear to be in good condition	1985	25+	2	10+		\$8,000.00
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1985	25+	2	10+		
		lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition, hooks appear to be in good condition some hardware is rusting, may not be SS.	N/A	25+	2	10+		
	Process equipment	Piping	100mm Galvanized Steel pipe	pipe has oxidisation on it, minor rusting	1985	20-25	3	2+	\$15,000.00	
		Hardware type	Stainless Steel nuts and bolts, 100mm Victaulic coupling	bolts have oxidisation on them, outlet coupler is rusty and should be replaced	N/A	20-25	3	2+		
		Isolation valves	2- 4 inch cast iron gate valve with a cast iron handle	operation is unknown, not operated	1985	20-25	3	2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	operation not checked to confirm sealing, body is corroded	1985	20-25	3	2+	\$6,000.00	
		Mix flush valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve on header	N/A	N/A	N/A	N/A	N/A	N/A
		Blower heater	Flygt Blower heater	Does not work	1985	10+	3	0	\$8,000.00	
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps operate and have be updated as needed .	FIR	10+	2	2+	\$30,000.00	
		Pump type and size	Flygt/ xylem pumps, each are 2.2hp, Model - 3085							
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	replace control panel, connect to scada	1990	25+	FIR	2	\$40,000.00	
					Estimated Total Cost			\$40,100.00	\$154,500.00	\$13,800.00
					ALL Year Total			\$208,400.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required



MULHURST MAIN LIFT STATION #2			County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment				Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments										
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	most recent drawings are dated 1994									
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
		Shelter	Site has a wood fence and no roof	Fence is in good condition, requires full electrical building	N/A	10+	2	5+	\$100,000.00				
		Site location	Located on the lane intersection of Lake drive and 50 Ave. It is in its own utility right of way. There is a small gravel access for a service vehicle	Recommend bollards be installed on road side to protect the site					\$1,000.00				
	Wet Well information	Dimensions	The wet well is 2.4m inside diameter, and total depth is 11 m from lid to WW floor. Active storage depth is 1.83m	N/A									
		Pump Lifting Davit/Monorail	the lifting davit is a 6000 lb duel I-beam posts and I-beam cross bar construction, with an electric winch	appears to be in good condition, slight rusting	1990	25+	1	10+			\$10,000.00		
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access									
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	some minor concrete spalling no cracks, the base of the wet well may be not be in good condition. FIR	1985	25+	3	2+	\$450,000.00				
	Access hatch and WW lid	Hatch description	Access hatch just above ground is checker plate stainless steel with aluminum stay bar.	hatches is heavy to open. The county would like to have safety grating installed, in side exiting hatches	1994	25+	1	10+	\$6,000.00		\$30,000.00		
		Hatch connections	hatch connections are galvanized steel and stainless	appear to be in good condition	1994	25+	1	10+					
	Platforms	Platforms description	2 Intermediate platforms are checker plate galvanized steel, there are removable access hatches in the grating for pump pass through	platform has corrosion, recommended to replace with fiber reinforced plastic	1985	25+	3	2+	\$40,000.00				
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to have corrosion	1985	25+	3	2+					
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the first platform and there is a second ladder below the first plat form to the second platform. It is unknown if the later extends past the second platform	upper ladder is in good condition, lower ladder looks to have some corrosion	1994	25+	2	5+		\$1,000.00			
		Ladder connections	ladder is bolted to the wall just below the lid and before the intermediate platform and below the first intermediate platform to above the second platform	connections appear to be in good condition for the upper ladder lower ladder it is not known.	1994	25+	2	5+					
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	guide rails are rusting	1994	25+	2	2+	\$15,000.00				
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, may need minor maintenance, replacement of rusty bolts	1994	25+	2	2+					
		Lifting chain and hooks	site has a pump lifting cable and hooks are galvanised steel, hardware is Stainless steel	cable is in good condition, hooks appear to be in good condition	N/A	25+	2	5+		\$2,000.00			
	Process header	Piping	150mm Galvanized Steel	pipe condition is unknown, not visual from up top. County staff confirms its not leaking	1985	20-25	3	2+	\$100,000.00				
		Hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	hardware condition unknown	N/A	20-25	3	2+					
		Isolation valves	2- 6 inch cast iron gate valve with a cast iron handle	have not been operated in a few years, not sure if they seat	1985	20-25	3	2+	\$30,000.00				
		Check valves	2 - 6 inch cast iron check valves	have not been check for sealing	1985	20-25	3	2+	\$12,000.00				
		Mix flush valve	N/A	no mixing valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
		Blower heater	flygt	not working	1985	10+	3	0	\$20,000.00				
		Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, volute on west pump has broke multiple times. Pumps have be updated as needed	FIR	10+	3	2+	\$80,000.00				
		Pump type and size	flygt/ xylem pumps, each are 88hp and 85hp, Model CP-3300-181										
	Electrical and controls	All electrical and controls	flygt/ xylem kit panel	updates to communications and controls tie to Scada system, add genset	1985	25+	FIR	2+	\$300,000.00				
					Estimated Total Cost				\$1,154,000.00	\$3,000.00	\$40,000.00		
					ALL Year Total				\$1,197,000.00				

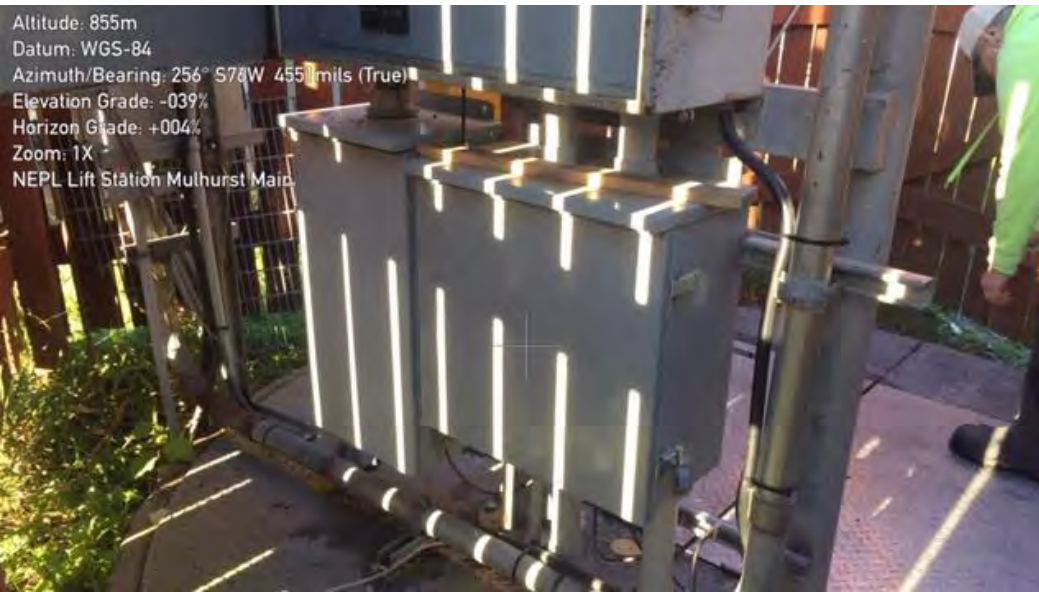
N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required

Date & Time: Thu, Sep 27, 2018, 09:12:39 MDT
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Altitude: 855m
Datum: WGS-84
Azimuth/Bearing: 064° N64E 1153mils (True)
Elevation Grade: +015%
Horizon Grade: +000%
Zoom: 1X
NEPL Mulhurst Main Station Parking



Altitude: 855m
Datum: WGS-84
Azimuth/Bearing: 256° S78W 455mils (True)
Elevation Grade: -039%
Horizon Grade: +004%
Zoom: 1X
NEPL Lift Station Mulhurst Main



Date & Time: Thu, Sep 27, 2018, 09:27:12 MDT
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Datum: WGS-84
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Elevation Grade: -039%
Horizon Grade: +000%
Zoom: 1X
NEPL Mulhurst Main



Altitude: 855m
Datum: WGS-84
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Horizon Grade: +077%
Zoom: 1X
NEPL Lift Station Mulhurst Main



SILVER BEACH LIFT STATION #1		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2+ years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	drawings are dated 1989						
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence may need to be replaced soon, roof is in ok condition	N/A	2+	1	5+	\$3,000.00	
		Site location	Located on the edge of Silver Beach Rd in the edge of the road right of way, has a asphalt pavement on one side and is treed in on the other. Close to a property	Recommend bollards be installed on road side to protect the site					\$1,000.00	
	Wet Well information	Dimensions	The wet well is 1.5m inside diameter, and total depth is 7.5 m from lid to WW floor. Active storage depth is 0.6 m	N/A						
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, davit arm chain is rusted and should be replaced	1989	25+	2	10+	\$100.00	\$3,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access						
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1989	30+	2	5+		\$80,000.00
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel with aluminum stay bar.	Overall access hatches appear to be in good condition. Slight corrosion around edges of hatch	1989	25+	2	5+	\$10,000.00	
		Hatch connections	hatch connections are galvanized steel	slight corrosion on hinges	1989	25+	2	5+		
	Platforms	Platforms description	Intermediate checker plate platform is galvanized steel, there are removable access hatches in the grating for pump pass through	platform has minor iodization	1989	25+	2	5+	\$12,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1989	25+	2	5+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is in good condition	1989	25+	2	5+	\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition, hardware is rusting.	1989	25+	2	5+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	Guide rails are in ok condition some minor corrosion and rusting	1989	25+	2	10+		\$10,000.00
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, minor oxidization	1989	25+	2	10+		
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition, hooks appear to be in good condition slight oxidization	1989	25+	2	10+		\$2,000.00
	Process header	Piping	4" Galvanized Steel	pipe is not leaking, FIR	1989	20-25	3	2+	\$15,000.00	
		Hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	FIR	1989	20-25	3	2+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been tested or operated in a few years, not sure if it seals	1989	20-25	3	2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been tested a few years, not sure if it seals FIR	1989	20-25	3	2+	\$6,000.00	
		Mix flush valve	N/A	removed	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A
		Blower heater	flygt	not working	1989	10+	3	0	\$8,000.00	
	Pumps	Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have be updated as needed	NFI	10+	2	2+	\$40,000.00	
		Pump type and size	Flygt/ xylem pumps, each are 2.4 hp, Model 3085							
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	updates to communications and controls to tie to radio system	1989	25+	2	2+	\$35,000.00	
					Estimated Total Cost			\$115,100.00	\$105,000.00	\$95,000.00
					ALL Year Total			\$315,100.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required

Elevation Grade: -014%
Horizon Grade: +002%
Zoom: 1X
NEPL Lift Station # 1 Silver Beach



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Altitude: 850m
Datum: WGS-84
Azimuth/Bearing: 030° N30E 0533mils (True)
Elevation Grade: -514%
Horizon Grade: +011%
Zoom: 1X
NEPL Lift Station # 1 Silver Beach



Date & Time: Mon, Sep 24, 2018, 14:30:40 MDT
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Datum: WGS-84
Azimuth/Bearing: 010° N10E 0178mils (True)
Elevation Grade: -704%
Horizon Grade: +038%
Zoom: 1X
NEPL Lift Station # 1 Silver Beach



Altitude: 851m
Datum: WGS-84
Azimuth/Bearing: 035° N35E 0622mils (True)
Elevation Grade: -102%
Horizon Grade: -001%
Zoom: 1X
NEPL Lift Station # 1 Silver Beach



SILVER BEACH LIFT STATION #2			County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2= years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component		Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	drawings are dated 1989							
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence may need to be replaced soon, roof is in ok condition slight rusting on framing	N/A	2+	1	5+	\$3,000.00		
		Site location	Located on the edge of Silver Beach Rd in the edge of the road right of way, has a asphalt pavement on one side and private property close to the other side.	Recommend bollards be installed on road side to protect the site							
	Wet Well information	Dimensions	The wet well is 1.5m inside diameter, and total depth is 7.14 m from lid to WW floor. Active storage depth is 0.64 m	N/A							
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, davit arm chain is rusted and should be replaced	1989	25+	2	10+	\$100.00		\$3,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access							
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. Not sure of condition of lower portion of manhole as lift was in operation	1989	30+	2	5+		\$80,000.00	
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel with aluminum stay bar.	Overall access hatches appear to be in good condition. Slight corrosion around edges of hatch and on stay bar mounts	1989	25+	2	5+		\$10,000.00	
		Hatch connections	hatch connections are galvanized steel	slight corrosion on hinges	1989	25+	2	5+			
	Platforms	Platforms description	Intermediate checker plate platform is galvanized steel, there are removable access hatches in the grating for pump pass through	platform has minor iodization	1989	25+	2	5+		\$12,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1989	25+	2	5+			
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is in good condition	1989	25+	2	5+		\$3,000.00	
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition.	1989	25+	2	5+			
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	Guide rails are in ok condition some corrosion and rusting	1989	25+	2	5+			\$10,000.00
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, minor oxidization	1989	25+	2	5+			
		Lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition, hooks appear to be in good condition slight oxidization	1989	25+	2	10+			\$2,000.00
	Process header	Piping	4" Galvanized Steel	pipe is not leaking, some oxidization	1989	20-25	3	2+	\$15,000.00		
		Hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	coupling is rusting	1989	20-25	3	2+			
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been tested for operated in a few years, not sure if it seals	1989	20-25	3	2+	\$7,000.00		
		Check valves	2 - 4 inch cast iron check valves	has not been tested a few years, not sure if it seals	1989	20-25	3	2+	\$6,000.00		
		Mix flush valve	N/A	removed	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Blower heater	flygt	not working	1989	10+	3	0	\$8,000.00		
	Pumps	Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have be updated as needed	NFI	10+	2	2+	\$40,000.00		
		Pump type and size	Flygt/ xylem pumps, each are 2.4 hp, Model 3085								
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	door interfears with the structures when opened. updates to communications and controls to tie to radio system	1989	25+	2	2+	\$35,000.00		
					Estimated Total Cost				\$114,100.00	\$105,000.00	\$15,000.00
					ALL Year Total				\$234,100.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required



SILVER BEACH LIFT STATION #3		County of Wetaskiwin North East Pigeon Lake Wastewater Collection System Assessment		Approx. year of installation	Typ. Life Expectancy (yrs)	Condition Grade	estimate remaining life (yrs)	Estimated costs in next 2= years	Estimated costs in next 5+ years	Estimated costs in 10+ years
2018	Component	Description	Comments							
Sanitary Lift Station Assessment	Layout	Drawings	Flight package lift station, drawings are available	drawings are dated 1989						
		Safety/security	Site is Locked, Electrical panel has access security, site has alarm call outs.	site is secure	N/A	N/A	N/A	N/A	N/A	N/A
		Shelter	Site has a wood fence with a tin roof mounted on fence. Roof has open gable ends.	Fence may need to be replaced soon, roof is in ok condition	N/A	2+	1	5+	\$3,000.00	
		Site location	Located on the edge of Silver Beach Rd in the edge of the road right of way, has a asphalt pavement and grass on one side and is treed in on the other.	N/A						
	Wet Well information	Dimensions	The wet well is 1.5m inside diameter, and total depth is 4.9 m from lid to WW floor. Active storage depth is 0.65 m	N/A						
		Pump Lifting Davit/Monorail	There is a small lifting davit mounted on the tank lid made of galvanized steel.	appears to be in good condition, davit arm chain is rusted and should be replaced	1989	25+	2	10+	\$100.00	\$3,000.00
		Access	There is an access hatches for removal of each pump. Ladder is installed in one access hatch	Lift station has suitable access						
		Wet well construction	wet well is a concrete barrel with approx. 300mm thick walls.	no signs of concrete spalling or cracks were observed. There is a concrete protrusion next to the latter that may be letting water in. not sure of base condition as wet well was in operation. FIR	1989	30+	1	10+		\$80,000.00
	Access hatch or WW lid	Hatch description	Access hatch just above ground are galvanized steel with aluminum stay bar.	Overall access hatches appear to be in good condition. Slight corrosion around edges of hatch and on stay bar mounts	1989	25+	2	5+	\$10,000.00	
		Hatch connections	hatch connections are galvanized steel	slight corrosion on hinges	1989	25+	2	5+		
	Platforms	Platforms description	Intermediate checker plate platform is galvanized steel, there are removable access hatches in the grating for pump pass through	platform has minor oxidization	1989	25+	2	5+	\$12,000.00	
		Platform connections	Connections are galvanized steel with stainless steel hardware	appear to be in good condition	1989	25+	2	5+		
	Access ladders	Ladder description	Ladder is aluminum, it extends from the top hatch to the platform there is no ladder below the platform.	ladder is in good condition	1989	25+	2	10+		\$3,000.00
		Ladder connections	ladder is bolted to the top lid and intermediate platform	connections appear to be in good condition, hardware is rusting.	1989	25+	2	10+		
	Pump guide rails and lifting chain	Guide rail description	Guard rails are galvanized steel	Guide rails are in ok condition some minor corrosion and rusting	1989	25+	2	10+		\$10,000.00
		Guard rail connections	Connections are galvanized steel	appear to be in good condition, minor oxidization	1989	25+	2	10+		
		lifting chain and hooks	pump lifting chain and hooks are galvanised steel, hardware is Stainless steel	chain is in good condition, hooks appear to be in good condition slight oxidization, cable hooks are rusting	1989	25+	2	10+		
	Process header	Piping	4" Galvanized Steel	pipe is not leaking, FIR	1989	20-25	3	2+	\$15,000.00	
		Hardware type	Stainless Steel nuts and bolts, 4 inch Victaulic coupling	coupler is rusting	1989	20-25	3	2+		
		Isolation valves	2- 4 inch cast iron plug valve with a cast iron handle	has not been tested for operated in a few years, not sure if it seals or operates	1989	20-25	3	2+	\$7,000.00	
		Check valves	2 - 4 inch cast iron check valves	has not been tested a few years, not sure if they seals	1989	20-25	3	2+	\$6,000.00	
		Fix flush valve	N/A	removed	N/A	N/A	N/A	N/A	N/A	N/A
		Air release valve	N/A	No air release valve	N/A	N/A	N/A	N/A	N/A	N/A
		Blower heater	flygt	not working	1989	10+	3	0	\$8,000.00	
	Pumps	Pump configuration	2 submersible pumps set up with a lead lag control	Pumps have annual maintenance program, pumps have be updated as needed	NFI	10+	2	2+	\$40,000.00	
		Pump type and size	Flygt/ xylem pumps, each are 2.4 hp, Model 3085							
	Electrical and controls	All electrical and controls	Flygt/ xylem kit panel	no latch on the control panel door, and door interfears with the structures when opened. updates to communications and controls to tie to radio system	1989	25+	2	2+	\$35,000.00	
					Estimated Total Cost			\$114,100.00	\$102,000.00	\$18,000.00
					ALL Year Total			\$234,100.00		

N/A: Not applicable, NR: Not Required at this time, SS: Stainless steel

Condition Rating 1-3: 3 - bad condition and an immediate action required, 2 - medium condition and a continuous observation required, 1 - very good condition and no action is needed. FIR - Further Investigation Required



Altitude: 854m
Datum: WGS-84
Azimuth/Bearing: 341° N19W 6082mils (True)
Elevation Grade: -417%
Horizon Grade: +026%
Zoom: 1X



Altitude: 856m
Datum: WGS-84
Azimuth/Bearing: 020° N20E 0356mils (True)
Elevation Grade: +053%
Horizon Grade: -003%
Zoom: 1X
NEPL Lift Station # 3 Silver Beach



Altitude: 842m
Datum: WGS-84
Azimuth/Bearing: 118° S62E 2098mils (True)
Elevation Grade: +009%
Horizon Grade: +004%
Zoom: 1X
NEPL Lift Station # 3 Silver Beach

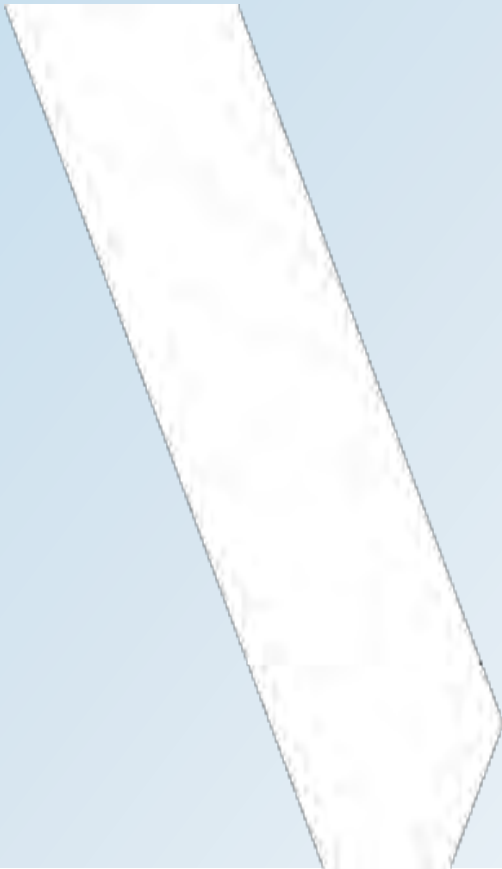


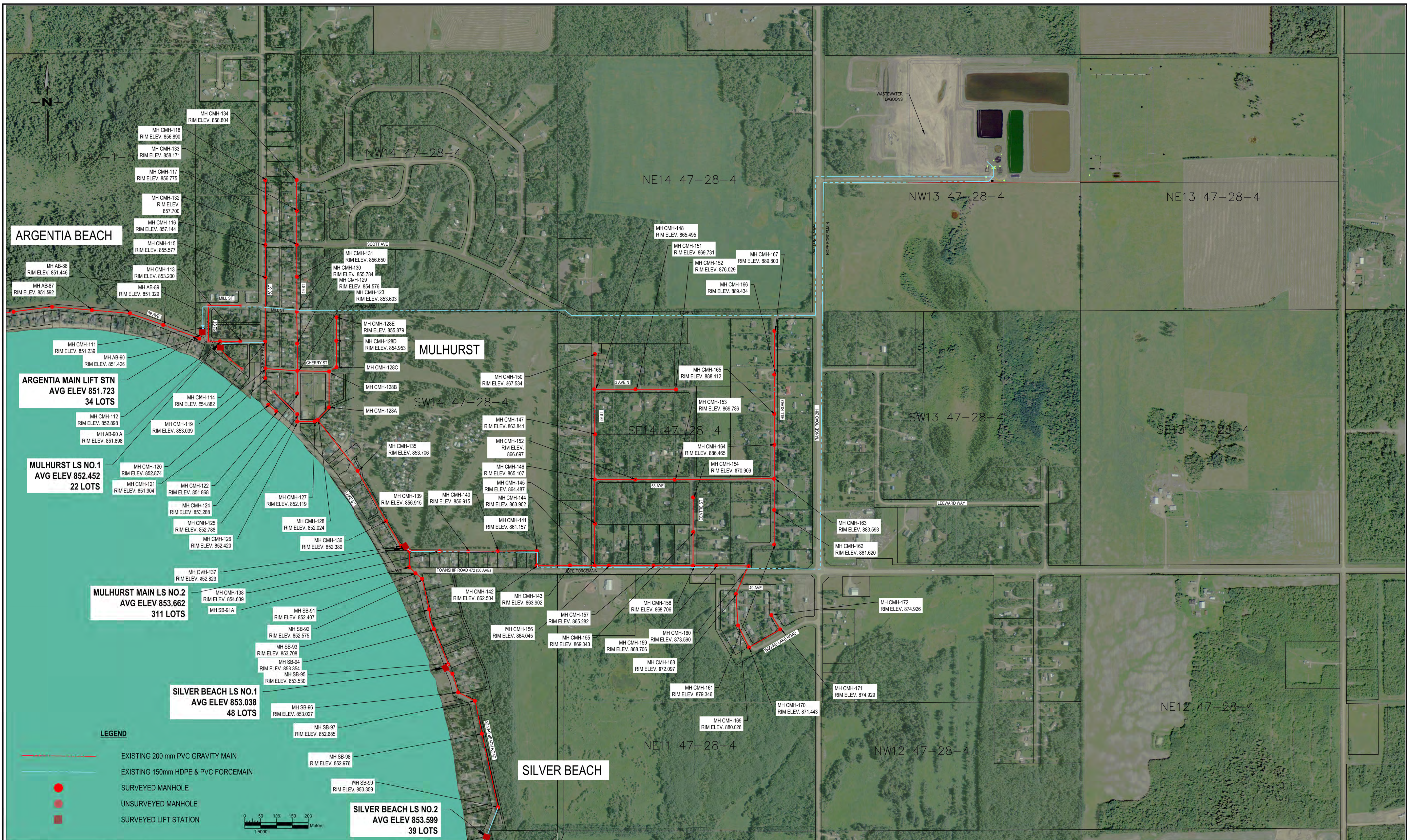
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NEPL Lift Station # 3 Silver Beach


APPENDIX

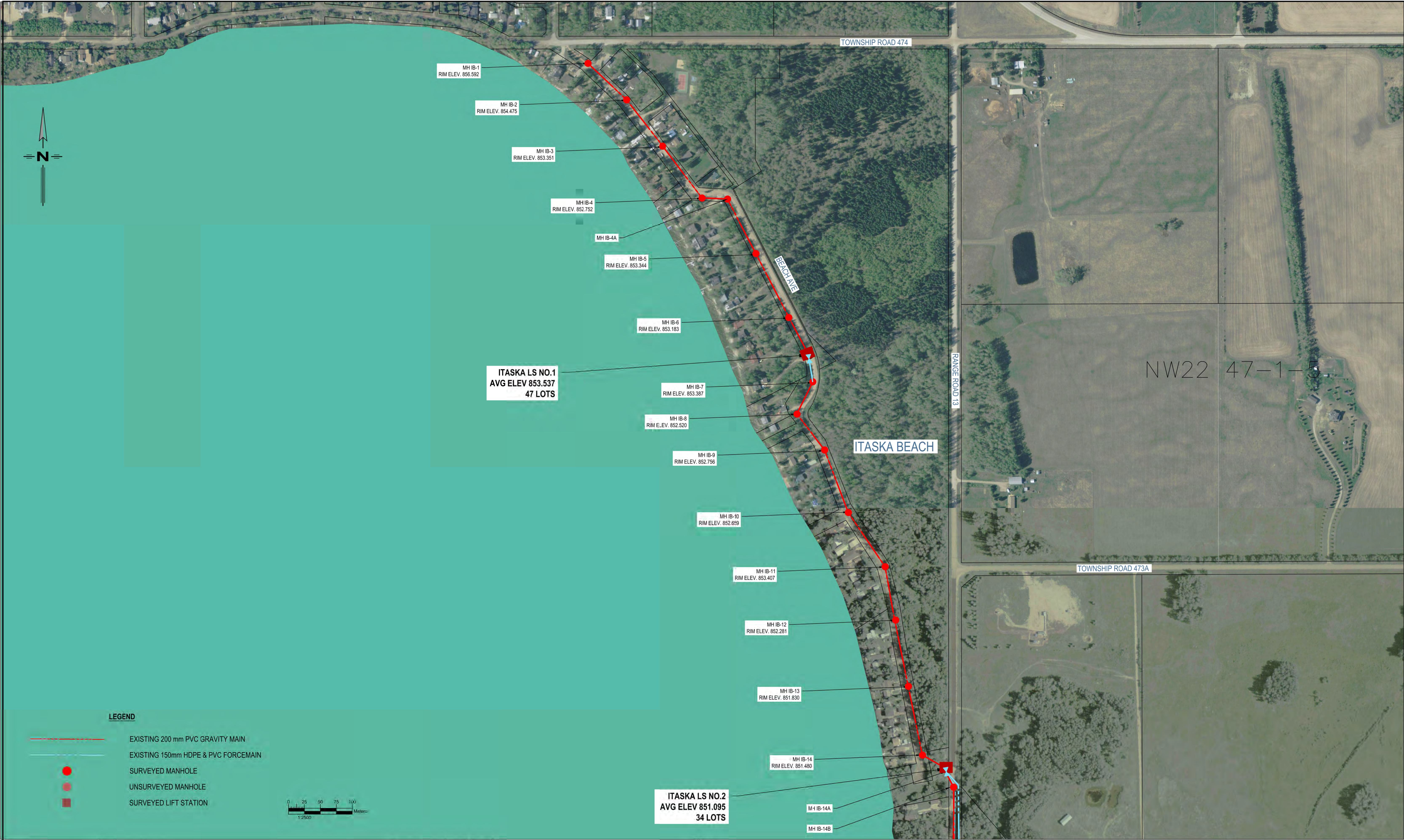
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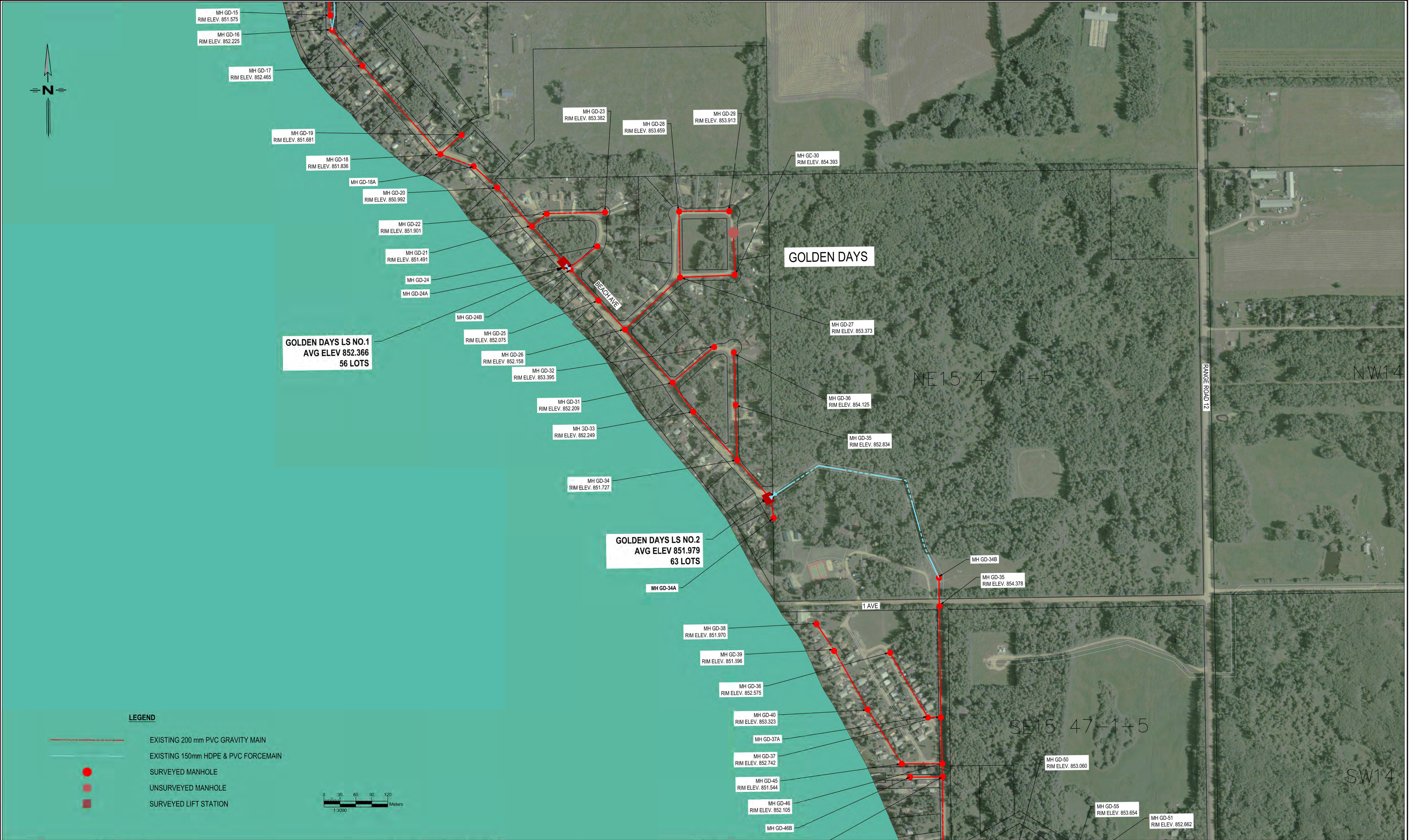




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DISCLAIMER:				--- --- --- --- ---				DRAWING NO:								002							
THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND UTILITY LOCATIONS AND REPORT ALL ERRORS AND OMISSIONS PRIOR TO COMMENCING WORK.				02 2019-05-01 REPORT				PROJECT NO:								181-10893-00							
				01 2018-12-05 REPORT				SCALE								1:5,000							
THIS DRAWING IS NOT TO BE SCALED.				00 2018-09-17 REVIEW				CLIENT REF. NO: ---				DISCIPLINE:				INFRASTRUCTURE							
ISS/REV YYYYY-MM-DD DESCRIPTION				DES DRN CHK PM								SHEET NO: 2 OF 7				ISSUE: FOR REPORT							
												MAY 1, 2019				ISS/REV: 01							



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DISCLAIMER: THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND UTILITY LOCATIONS AND REPORT ALL ERRORS AND OMISSIONS PRIOR TO COMMENCING WORK.						CLIENT REF. NO.:			PROJECT NO: 181-10883-00			DRAWING NO: 003		
THIS DRAWING IS NOT TO BE SCALED.									SCALE: 1:5,000			SHEET NO: 3 OF 7		
									DISCIPLINE: INFRASTRUCTURE			ISSUE: FOR REPORT MAY 1, 2019		
												ISS/REV: 01		

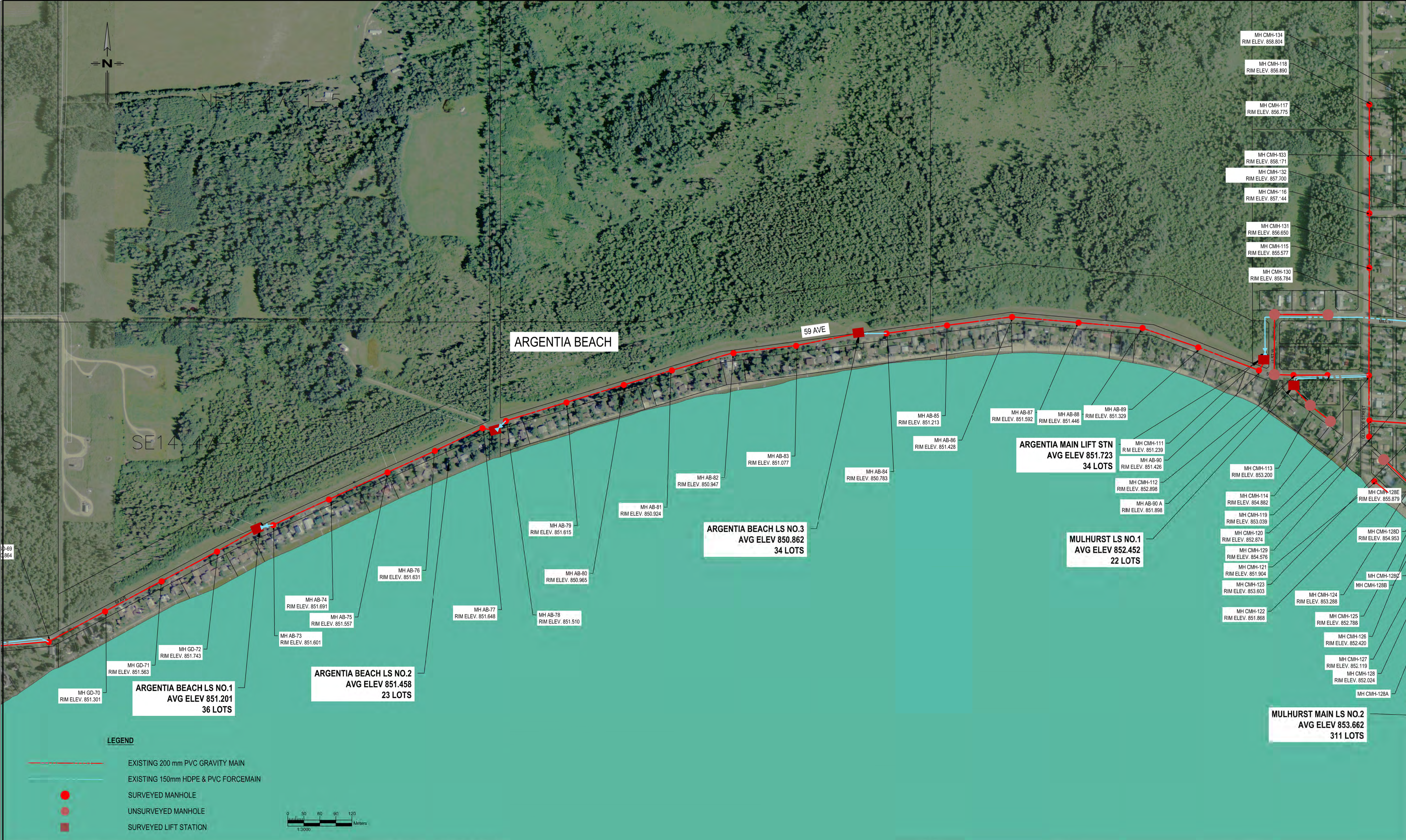


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<p>02 2019-05-01 REPORT</p>				<p>01 2018-12-05 REPORT</p>				<p>00 2018-09-17 REVIEW</p>				<p>PROJECT NO: 181-10883-00</p>				<p>DRAWING NO: 004</p>			
<p>ISS/REV: YYYY-MM-DD DESCRIPTION</p>				<p>DES DRN CHK PM</p>				<p>CLIENT REF. NO:</p>				<p>SCALE: 1:5,000</p>				<p>SHEET NO: 4 OF 7</p>			
<p>DISCIPLINE: INFRASTRUCTURE</p>				<p>DATE: MAY 1, 2019</p>				<p>ISS/REV: 01</p>				<p>FOR REPORT</p>				<p>ISS/REV: 01</p>			

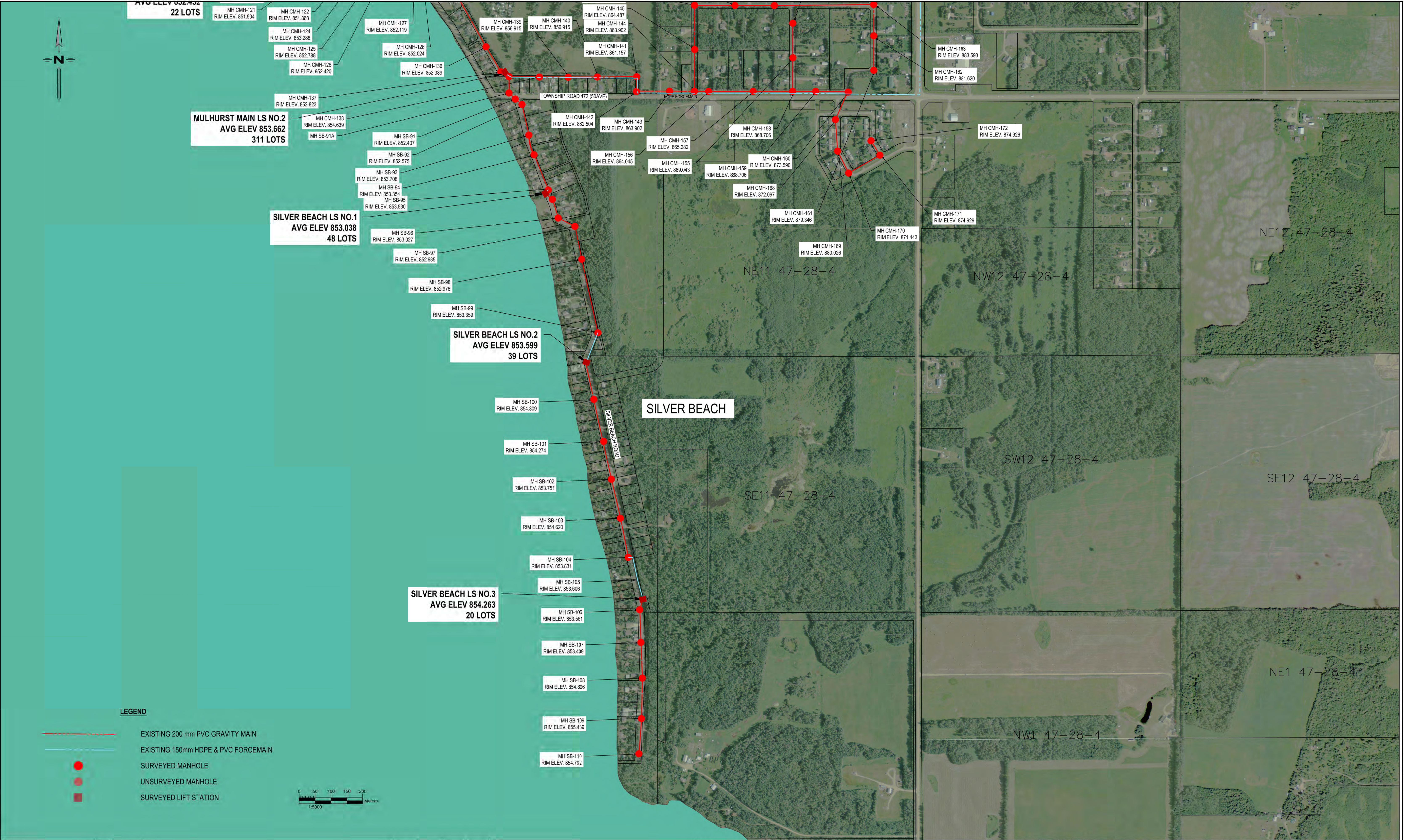
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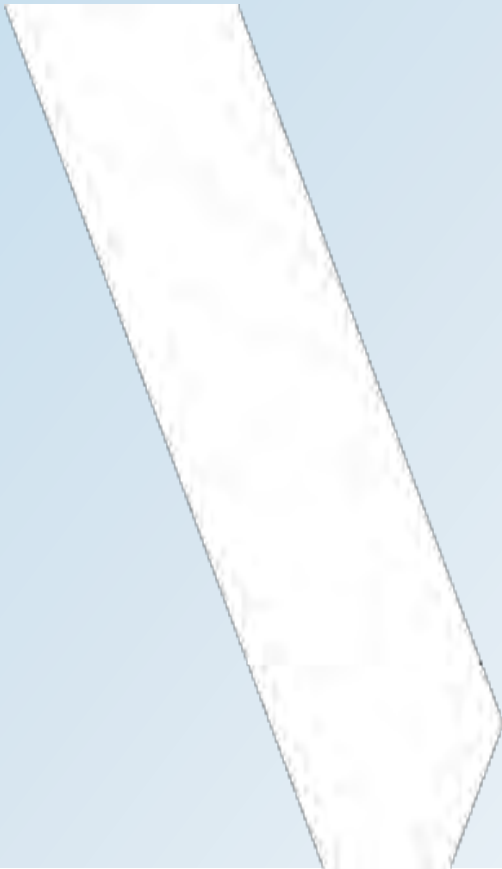


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APPENDIX

D

SIGNATURE FLOW METER AND SAFETY
GRATING





Signature® Flow Meter

The Signature flow meter is designed for open channel flow monitoring applications. It supports flow measurement technologies including bubbler, non-contact laser area velocity, submerged Doppler ultrasonic area velocity, and ultrasonic. The meter can calculate flow using standard open channel level-to-flow and area velocity conversions, as well as user-defined equations, level to area data points, or level to flow data points, depending on the application need. The Signature flow meter has unique features to verify data integrity. It logs key events such as changes in calibration and power outages to validate data accuracy. Data can be easily reviewed to detect any type of data alteration. With multiple smart interface options and multi-parameter logging (such as pH), the Signature flow meter provides a common platform for control action, reporting, and communication.

Available Measurement Technologies

- ◆ Bubbler and Ultrasonic
- ◆ Non-Contact Laser Velocity
- ◆ Continuous Wave Area Velocity

Applications

- ◆ Industrial Pretreatment Compliance
- ◆ Shallow flow measurement in large and small pipes
- ◆ Permit Enforcement
- ◆ Wastewater Treatment Plants
- ◆ Stormwater Monitoring
- ◆ Outfall

General Features

- ◆ Multiple parameter data logging
- ◆ Program and Summary Reports
- ◆ Data Integrity Verification
- ◆ Triggering, sampler enabling
- ◆ Compatibility with Flowlink® software
- ◆ Load calculation
- ◆ Add, subtract average multiple inputs



IP66/NEMA 4X panel offers protection against entry of dust or water during meter programming

I/O Features

- ◆ Multiple simultaneous flow technologies
- ◆ pH and temperature input
- ◆ SDI-12 input
- ◆ RS-485 Modbus input
- ◆ Rain gauge input
- ◆ Analog input (Optional TIENet® 307 card)
- ◆ RS-485 Modbus output
- ◆ Analog outputs (Optional TIENet® 308 card)
- ◆ Contact output (Optional TIENet® 304 card)

Communication/Interface Features

- ◆ Ethernet modem
- ◆ Cellular modem options
- ◆ USB interface

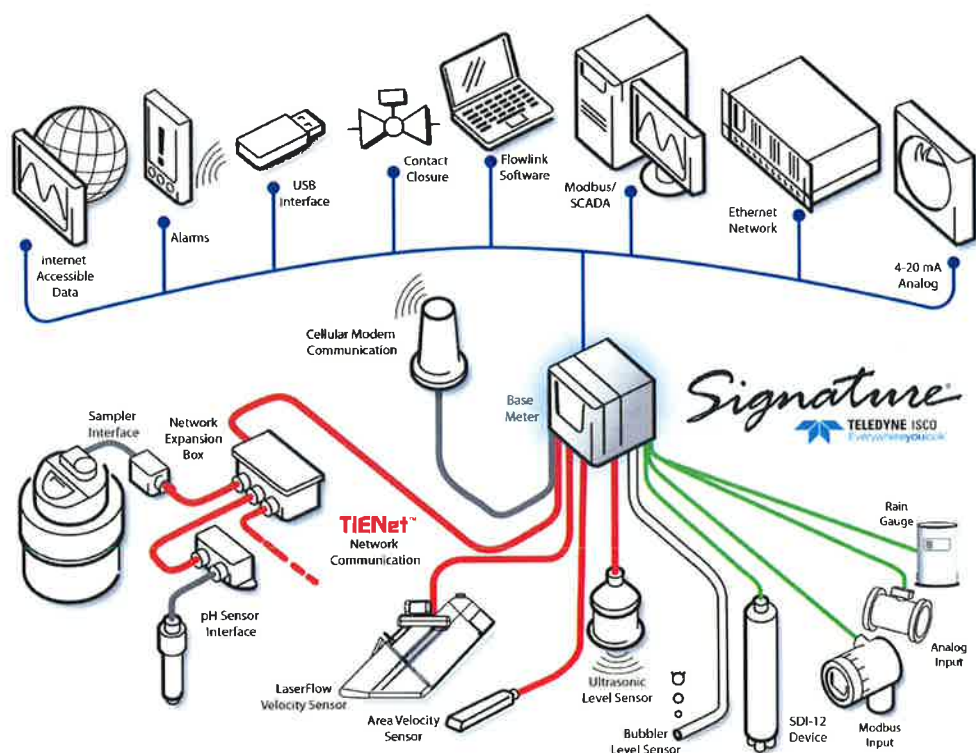


Signature permanently installed on location

Signature Portable with stand and locking handle for temporary installations



Signature Flow Meter Connectivity and Interface Options



Smart TIENet® Devices

- ◆ TIENet input and output devices utilize a common, proprietary interface protocol
- ◆ Low system integration cost with multiple measurement technologies, I/O protocols, and communication options
- ◆ Configurable and upgradable without hardware or firmware changes in Signature flow meter
- ◆ Quick setup with an identifiable, unique address for each device
- ◆ Easy troubleshooting with built-in device diagnostics

Data Integrity

Data Integrity is ensured by logging event data types that can be verified, thereby producing confidence with verifiable data:

- ◆ Summary Report: Documents summaries of data measurements (e.g. Daily Min/Max/Avg) to meet regulatory and compliance requirements
- ◆ Diagnostic Report: Tracks the results with built-in diagnostic runs to provide confidence in data quality and spot application issues
- ◆ Program Report: Tracks changes to the Signature flow meter's configuration to ensure proper setup for specific applications
- ◆ History Report: Tracks user and meter events (e.g. level adjustments, data push, and program changes)
- ◆ Verify Report File: Detects any attempted data alterations

Flowlink® Data Analysis

Teledyne Isco Flowlink® software is a powerful tool for analyzing flow and water quality data. It provides site setup and data retrieval/analysis, as well as advanced reporting and graphing. Flowlink software also gives you the ability to generate site data graphing and reports.

USB Connectivity

With a USB flash drive attached, you can quickly download Data, Diagnostic, Program, History, and Summary reports, update firmware in the Signature flow meter and connected TIENet® devices, and download data files for use with Flowlink software. In addition, the USB port provides direct serial connection with a computer running Flowlink software.



Remote Communication

Remote communication options allow meter configuration and data/report retrieval from remote locations. They also enable the transfer of data to a dedicated server running Flowlink Pro software.

- ◆ Communication options include Ethernet and cellular phone (CDMA and GSM). Internal modems are factory-installed and configured, allowing remote programming and high-speed data transmission from the Signature flow meter.
- ◆ Also available is automatic alarm messaging which can be sent to multiple designated contact lists as SMS text or e-mail messages. The alerts are based upon user-specified conditions.

Specifications

Signature® Flow Meter	
Size (HxWxD)	8.88 x 12.22 x 8.22 in. (with mounting bracket) 16.74 x 13.58 x 10.48 in (with stand)
Materials	PPO Polyphenylene Oxide
Enclosure (self-certified)	NEMA 4X/IP66
Power Required	100 to 240 VAC 50/60 Hz 12V DC, Lead Acid Battery 12V DC (current consumption varies depending upon configuration)
Cable Entry	Standard: ¾" NPT conduit Optional: ¾" NPT cord grips
Flow Measurement Technologies	Ultrasonic (TIENet 310) Bubbler (TIENet 330) Area Velocity (TIENet 350, 360)
Inputs	Two SDI-12 Two MODBUS ASCII/RTU pH Measurement (TIENet 301) Analog In (TIENet 307) Rain In
Setup	Front Panel Keypad Flowlink Software - with serial USB, remote cellular, or Ethernet
Flow Conversions	Area Velocity, Weir, Flume, British Flume, Metering Insert, Manning Formula, Equation, Level to Flow Data Points, Level to Area Data Points
Data Storage	Non-volatile flash; retains stored data during program updates. Capacity: 8M Interval: 15 or 30 seconds; 1, 2, 5, 15, or 30 minutes; or 1, 2, 4, 12, or 24 hours Capacity: 180 days with 5 parameters logged at 1 minute intervals, reports once per day
Data Retrieval	USB drive Flowlink Software - with serial USB, remote cellular, or Ethernet
Outputs	MODBUS ASCII/RTU Analog (TIENet 308) Contact Output (TIENet 304) SMS Alarm
Sampler Interface	TIENet 306

TIENet® 301 pH/Temperature Device	
Weight (w/o probe)	w/ 10 m cable: 3.5 lb w/ 23 m cable: 7.5 lb
Ambient Operating Temperature	-20 to 50°C (-4 to 122°F)
pH Measurement Range	0 - 14 pH units
Temperature Compensation	Performed by the 301 device
pH Accuracy	±0.1 pH units (new probe, freshly calibrated w/in range)
Probe Dimensions	1.12"Æ X 6" long, 3/4 NPT; Cable 25ft

TIENet® 301 pH/Temperature Device	
Probe Body Material	316SST
pH Electrode Junction	Double porous
Temperature Measurement Range	0 to 80 °C (32 to 176 °F)

TIENet® Model 304 Contact Output	
Type	NO or NC, Galvanically isolated
Output rating	30 volts, 1 Ampere
Operating Temperature	-20 to 70°Celsius (-4 to 158 °F)

TIENet® Model 307 Analog Input	
Power source in active mode	17-29 volts
Isolation	Galvanically isolated
Input Impedance	400 ohm
Operating Temperature	-20 to 70 °Celsius (-4 to 158 °F)

TIENet® Model 306 Sampler Interface	
Function	Flow pacing, enabling based on triggered event. Time and bottle information sent to Signature Flow Meter
Powered By	Signature Flow Meter
Operating Temperature	-20 to 50 °C (-4 to 122 °F)
Storage Temperature	-40 to 60 °C (-40 to 140 °F)
Pulse Width	50 ms
Pulse Output	5 volts
Sampler Connection	Standard: 6 pin connector for Isco 6712, Avalanche, Glacier, GLS, and 3700 samplers For other options, contact factory

TIENet® Model 308 Analog Output	
Output	4-20 mA
Isolation	Monolithic
Maximum Load	900 ohm
Outputs per card	Two

TIENet® Model 310 Ultrasonic Level Sensor	
Measurement Range	0.3 to 3.3 m (1 to 11 ft)
Accuracy at 72°F (22°C)	±0.006 m (0.02 ft) at ≤ 1 ft level change ±0.009 m (0.03 ft) > 1 ft level change
Temperature Coefficient (w/ in compensated range)	±0.0002 x Distance (m) x Temperature Deviation from 22 °C. ±0.00011 x Distance (ft) x Temperature Deviation from 72 °F.
Beam Angle	10° (5° from center line)
Frequency	50 kHz
Size	9.1 cm Ø X 10.2 cm tall (3.63"x 4")
Cable Length	10 or 23m (32.8 or 75.5 ft)

TIENet® Model 310 Ultrasonic Level Sensor (cont.)

Weight	1.8 kg (4 lbs)
Body Material	PVDF
Temperature Range	-30° to 60°C (-22° to 140°F) (Operating & Storage)
Certifications	Group 2, Category 1G (zone 0), T4 Class I, Div 1, Groups C & D, T4 (pending)

TIENet® 330 Bubbler Module

Level Measurement Range:	0.003 to 3.05 m (0.01 to 10 ft)
Level Measurement Accuracy	±0.002 m @ 22 °C (0.007 ft @ 72 °F)
Operating and Storage Temperature	-18° to 60 °C (0 to 140 °F)
Temperature Compensation Range	0° to 60 °C (32° to 140 °F)
Temperature Coefficient (w/in compensated range)	±0.0003 x Level (m) x Temperature Deviation from 22 °C. ±0.00017 x Level (ft) x Temperature Deviation from 72 °F.

TIENet® Model 360 LaserFlow Velocity Sensor

Sensor Dimensions	38.01 x 26.21 x 56.7 cm 14.96 x 10.3 x 22.32 in
Weight	8.7 kg (19.2 lbs)
Materials	Conductive Carbon Filled ABS, SST, Conductive Kynar, Anodized Aluminum, UV-Rated PVC
Temperature Range	Operating: 0 to 60 °C (32 to 140 °F) Storage -40 to 60 °C (-40 to 140 °F)
Cable Lengths	5, 10, or 15 m (16.4, 32.8, or 49.2 ft)
Enclosure	IP68
Certifications	CE EN61326; FDA CDRH 21CFR1040; IEC 60825-1
Power Required	Input voltage: 8 to 26 VDC 12 VDC Nominal
Flow Accuracy	±5% of Reading. (Typical, under normal flow conditions)
Velocity Measurement Range	-4.6 m/s to 4.6 m/s (-15 ft/s to 15 ft/s)
Direction	Bi-Directional ^a
Velocity Accuracy	±0.5% of reading ±0.03 m/s (0.1 ft/s)
Minimum Velocity	0.25 m/s (0.8 ft/s)
Level Measurement Range	0 to 3 m (0 to 10 ft) from measurement point

TIENet® Model 360 LaserFlow Velocity Sensor (cont.)

Level Accuracy @ 22 °C (72 °F)	±0.006 m (0.02 ft) at ≤1 ft level change; ±0.012 m (0.04 ft) at >1 ft level change
Temperature Coefficient within compensated range	± 0.0002 x D (m) per degree C ± 0.00011 x D (ft) per degree F (Where D = Distance from transducer to liquid surface)
Beam Angle	10° (5° from center line)
Ultrasonic Signal	50KHz

TIENet® Model 350 Area Velocity Sensor

Probe Dimensions	1.9 x 3.3 x 15.2 cm (0.75 x 1.3 x 6.0 in)
Materials	Sensor: Epoxy, chlorinated PC, SST. Cable: UV-Rated PVC
Temperature Range	0 to 70 °C (32 to 158 °F)
Velocity Measurement Range	-1.5 to 6.1 m/s (-5 to 20 ft/s)
Velocity Measurement	Bi-Directional
Velocity Accuracy	±0.03 m/s (±0.1 ft/s) from -5 to 5 ft/s ±2% of reading from 5 to 20 ft/s, Uniform velocity profile
Minimum Depth	25 mm (0.08 ft)
Frequency	500 kHz
Level Measurement Range	0.01 to 3.05 m (0.033 to 10 ft)
Level Accuracy	± 0.10%FS ^b
Maximum Allowable Depth	10.5 m (34 ft)
Typical Long-Term Stability	±0.007 m/yr (±0.023 ft/yr)

- Turbidity > 20 NTU; Distance from liquid surface to bottom of sensor < 48 inches
- Maximum non-linearity, hysteresis, & temperature error from actual liquid level.

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