



Making a difference...together

MAGIC LAKE ESTATES WATER AND SEWER COMMITTEE
 Notice of Meeting on **Tuesday, September 13, 2022 at 9:30 a.m.**
 Goldstream Conference Room, 479 Island Highway, Victoria, BC

For members of the **public who wish to listen to the meeting** via telephone please call **1-833-353-8610** and enter the **Participant Code 1911461 followed by #**. You will not be heard in the meeting room but will be able to listen to the proceedings.

M. Fossil (Chair)
 W. Foster
 R. Sullivan

J. Deschenes (Vice Chair)
 K. Heslop

P. Brent, Acting Electoral Area Director
 D. Reed

AGENDA

1. APPROVAL OF AGENDA

2. ADOPTION OF MINUTES2

Recommendation: That the minutes of the June 14, 2022 meeting be adopted.

3. CHAIR'S REMARKS

4. PRESENTATIONS/DELEGATIONS

The public are welcome to attend Committee meetings in-person.

Delegations will have the option to participate electronically. Please complete the [online](#) application for "Addressing the Board" on our website and staff will respond with details.

Alternatively, you may email your comments on an agenda item to the Magic Lake Estates Water and Sewer Committee at iwsadministration@crd.bc.ca.

Requests must be received no later than 4:30 p.m. two calendar days prior to the meeting.

5. COMMITTEE BUSINESS

5.1. Project and Operations Update5

There is no recommendation. This report is for information only.

6. CORRESPONDENCE

7. NEW BUSINESS

8. ADJOURNMENT

Next Meeting: Tuesday, October 11, 2022

*To ensure quorum, advise **Mikayla Risvold 250.474.9518** if you cannot attend.*



Making a difference...together

MINUTES OF A MEETING OF THE Magic Lake Estates Water and Sewer Committee, held Tuesday, June 14, 2022 at 9:30 a.m., In the Goldstream Conference Room, 479 Island Highway, Victoria, BC

PRESENT: Committee Members: M. Fossil (Chair); J. Deschenes (Vice Chair) (EP); P. Brent, Alternate Electoral Area Director (EP); W. Foster; K. Heslop (EP); D. Reed; R. Sullivan

Staff: I. Jesney, Senior Manager, Infrastructure Engineering; M. McCrank, Senior Manager, Wastewater Infrastructure Operations; C. Moch, Manager, Water Quality Operations, Environmental Protection; M. Bona; Project Engineer; M. Risvold, Committee and Administrative Clerk (Recorder)

EP = Electronic Participation

The meeting was called to order at 9:34 am.

1. APPROVAL OF AGENDA

MOVED by D. Reed, **SECONDED** by W. Foster,
That the agenda be approved.

CARRIED

2. ADOPTION OF MINUTES

MOVED by W. Foster, **SECONDED** by D. Reed,
That the minutes of the May 10, 2022 meeting be adopted.

CARRIED

3. CHAIR'S REMARKS

The Chair had no remarks.

4. PRESENTATIONS/DELEGATIONS

There were none.

5. COMMITTEE BUSINESS

5.1. Project and Operations Update

Staff provided updates on water capital projects and operations.

Staff responded to questions from the committee regarding the Buck Lake Dam Repair kickoff meeting and the Electric Vehicle (EV) Charging Station. Staff advised there were no known issues at the Buck Lake Dam Repair kickoff meeting. A cost estimate for the EV Charging Station project will be provided, and a portion of the funding is dependent on receiving a grant.

Staff provided updates on wastewater capital projects and operations.

Discussion ensued regarding:

- The quality of water discharged into the ocean
- Membrane bio-reactor (MBR) system

Staff advised the water discharged into the ocean is not drinking water quality. Staff noted MBR is a more reliable and advanced treatment. MBR satisfies the effluent discharge quality requirement coming from the plant and produces a better quality effluent compared to the alternative moving bed biofilm reactors (MBBR). MBR filters micro plastics due to the membranes, provides a more consistent quality effluent, and reduces the amount of sludge.

Discussion ensued regarding:

- How staff determine which pump stations require pumping during power outages
- Supervisory Control and Data Acquisition (SCADA) operating network
- Installation of permanent generators

5.2. 2021 Annual Report

I. Jesney introduced the 2021 Annual Report.

Discussion ensued regarding:

- The wastewater treatment capacity
- Capacity planning
- Water demand
- Non-revenue water
- Frequency of water testing

Staff responded to questions from the committee regarding water testing, advising toxin tests are testing for presence. The water quality lab is aware of the thresholds that constitute an algae bloom and would take appropriate measures in the event of a bloom. Iron and manganese naturally occur on Vancouver Island in the rocks and soil, and high rainstorm events can wash the iron and manganese into the lakes and streams. There is treatment at the Magic Lake Water Treatment Plant, and there is no exceedance of the health limit. Staff advised additional and further testing can be discussed if needed, and costs incurred will be charged to the committee.

Staff advised the Annual Report will be posted publicly on the CRD website at the end of June.

6. CORRESPONDENCE

There was none.

7. NEW BUSINESS

I. Jesney provided information on expense claim forms.

8. ADJOURNMENT

MOVED by D. Reed, **SECONDED** by W. Foster,
That the June 14, 2022 meeting be adjourned at 10:33.

CARRIED

CHAIR

SECRETARY



REPORT TO MAGIC LAKE ESTATES WATER AND SEWER COMMITTEE MEETING OF TUESDAY, SEPTEMBER 13, 2022

SUBJECT Capital Project Status Reports and Operational Updates

ISSUE SUMMARY

To provide the Magic Lake Estates Water and Sewer Committee with capital project status reports and operational updates up to and including August 31, 2022.

BACKGROUND

The Magic Lake Estates (MLE) Water System is located on the south shore of North Pender Island in the Southern Gulf Islands Electoral Area and provides drinking water to approximately 1,202 parcels of which 1,043 are currently serviced. The Wastewater system is in a similar location and includes potential service to 714 parcels of which 642 are currently serviced. Capital Regional District (CRD) Integrated Water Services is responsible for the overall operation of the water and wastewater systems with day-to-day operation and maintenance, design and construction of water and wastewater system facilities provided by the CRD Infrastructure Engineering and Operations Divisions. The quality of drinking water provided to customers in the Magic Lake Estates Water System is overseen by the CRD Water Quality Division while wastewater monitoring is overseen by the CRD Environmental Protection Division.

CAPITAL PROJECT UPDATE

Magic Lake Estates Water

21-02 | Design and Construction Buck Lake and Magic Lake Adjustable Intakes

Project Description: Detailed design and construction of adjustable intakes to inform future capital works to maintain water quality.

Project Rationale: Both the Buck and Magic Lake adjustable intakes are unsafe to clean and adjust without employing divers. Funds are required to design and construct adjustable intakes.

Project Update and Milestones:

- A consultant was retained in November 2021 and they produced a draft design report summarizing design requirements for the intakes and floats on December 6, 2021.
- Preliminary design drawings were received by staff in March 2022 for review.
- Tendering scheduled for mid-May 2022 and construction in the fall of 2022.
- Notification of works to the Ministry of Environment through Front Counter BC is required. This is not approvals as permitting is not required based on the scope of works.
- Tenders closed on July 4, 2022 with no tenders received.

21-04 | Buck Lake Dam Repairs - Phase 1

Project Description: Conduct additional inspections, minor repairs, and performance analysis highlighted in the 2019 Dam Safety Review. Phase 2 dam improvements to be completed in the following five years.

Project Rationale: Resulting from the Hatch 2019 Dam Safety Review, funds are required to conduct additional inspections, minor dam repairs, and performance analysis. Phase 2 dam improvements to be completed in the following five years. The November 26, 2020 staff report outlines the detailed expenditure plan for Phase 1.

Project Update and Milestones:

- Detailed scope of work and acceptable options for preventing high live loads at Buck Lake's west dam have been developed. Work is to be complete in September 2022.
- Consultant has been retained to conduct a dam breach analysis for both dams to confirm the dam flood area and improve the dam emergency plan. The kick off meeting took place in March 2022.
- Operations to coordinate with CRD Protective Services so that dam emergencies are part of CRD's Public Alert Notification System.
- CRD staff have started compiling required information for the dam emergency plan and operating and maintenance manuals. Updates are to be completed by December 2022.

22-01 | Failed Valve Replacement

Project Description: Replace 6 failed water main valves.

Project Rationale: Through annual operations of the water system, three valves have been identified as having failed. Funding is required to replace these valves at 4708 Capstan Crescent, Schooner Way and Privateers, 3710 Rum Road, Schooner Way and Ketch Road, 4742 Bosun Way, and 37140 Galleon Way.

Project Update and Milestones:

- Project to commence upon CRD Board approval of the 5-year capital plan at the March 16, 2022 meeting.
- Operations is currently scheduling for works to commence in September and October 2022 unless an earlier opportunity is available.

22-02 | EV Charging Station

Project Description: Construct a new Electric Vehicle (EV) Charging Station at the Water Treatment Plant, project to be split across MLE Water, Wastewater, and a possible grant.

Project Rationale: Construct a new EV Charging station at the water treatment plant, project is to be partially funded through a cost matching grant and the MLE Wastewater Service.

Project Update and Milestones:

- Project delivery is currently being planned with CRD Facilities and Operations.
- Execution to occur in October 2022 pending equipment delivery, early delivery will occur if possible.

22-03 | Process Pipe Replacement

Project Description: Replace corroded process pipe in the water treatment plant.

Project Rationale: The water treatment plant has corroded process piping. Funding is required to plan and replace the affected pipe.

Project Update and Milestones:

- This project is deferred until there is noticeable leakage identified through ongoing inspections.
- The financial component of the project will remain open so there is funding available on short notice.

OPERATIONAL UPDATE

This is an operational update report for June, July and August 2022.

- Buck Lake and Magic Lake intake inspections completed by contract divers. Included cleaning of the intake screens.
- Magic Lake Estates Water Treatment Plant emergency lighting repairs. Replacement of batteries and lights that were not functioning.
- Annual Buck Lake and Magic Lake Dam inspections completed led by Infrastructure Engineering and supported by Infrastructure Water Operations.
- Emergency response to Supervisory Control and Data Acquisition (SCADA) system communications failure.
- Replacement of the Magic Lake Estates Water Treatment Plant backwash flow meter.
- Installation of a portable air conditioner in the water treatment plant office.
- Water system leak repair on Frigate Road.
- Magic Lake Water Treatment Plant chlorine analyzer emergency repairs.
- Failed valve replacement capital work: completed the valve replacement on Galleon Way. This is one of several locations identified for valve replacements.
- Fire safety plan completed by Pacific Coast Fire Safety for the MLE Water Treatment Plant.

Magic Lake Estates Sewer Utility

20-01 | Wastewater Improvements – Sewer Replacement

Project Description:

1. Replace about 3 kilometers (km) of failing asbestos cement (AC) pipe and install Cannon forcemain pipe (2021).
2. Replace as much failing AC pipe as possible with remaining funds left from \$6 million loan (2023).

Project Rationale: Several km of failing AC sewer pipe requires replacement (to be completed over three years from 2021-2023).

Project Update and Milestones:

- The contract is complete and the one-year warranty review will occur on December 17, 2022.

- Road Restoration – refer to handouts
 - Majority of roads are chip-seal, are in very poor condition and have no shoulders.
 - Originally considered chip-sealing portions of the roads, but there is only one contractor, (Shades), and he was not interested in small quantity work.
 - Sewer alignment was shifted further over so that the trench was mostly in the shoulder and ditch area. All shoulders were backfilled and compacted with gravel and are much wider than before.
 - All driveway and road crossings were paved.
- No further updates are required until the next phase of sewer replacement work commences which will be after the pump station and treatment plant tender is closed so that we know the remaining funds from the \$6 million loan.

21-01 | Wastewater Improvements – Pump Station and Treatment Plant Upgrades

Project Description:

1. Renew Buccaneer, Galleon, Schooner, Capstan, Cutlass and Masthead Pump Stations.
2. Replace Cannon WWTP with a new pump station.
3. Upgrade Schooner WWTP.

Project Rationale: Successfully received an Infrastructure Canada grant to complete upgrades on six pump stations, install a new pump station at Cannon to pump to Schooner WWTP, and upgrade Schooner WWTP to treat flow from Cannon and renew many components to bring the wastewater system into compliance with environmental regulations.

Project Update and Milestones:

See the attached Appendix A: "Wastewater Improvements – Pump Station and Treatment Plant Upgrades – Progress Report"

22-01 | EV Charging Station

Project Description: Construct a new EV Charging Station at the Water Treatment Plant, project to be split across MLE Water, Wastewater, and a possible grant.

Project Rationale: Construct a new EV Charging Station at the Water Treatment Plant, project to be split across MLE Water, Wastewater, and a possible grant.

Project Update and Milestones:

- Project delivery is currently being planned with CRD Facilities and Operations.
- Execution to occur in October 2022 pending equipment delivery, early delivery will occur if possible.

OPERATIONAL UPDATE

This is an operational update report for June, July and August 2022.

- Chart Drive pump station check valve and pump repairs.
- Chart Drive pump station pump out and waste disposal.
- Reponse to odour complaints/concerns near Spyglass Road and subsequent installation of odour control equipment at various manhole locations.
- Ongoing support for the capital wastewater improvement projects.

Magic Lake Estates Water and Sewer Committee – September 13, 2022
Capital Project Status Reports and Operational Updates

5

Table 1: Operating Permit Regulatory non-compliance reporting for June, July and August 2022

Facility	June/July/Aug Reports Issued	Reports YTD 2022	Total Reports 2021	Cause
Schooner WWTP	1	9	24	Environmental Incidence Reports are issued typically as a result of: 1. Facility power outage causing loss of UV disinfection resulting in exceedance of fecal coliform (FC) regulatory requirements (permit <200 cfu/100ml). 2. Exceedance of permitted daily maximum flows (< 640m³/day). Flow exceedances are due to excessive collection system inflow and infiltration (I&I). 3. Exceedance of permitted total suspended solids (TSS) (<45mg/l). This is type of exceedance is the result of high I&I.
Schooner Pump Station	0	0	2	Typically, these are overflow events into the marine environment (Boat Nook) due to extended power failures in the area. There is no standby power at the facility.
Cannon WWTP	1	6	52	Exceeding maximum daily flows due to storm water entering through I&I. • Permit exceedance: total suspended solids (TSS) (<60mg/l) and carbonaceous biochemical oxygen demand (CBOD) (<45mg/l) • Failed toxicity test (likely the result of high ammonia concentration).

RECOMMENDATION

There is no recommendation. This report is for information only.

Submitted by:	Ian Jesney, P.Eng., Senior Manager, Infrastructure Engineering
Submitted by:	Jason Dales, B.Sc., WD IV, Senior Manager, Wastewater Infrastructure Operations
Concurrence:	Ted Robbins, B.Sc., C.Tech., General Manager, Integrated Water Services

ATTACHMENT:

Appendix A: “Wastewater Improvements – Pump Station and Treatment Plant Upgrades – Progress Report”

Wastewater Improvements Pump Station and Treatment Plant Upgrades Progress Report

BACKGROUND

The Magic Lake Estates Sewer Service has committed to address the issues facing the aging and failing sewer infrastructure in Magic Lake Estates (MLE) through capital project upgrades. On November 23, 2019, the electors of the MLE Sewer Service approved borrowing \$6 million to complete Phase 1 upgrades to the system. Phase 1 upgrades originally included about 4.6 kilometers (km) of sewer pipe replacement, renewing of three pump stations, and some improvements at Schooner Wastewater Treatment Plant (WWTP). In 2020, the Capital Regional District (CRD) applied for a grant from Infrastructure Canada to complete upgrades on the pump stations and treatment plants at an estimated cost of \$7.71 million. The application was successful, and the 73.33% senior government share of the grant was \$5.65 million, and the 26.67% local taxpayer share was \$2.06 million.

The scope previously noted in Phase 1, 2 and 3 was adjusted so that \$3.94 million would be allocated for sewer replacement and overall project administration; and \$7.71 million would be allocated towards the pump stations and treatment plant upgrades.

In 2021, the Magic Lake Estates Water and Sewer Committee directed staff to proceed with replacing about 3km of sewer pipe and to install the new Cannon force main at an estimated cost of about \$2.2 million and to retain the remaining funds from \$3.94 million allocation until the final pump station and treatment plant costs were known. Refer to the map in Attachment 1 showing the completed and proposed upgrades.

Upgrades to the wastewater system are required to bring the system back into compliance with environmental regulations. McElhanney Ltd. was awarded a consulting engineering contract in January 2022 for the design of the WWTP and pump station upgrades. Previous staff reports provided information on the conceptual design progress and treatment technology selection process for Schooner WWTP.

Project Scope

The upgrades under the Magic Lake Estates Wastewater Pump Station and Treatment Plant Project include:

1. Renew Buccaneer, Galleon, Schooner, Capstan, Cutlass and Masthead pump stations:
 - a. Replace mechanical and electrical components
 - b. Provide a standby generator for Galleon and Schooner
2. Replace Cannon WWTP with a new pump station:
 - a. Provide an access road to the pump station
 - b. Install new pump station and kiosk
 - c. Retain existing tankage for emergency overflow storage
3. Upgrade Schooner WWTP:
 - a. Replace existing headworks and secondary treatment
 - b. Replace electrical and mechanical equipment (pumps, blowers, etc.)
 - c. Provide a new emergency standby generator
 - d. Retain existing tankage for emergency overflow storage

- e. Remove the existing electrical and blower sheds
- f. Improve the sludge dewatering process
- g. Improve access, landscaping and screening around the facility

Project Status

McElhanney has submitted their 30% preliminary design drawings and report for the project. CRD staff have reviewed and provided comments back on the design. McElhanney is now progressing into detailed design which is scheduled to be complete in November 2022. Although the schedule for design has slipped by a couple months, the anticipated construction start date is still scheduled for the first quarter (Q1) of 2023 and estimated to be substantially complete by the end of 2023.

Refer to Attachment 2 for the preliminary site plans for Schooner and Cannon, and Attachment 3 for some photos of the design progress to date.

Updated Cost Estimate and Risk Mitigation

The preliminary design report included a Class C cost estimate for the current design. A Class C estimate is based on quotes for major equipment and recent construction costs. It is expected to be within (plus or minus) 20% to 30% of the estimated construction cost. Here is a summary of the latest cost estimate provided by McElhanney:

Project Component	Cost Estimate – Class C
Schooner WWTP Upgrades	\$3,450,000
Six Pump Stations	\$2,120,000
General Requirements	\$670,000
Location Allowance	\$560,000
Construction Total	\$6,800,000
Engineering & Inspection (based on McElhanney contract)	\$806,000
Project Contingency	\$950,000
Project Total	\$8,556,000

The original project estimate in 2020 when the grant application was submitted prior to Covid, world events and market supply shortages, was \$7,709,350. The current Class C cost estimate is about 11% higher due to recent inflation and market conditions which all projects are experiencing.

The following strategies are being employed to mitigate cost increases:

1. Pre-purchase major equipment: reduces markup costs, ensures timely delivery to site, and controls quality of products. The following equipment is essential for the upgrades and are planned to be pre-purchased:
 - a. Standby Generators
 - b. Membrane Bioreactor Package
 - c. Screening and Aeration Package

APPENDIX A

2. Provisional items in the construction tender: provides the ability to review the competitive costs of less essential items during the bid evaluation to determine if sufficient funds are available prior to making a commitment. For example, it is recommended to make the sludge dewatering equipment provisional. Sludge dewatering equipment is not essential but is recommended to lower the annual operating cost. Refer to Attachment 4 for details on the sludge dewatering business case.
3. Constructability review with a contractor: allows a contractor to provide suggestions on how to make the design more efficient to construct which can help lower costs.
4. Refined cost estimate prior to construction: a Class B cost estimate will be prepared at the end of the detailed design. The scope will be more defined and percent estimates will be refined and based on more accurate quantities and quotes. Generally, a Class B cost estimate is within 15% to 20% of the actual construction cost.
5. Reserve Phase 1 funds for additional contingency: if the tendered amounts come in higher than planned, some remaining funds from Phase 1 could be used for treatment plant or pump station upgrades and less sewer pipe could be replaced.

Overall Project Budget

The current financial status, as of August 2022, of the whole project (Phase 1, 2 and 3) is summarized in the below table. As can be seen, if some of the remaining funds from Phase 1 work (shown as a positive variance) are allocated to the WWTP and pump station upgrades, the total WWTP and pump station project can remain under budget for the current cost estimate.

Financial Status of Whole Project

Task	Budget	Actual and Committed Cost To Date	Remaining Cost To Complete	Variance
Pipe Replacement (Phase 1)	\$3,693,916	\$2,366,475	\$280,000 <i>Note 1</i>	\$1,047,441
WWTP and Pump Station (Phase 2/3)	\$7,709,350	\$808,655	\$7,947,192	(\$1,046,497)
<i>Construction</i>	\$5,350,000	\$0	\$6,800,000	(\$1,450,000)
<i>Implementation</i>	\$ 200,000	\$2,808	\$197,192	\$0
<i>Design and Inspection</i>	\$ 900,000	\$805,847	\$0	\$94,154
<i>Contingency</i>	\$1,259,350	\$0	\$950,000 <i>Note 2</i>	\$309,350
Project Management	\$250,000	\$79,634	\$170,366	\$0
Total (Phase 1, 2 and 3)	\$11,653,266	\$3,254,764	\$8,397,558	\$944

Note:

1. Remaining cost to complete is shown as \$280,000 to portray a scenario where some pipe replacement funds (variance) are allocated to Phase 2/3.
2. McElhanney lowered the contingency based on Class C estimate with more accurate costs being shifted into the construction cost estimate.

Next Steps

McElhanney is preparing equipment specifications for three pre-purchase equipment packages and progressing the detailed design for tendering in November.

APPENDIX A

The table below is an update of the major project milestones:

Key Project Milestone Dates

Milestone	Start Date	Completion Date
Equipment Pre-purchase Procurement	September 2022	November 2022
Detailed Design	August 2022	October 2022
Tender Period	November 2022	January 2023
Construction	February 2023	December 2023
Warranty Period	January 2024	January 2025

CONCLUSION

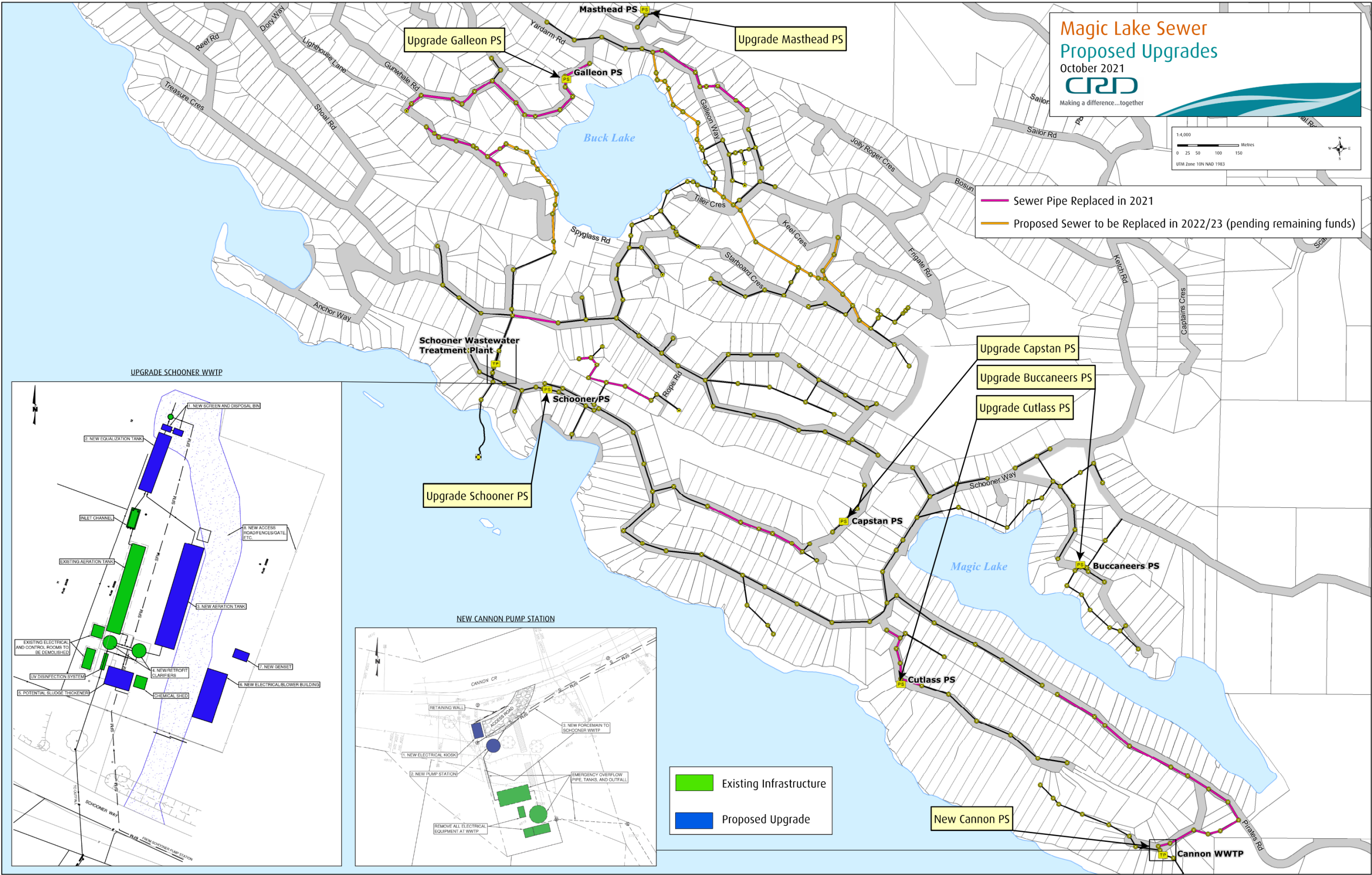
The Magic Lake Estates Wastewater Pump Station and Treatment Plant Upgrades project is progressing well. Increases to the cost estimate reflect current inflation and market conditions and cost mitigation strategies are being implemented to ensure that the treatment plant and pump station upgrades can be completed the within the available funds.

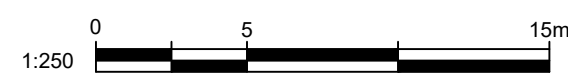
ATTACHMENTS

- Attachment 1: Magic Lake Sewer – Proposed Upgrades Map
- Attachment 2: Preliminary Site Plans for Schooner WWTP and Cannon Pump Station
- Attachment 3: Progress Photos
- Attachment 4: Sludge Dewatering Business Case

Attachment 1 – Magic Lake Sewer – Proposed Upgrades Map

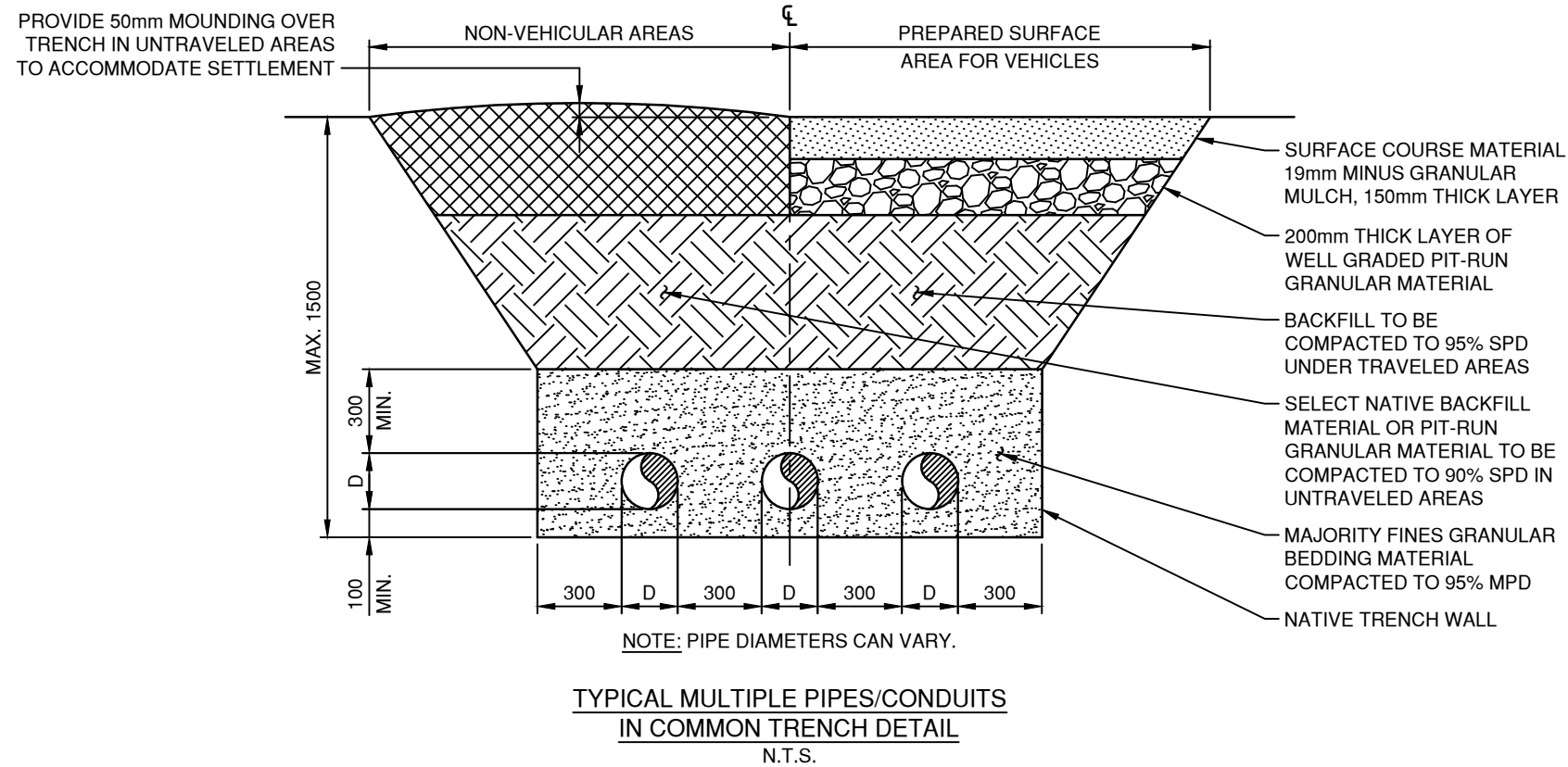
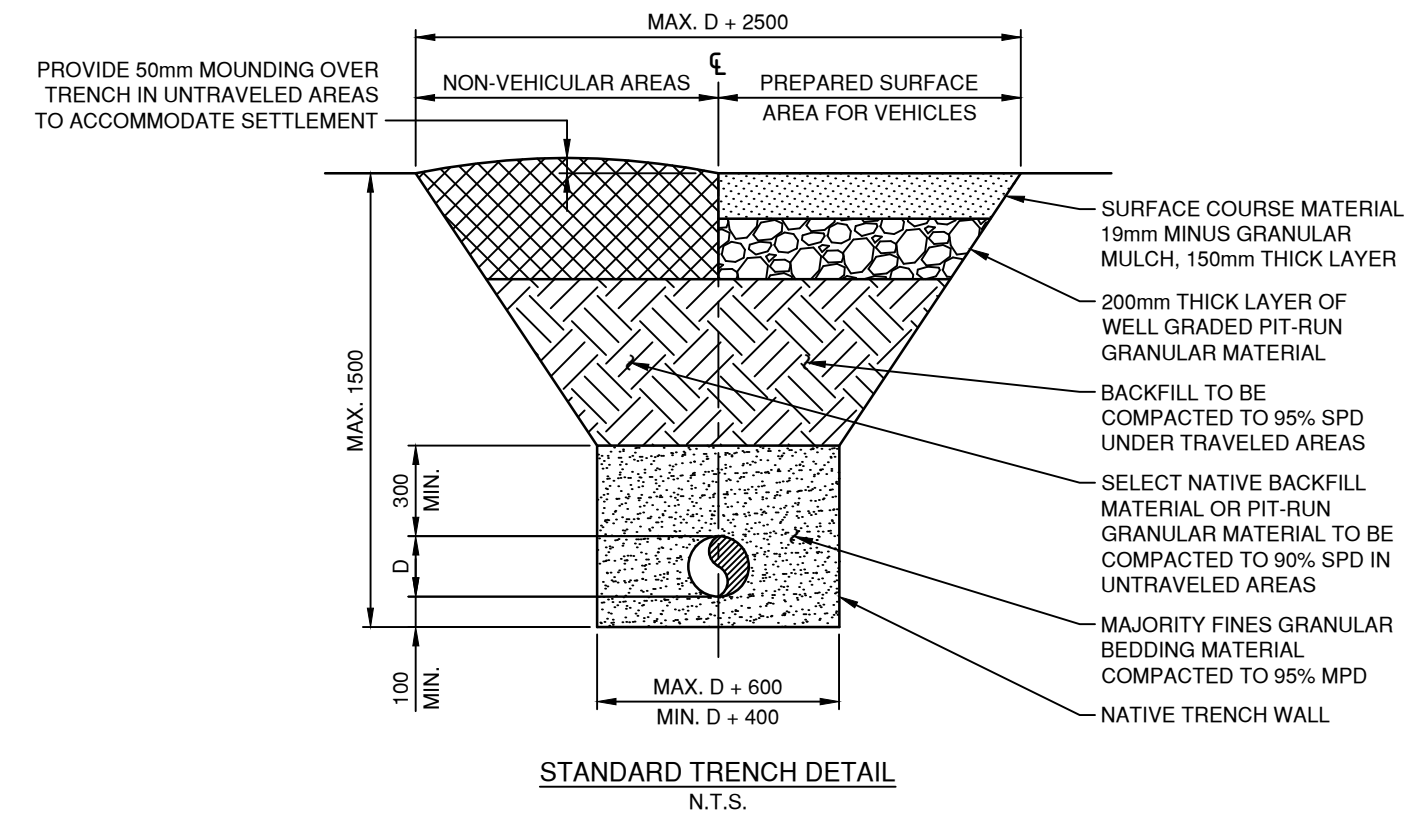
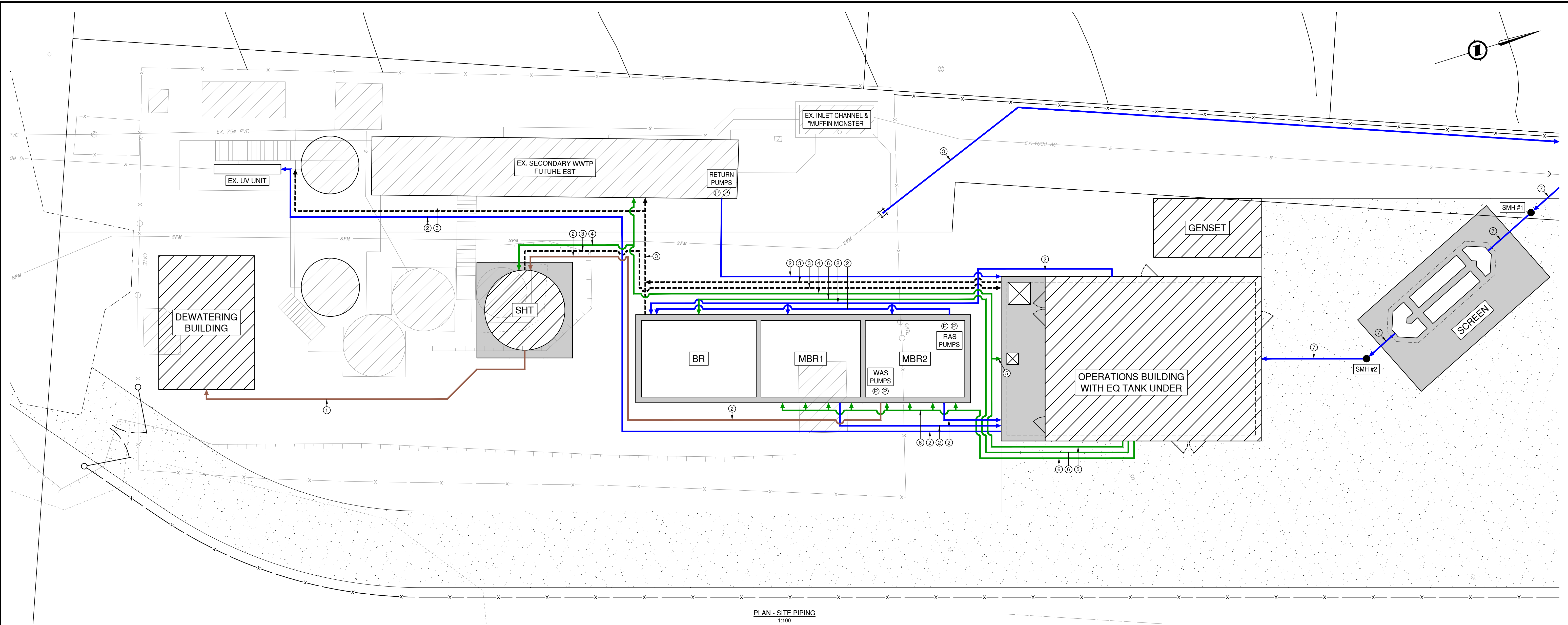
This map shows the completed sewer works under Phase 1 completed in 2021 and the proposed sewer to be replaced pending award of the Phase 2/3 construction contract.







X:\2021\CD\PROJECTS\2024\21182-00 CRD MAGIC LAKES ESTATES WASTEWATER PST AND TREATMENT UPGRADES\100 DRAWINGS\103 ENGINEERING\103.2 SHEET\21182-00 SCHOOER WWTP.DWG PLOT DATE: July 18, 2022



- PIPING TYPE LEGEND:
- DRAIN
 - WASTEWATER
 - POTABLE WATER
 - TREATED EFFLUENT
 - SLUDGE TRANSFER
 - AIR SUPPLY
 - CHEMICAL ADDITION
 - VENTILATION
 - OVERFLOW/ NORMALLY NO FLOW

- PIPING SIZE LEGEND:
- ① 750 SCH80 PVC
 - ② 1000 SCH80 PVC
 - ③ 1500 SCH80 PVC
 - ④ 750 S.S. 316S10
 - ⑤ 1000 S.S. 316S10
 - ⑥ 1500 S.S. 316S10
 - ⑦ 2000 PVC DR35

- PIPING SYMBOL LEGEND:
- ▶ FLOW DIRECTION
 - ⊕ PUMP

JULY 22, 2022
30% REVIEW



 McElhanney 500 - 3960 QUADRA STREET VICTORIA, BC V8X 4A3 PH (250) 370-9221	SEAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			</
--	------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----

Attachment 3 – Progress Photos



Attachment 4 – Sludge Dewatering Business Case

Sludge Dewatering

Wastewater treatment consists of two main processes, liquid treatment and solids treatment. The liquid stream is treated by the membrane bio-reactor (MBR) and is then disinfected by ultra-violet lamps before being discharged through the ocean outfall into Swanson Channel. Larger solids in the wastewater (greater than 3mm) will be removed by screens at beginning of the plant and are collected in bins for disposal at Hartland Landfill. Further in the process, organic material (called sludge) is filtered from the liquid stream and wasted into holding tanks, where it is thickened by gravity to about 2-3% percent dry solids (DS).

The current thickening process requires significant operator involvement - adding polymer, allowing the sludge to settle, and manipulating valves to manually decant the separated liquid. A septic truck comes about 85 times per year to transport the 2-3% thickened solids for treatment and disposal at a private facility in Langford. The operational costs for trucking and disposal of sludge from Schooner and Cannon is currently around \$170,000 annually.

At minimum, the proposed upgrades will improve the current sludge processing procedures by replacing the current sludge holding tanks with a larger tank designed to thicken sludge by gravity settling and decanting the liquid by gravity over a weir. The operator involvement in this process should be much less than the current process.

The sludge dewatering process can be further improved by installing mechanical equipment to separate and squeeze out excess water from sludge to increase the solids content to 15-17% which will reduce the number of loads for disposal. Dewatering is used in many treatment plants including at other CRD facilities. Reducing the number of loads for disposal reduces the operational cost but there is a capital cost to install the dewatering equipment and it too has an annual operating and maintenance cost which has been considered in the business case. Table 1 summarizes the annual trucking and disposal costs based on current 2-3% sludge disposal and the proposed 15-17% dewatered sludge disposal.

Table 1: Estimated Trucking and Disposal Costs for Sludge Handling Options

Sludge Processing Options	% DS	Annual Sludge Volume (m ³)	# Trucking Trips	Annual Trucking + Disposal Cost
Gravity Thickened	2-3	1090 - 2180	46 - 92	\$170,000 - \$200,000
Dewatered Sludge	15-17	190 - 220	26 - 28	\$ 90,000 - \$100,000

As shown in Table 1, the business case of installing sludge dewatering equipment indicates an estimated annual savings of about \$80,000 to \$100,000. Therefore, the payback period for a \$600,000 capital investment on sludge dewatering equipment is about 6-7 years.

Based on the successful use of dewatering equipment at other CRD facilities and the lower hauling and disposal costs, it is recommended that the sludge dewatering equipment be included as a provisional item in the construction tender. The final decision whether to proceed with the dewatering equipment can be made once the provisional cost is known and if there are sufficient funds available within project budget to include that equipment.