



Notice of Meeting and Meeting Agenda Core Area Liquid Waste Management Committee

Wednesday, October 13, 2021

9:30 AM

6th Floor Boardroom
625 Fisgard Street
Victoria, BC V8W 1R7

Special

D. Blackwell (Chair), L. Seaton (Vice-Chair), S. Brice, B. Desjardins, F. Haynes, L. Helps, B. Isitt, J. Loveday, J. Olsen, R. Martin, R. Mersereau, K. Murdoch, D. Screech, N. Taylor, G. Young, C. Plant (Board Chair, ex-officio)

The Capital Regional District strives to be a place where inclusion is paramount and all people are treated with dignity. We pledge to make our meetings a place where all feel welcome and respected.

1. Territorial Acknowledgement

2. Approval of Agenda

3. Presentations/Delegations

Due to limited seating capacity, this meeting will be held by Live Webcast without the public present.

To participate electronically, complete the online application for "Addressing the Board" on our website. Alternatively, you may email the CRD Board at crdboard@crd.bc.ca.

4. Special Meeting Matters

4.1. [21-772](#) 2022 Service Planning - Wastewater

Recommendation: That the Core Area Liquid Waste Management Committee recommends the Committee of the Whole recommend to the Capital Regional District Board:
That Appendix A, Community Need Summary - Wastewater be approved as presented and form the basis of the 2022-2026 Financial Plan.

Attachments: [Staff Report: 2022 Service Planning - Wastewater](#)
[Appendix A: Community Need Summary – Wastewater](#)
[Appendix B: Capital Plan Report](#)
[Appendix C: Initiatives Progress Report](#)

4.2. [21-763](#) Core Area Liquid Waste Management Service - 2022 Operating and Capital Budget

Recommendation: That the Core Area Liquid Waste Management Committee recommends that the Committee of the Whole recommends that Capital Regional District Board:

1. Review and approve the 2022 Core Area Liquid Waste Management Service operating and capital budgets as presented; and
2. Direct staff to balance the 2021 actual revenue and expenses on the transfer to the operating, equipment, and capital replacement reserves.

Attachments: [Staff Report: CALWM Service - 2022 Operating & Capital Budget](#)
 [Appendix A: Budget Summary](#)
 [Appendix B: Five Year Capital Plan](#)
 [Appendix C: Long-term Budget Overview](#)

4.3. [21-773](#) Core Area Inflow & Infiltration Program - 2021 Summary

Recommendation: That the Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:
That this report be received for information.
(NWA)

Attachments: [Staff Report: Core Area Inflow & Infiltration Program - 2021 Summary](#)
 [Appendix A: Map Summarizing I&I in the CRD's Core Area](#)
 [Appendix B: Table Comparing Measured Flows to Alloc. Flows in Bylaw 4304](#)
 [Appendix C: Ex. Monthly Sewer Reports Dist. to Core Area Munis & FN](#)

4.4. [21-783](#) Core Area Wastewater Treatment Project Closeout

Recommendation: The Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:
That Core Area Wastewater Treatment Project Closeout Report be received for information.
(NWA)

Attachments: [Staff Report: Core Area Wastewater Treatment Project Closeout](#)
 [Appendix A: CRD WTP Project Completion Report](#)
 [Appendix B: CRD WTP Governance Transition Report](#)
 [Appendix C: Project Cost Report](#)

5. Adjournment

**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, OCTOBER 13, 2021**

SUBJECT 2022 Service Planning – Wastewater

ISSUE SUMMARY

To provide the Core Area Liquid Waste Management Committee with an overview of core service levels, new and progressing initiatives and performance metrics related to the Wastewater Community Need. These activities are undertaken by both the Integrated Water Services and Parks & Environmental Services Department, and deliver on approved Board Strategic Priorities and the Capital Regional District (CRD) Corporate Plan.

BACKGROUND

The CRD Board identified its strategic priorities in early 2019. Subsequently, staff prepared the 2019-2022 CRD Corporate Plan to align with this direction. The CRD Corporate Plan presents the work the CRD needs to deliver over the Board term to meet the region's fifteen most important needs (community needs). These initiatives are delivered in conjunction with the mandated core services and regulatory requirements that the CRD is accountable for delivering. The priorities were reconfirmed by the CRD Board at the annual check-ins on May 13, 2020 and May 12, 2021.

At the start of the Board term, staff identified that the ambitious plan for the region would require a significant amount of effort and resources to action and implement Board and Corporate Priorities, and to keep pace with the anticipated increase in service demands, primarily driven by population growth and construction activity. The general level of effort deployed by the organization has been increasing to keep pace since the direction was set and, in some cases, emerging trends and changes in economic activity have had a significant impact on the demand for services driving additional resource requirements.

This is the final year of service plan and budget approvals for this CRD Board, as well as the final year of implementation of its strategic priorities. For 2022, staff are recommending a significant package of work to finalize the delivery of the strategic priorities and CRD Corporate Plan. Implementation timeframes for much of the work initiated in 2022 will carry into 2023.

2022 is a transition year for the CRD Board. Staff anticipate that any service planning requests for 2023 will be focused on operational adjustments while the Board is determining its strategic priorities for the 2023-2026 term.

The Community Need Summary Report (Appendix A) provides an overview of the strategic context for service areas by department, core service levels for services, new initiatives and a summary of the business model and performance metrics associated with targeted outcomes.

A summary of the capital investment made in support of the Community Need (Appendix B) and the initiatives progressed over the course of this Board's term (Appendix C) have been appended to this report.

ALTERNATIVES

Alternative 1

The Core Area Liquid Waste Management Committee recommends the Committee of the Whole recommend to the Capital Regional District Board:

That Appendix A, Community Need Summary – Wastewater be approved as presented and form the basis of the 2022-2026 Financial Plan.

Alternative 2

That Appendix A, Community Need Summary – Wastewater be approved as amended and form the basis of the 2022-2026 Financial Plan.

IMPLICATIONS

Financial Implications

The Executive Leadership Team (ELT) is taking steps to mitigate the financial impacts resulting from the work. ELT has reviewed the phasing of the work for 2022 to ensure that the activities and resources are allocated as efficiently as possible. Phasing out the initiatives over a longer period of time helps avoid delays that can occur when staff are too thinly spread across projects. Additionally, timing initiatives to start mid-year will also reduce the impact in 2022, but will have an incremental annualization impact in 2023 for ongoing impacts.

The CRD continues to look for ways to fund its services in a manner that relieves affordability pressure for the taxpayer. This is reflected in the policy for reserve balance measures and gaps/surplus, which was approved by the CRD Board on July 14, 2021. The CRD has had other funding successes optimizing capital funding and leveraging grant funding in a more aggressive way than ever before.

Finally, where feasible, an incremental change management strategy has been adopted for larger projects. This means that divisions are testing out the objectives and delivery approach with a proof-of-concept and then deploying out more broadly, if the benefits can be demonstrated. This has been a successful strategy adopted for our enterprise asset management strategy deployment, for example.

A comprehensive overview of the resources required to advance the initiatives listed in all Community Need Summaries, including all proposed staffing changes, will be presented to the Committee of the Whole at the 2022 provisional budget review.

Service Delivery Implications

In May 2021, the CRD's Parks & Environmental Services staff assumed responsibility for the contract management of the new Residuals Treatment Facility. Delays in commissioning have required staff to reorganize program priorities to accommodate the extended timeline to address administrative, technical and operational issues.

As a result of incremental work content and resourcing through the following initiatives in support of the community need, there is an additional 0.5 fixed term FTE in the area of Finance and

Technology to administer required corporate functions.

See Appendix A for more details about core service delivery.

New initiatives proposed for 2022:

Staff have identified three initiatives in support of this community need that will have budget implications in 2022 (Table 1). The key drivers for this work are:

1. The operationalization of capital investment (Core Area Wastewater Treatment Plant and Residuals Treatment Facility): follow-up adjustments to the operational model to optimize service and meet regulatory obligations.
2. Minimize the materialization of risk through preventative maintenance planning: the finalization of a program of work to collect data and manage risks related to inflow and infiltration to the sanitary sewage system on the Saanich Peninsula.

Table 1: Wastewater Community Need Initiatives

#	Initiative	Description	Year(s)	FTE impacts (2022)	Cost impacts (2022)	Funding source
8a-1.3	Saanich Peninsula Liquid Waste Management Plan	Development of a detailed inflow and infiltration reduction program for the Peninsula	2022	--	\$65K	Requisition
8a-1.4	Biosolids Research Assistant	Development of short- and long-term biosolids management plans	2022-23	+1.0 FTE Term	\$92K	Requisition
8a-1.5	Lab Services Core Area Wastewater Treatment Plant	Support for lab services during evaluation of longer-term Core Area Wastewater Treatment Plant requirements	2022	+1.0 FTE Term	\$105K	Requisition

This information reflects the business case costs, which the ELT reviewed as part of its annual assessment of initiatives.

8a-1.3 Saanich Peninsula Liquid Waste Management Plan

An audit of the Saanich Peninsula Liquid Waste Management Plan has identified unfulfilled commitments to evaluate and manage inflow and infiltration (I&I) to the sanitary sewer. The Saanich Peninsula Wastewater system has not had any documented wet weather related overflows but I&I increases as infrastructure ages, so it would be prudent to manage this risk proactively. It will also ensure the Saanich Peninsula Municipalities manage sanitary flow in accordance with the BC Municipal Wastewater Regulation.

Initiative 8a-1.3 is the third and final initiative related to I&I planning for the Saanich Peninsula. The final stage is to develop custom I&I management plans for Sidney, North Saanich and Central

Saanich, complete with high-level actions, timelines and costs. The work builds on the 2020 work done to collect additional flow data and pinpoint areas with the highest I&I levels, and 2021 work to develop flow calculations for each catchment area to plan for the most cost-effective capital upgrades/replacement program for the sanitary sewer infrastructure.

8a-1.4 Biosolids Research Assistant – Term Position

The commissioning of the Residuals Treatment Facility requires the implementation of a short-term biosolids management plan (2021-24). In addition, the Province requires the development of a long-term biosolids management plan, which must be submitted by mid-2024. This is a regulatory requirement under the Environmental Management Act. Initiative 8a-1.4 seeks to create a new term position in the Environmental Protection division to support both the implementation of the short-term management plan and development of the longer-term biosolids management operations and analysis for public consultation.

8a-1.5 Lab Services Core Area Wastewater Treatment Plant

The initial commissioning and operational start-up of the Core Area Wastewater Treatment Plant is now underway. Lab (analytical) services is an essential component of wastewater service delivery as data produced supports the optimization of plant operations. The service levels at McLoughlin Point Wastewater Treatment Plant have been materially higher than planned so far and therefore a staffing optimization evaluation is underway to assess the long-term requirements.

Initiative 8a-1.5 seeks to create a one-year term position in the Environmental Protection division to support additional lab services in 2022 while the treatment plant is optimized.

The proposed initiatives will also increase demand and requirements for financial support (e.g. budget and transaction processing etc.). This initiative, alongside others, will result in a small adjustment to the Financial Services staffing model to accommodate the demand. To provide full transparency, the financial impact of the initiative reflects the whole cost of delivering the work, including flow-down impacts on support services.

Alignment with Board & Corporate Priorities

The direction given to staff was to bring forward work that is of essential nature. This was defined as:

- initiatives that provide public health and safety and/or deliver on a regulatory requirement.
- initiatives that are required to deliver the Board Strategic Priorities.
- initiatives that will prevent the materialization of significant negative impacts on service customers, partners, the region, local services or the CRD's finances.
- initiatives that minimise the materialization of financial, reputational or other risks and liabilities for the CRD by ensuring the organization is keeping pace with expectations and demand.
- there is an imperative to deliver the work immediately and/or quickly.

The ELT has reviewed and assessed all business cases against the criteria. The consolidated package of work is appropriate and commensurate to the challenge facing the organization.

CONCLUSION

Staff have been progressing initiatives and actions identified in the Capital Regional District (CRD) Corporate Plan, including Board Strategic Priorities. The CRD Board determines resourcing through its annual review and approval of financial plans. As per previous years, to support the Board's decision-making, staff are providing recommendations on funding, timing and service levels through the service and financial planning processes.

RECOMMENDATION

The Core Area Liquid Waste Management Committee recommends the Committee of the Whole recommend to the Capital Regional District Board:

That Appendix A, Community Need Summary – Wastewater be approved as presented and form the basis of the 2022-2026 Financial Plan.

Submitted by:	Glenn Harris, Ph.D., R.P.Bio., Senior Manager, Environmental Protection
Concurrence:	Larisa Hutcheson, P. Eng., General Manager, Parks & Environmental Services
Concurrence:	Ted Robbins, B.Sc., C.Tech., General Manager, Integrated Water Services
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

ATTACHMENTS

Appendix A: Community Need Summary – Wastewater

Appendix B: Capital Plan Report

Appendix C: Initiatives Progress Report

Community Need

2022 Summary



Wastewater

Strategy

Target Outcome

We envision efficient and effective management of the region's wastewater.

Strategic Context

Strategies

- [Core Area Liquid Waste Management Plan](#)
- Transition to stable operation of McLoughlin Point Wastewater Treatment Plant (MPWWTP) and Residuals Treatment Facility.
- Transition of residual solids from other wastewater treatment facilities to the Residuals Treatment Facility.
- Continue to effectively operate and maintain the Saanich Peninsula Wastewater Treatment Plant.
- Continue to effectively operate and maintain five small wastewater systems in the Electoral Areas.

Trends, risks and issues

- Monitoring programs for new wastewater infrastructure in the Core Area continue to be implemented; ongoing commissioning and operational refinement requires additional samples to be collected and analyzed. Lab Services requires additional resources to support the wastewater operations at MPWWTP for 2021.
- Enhanced Key Manhole study to inform CRD source control initiatives and wastewater operations to be completed 2021-2022.
- Biosolids short-term implementation, and long term planning, options analysis and pilot testing.
- Commissioning of the Residuals Treatment Facility (RTF) has been extended, which has resulted in extra regulatory, technical and administrative oversight for CRD staff.
- Optimization of operation and maintenance of new infrastructure in the Core Area. Continued onboarding of new staff to operate and maintain the new infrastructure.
- Continue to operate and maintain the other wastewater infrastructure in the Core Area, Saanich Peninsula, and the Electoral Areas. This infrastructure is of various ages and in several cases large scale infrastructure renewal is required.
- Facilities Management's role in supporting maintenance of superstructures in wastewater is evolving.

Community Need

2022 Summary

Services

Core Services Levels	
Service	Levels
Core Area, Saanich Peninsula Wastewater Systems and Small Wastewater Systems in the Electoral Areas Services include wastewater conveyance and tertiary treatment for Core Area, and conveyance and secondary treatment for Saanich Peninsula, and the small wastewater systems in the Electoral Areas.	
Wastewater System Operations Wastewater treatment collection and transmission system operation and monitoring. System and facility maintenance, consumables management and preventative maintenance.	- Wastewater treatment - System operation, monitoring and maintenance - Consumables management
Emergency Response/System Failure Wastewater overflows and unplanned service interruptions.	- Wastewater overflows and public and environmental health protection - Unplanned service interruptions
Capital Project Delivery and Works Project design, procurement and delivery of projects planned each year, on time and budget. Installations, equipment replacement and capital projects support.	- Capital program value for seven services - Infrastructure renewal and upgrades - Capital project support
Infrastructure planning Strategic asset management for all services/systems including modeling and capacity analysis, vulnerability assessment, infrastructure renewal plans.	- Asset management Plans - Manage capital plans for seven wastewater services
Engineering services Support of Infrastructure Operations through engineering services such as process, civil, electrical and mechanical troubleshooting.	Engineering support of utility operations for the seven wastewater services.
Environmental Protection Regulatory and non-regulatory services and a support role across the organization that focuses on contaminant reduction, monitoring and assessment associated with liquid waste treatment.	
Regional Source Control Administration, monitoring, and reporting of compliance with regional bylaw.	- Inspect, monitor and enforcement for businesses and institutions connected to sanitary sewer. - Promote contaminant reduction associated with sanitary and stormwater systems. → Service level adjusted, see IBC 8a-1.3

Community Need

2022 Summary

Core Services Levels	
Service	Levels
Core Area and Saanich Peninsula Wastewater & Marine Environmental Program Oversight for wastewater monitoring and assessment and reporting to meet regulatory requirements.	- Marine outfall monitoring, assessment and reporting services to demonstrate compliance with federal and provincial legislation. → Service level adjusted, see IBC 8a-1.5 - Update of Liquid Waste Management Plans.
Residuals Treatment Facility Administration of the Project Agreement for operation of the RTF and biosolids beneficial use strategy.	Monitoring and compliance reporting. → Service level adjusted, see IBC 8a-1.4
On-site Wastewater Management Regulatory oversight for onsite wastewater systems and education and outreach services across the region.	Promote and monitor compliance with regional bylaw.
Septage Service Administration, monitoring and reporting of regional septage service.	Negotiate and manage one septage disposal contract servicing the capital region.
Watershed Management Program Promote environmental stewardship associated with sanitary and stormwater systems, contaminants and flows.	- Promote public awareness and stewardship initiatives. - Public education and engagement in the region to promote sustainable behavior through campaigns, initiatives and services.
Support Services The core services listed rely on the support of several corporate and support divisions to effectively operate on a daily basis. These services are reported on in the Accountability Community Need Summary.	Services include Human Resources & Corporate Safety, Corporate Communications, Asset Management, Financial Services, Information Technology & GIS, Information Services, Legislative Services, Facility Management, Fleet Management, Legal Services, Risk & Insurance and Real Estate Services.

Community Need

2022 Summary

Initiatives					
Ref	Initiative	Description	Year(s)	2022 impacts	
8a-1.3	Saanich Peninsula Liquid Waste Management Plan	Development of a detailed inflow and infiltration reduction program for the Peninsula.	2022	--	\$65K requisition
8a-1.4	Biosolids Research Assistant (Term)	Development of short- and long-term biosolids management plans.	2022-23	+1.0 FTE Term	\$92K requisition
8a-1.5	Lab Services CAWTP	Support for lab services during evaluation of longer-term CAWTP requirements.	2022	+1.0 FTE Term	\$105K requisition

Business Model

Funding
Who contributes - Core Area Municipalities (Colwood, Esquimalt, Langford, Oak Bay, Saanich, Victoria, View Royal) and Songhees and Esquimalt First Nations. - Saanich Peninsula Municipalities (Central Saanich, North Saanich, Sidney) and Saanich Peninsula First Nations Bands. - Local Wastewater Service Areas in the Electoral Areas. - Support Services: varies per service. Funding Sources - Requisitions

Reporting Structure
Core Area Liquid Waste Management Committee Saanich Peninsula Wastewater Commission

Performance			
Definition and Source	2020 Actual	2021 Forecast	2022 Target
TBC			

Community Need

2022 Summary

Discussion

Link to Target Outcome

The following KPIs link to the CRD's goals of safe, resilient and environmentally sound wastewater conveyance and treatment for our customers in the capital region and protection of the environmental and public health. These KPIs are being established with new performance targets that will be reported in future service plans.

- Compliance with provincial and federal regulatory requirements and operational certificates
- Total volume of wastewater collected and treated
- Operating cost per megaliter of wastewater collected and treated
- Energy use per megalitre of wastewater treated
- Volume/percent of biosolids beneficially used
- Utilization of gas generated at the Residuals Treatment Facility
- Annual number of wet-weather related sanitary sewer overflow events from CRD systems (resulting in near-shore discharges/beach closures)
- Delivery of annual capital program
- Number of complaints related to operation (noise/odour)

Community Need

Capital Plan Report



Wastewater

Highlights since 2019

- The CRD has allocated **over \$480M** on projects that advance the Wastewater Community Need. This was primarily funded through debenture debt, reserves and capital funds at hand.
- The projects included:
 - Construction of the Core Area Wastewater Treatment Plant (CAWTP), including the McLoughlin Point Wastewater Treatment Plant, Residuals Treatment Facility and Residuals Solids Conveyance Line. The CRD, through the Project Board, planned, procured and constructed the Wastewater Treatment Project from May 2016 to May 2021. Work took place across three municipalities and within the traditional territories of the Esquimalt, Songhees, Tsartlip, Tsawout, Tseycum and Pauquachin Nations.
 - Infrastructure upgrades to rehabilitate a number of existing sewer systems including Ganges on Salt Spring Island, the North West Trunk and Bowker in the Core Area and the Saanich Peninsula Wastewater Trunk Sewer
 - Remediation of the Millstream Meadows contaminated site

Planned for 2022

- The CRD will allocate **over \$15M** on projects that advance the Wastewater Community Need. Projects to be undertaken include:
 - Update of condition assessment studies for CAWTP to incorporate long-term asset management plans and expected level-of service requirements
 - Improvements and upgrade of the Magic Lake wastewater treatment plant (Phase 1)
 - Replacement program for existing, end-of-life vehicles that support ongoing integrated water system operations and purchase of new vehicles for CAWTP operations

Community Need

Capital Plan Report



- Infrastructure upgrades to rehabilitate a number of existing sewer systems including Ganges on Salt Spring Island, Bowker in the Core Area, the Saanich Peninsula Wastewater Trunk Sewer and Port Renfrew Sewer
- This work is funded through debenture debt, grant and some reserves (including equipment reserve fund) and capital funds on hand.

Community Need

Initiative Progress Report



Wastewater

Initiatives approved in 2020 and 2021			
Ref	Initiative	% complete	Progress to date
8a-1	Wastewater Management through LWMP	100%	Lead: Environmental Protection (2020) Part of core services delivery – operational handover of most components to CRD complete
8a-1.1	Wastewater Management	100%	Lead: Infrastructure Operations Wastewater (2021) Part of core services delivery – operational handover of most components to CRD complete
8a-1.2	FM Centralization Strategy - FMW (CAWTP)	100%	Lead: Facilities Management & Engineering Services (2021) Completed – recruitment completed in March 2021
8a-1.3	Saanich Peninsula Liquid Waste Mgmt. Plan – I&I	20%	Lead: Environmental Protection (2021) Progressing – Phase 2 – development of I&I modelling underway
8a-2	Stormwater Contaminant Sources	100%	Lead: Environmental Protection (2020) Part of core services

**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, OCTOBER 13, 2021**

SUBJECT **Core Area Liquid Waste Management Service - 2022 Operating and Capital Budget**

ISSUE SUMMARY

To provide an overview of the 2022 Core Area Liquid Waste Management Service budget including 2021 year end budget projections and budget highlights.

BACKGROUND

As of 2021 the Core Area Wastewater System has provided wastewater collection, conveyance and tertiary treatment for the sewered areas of the seven participating municipalities and two First Nations, serving a population equivalent of approximately 320,000 and treating an average of almost 82 million litres of wastewater per day. It is also noted that the Capital Regional District (CRD) owns and operates other sub-regional and local wastewater systems on the Saanich Peninsula and across the Electoral Areas, allocating service and program costs on a cost recovery basis.

The CRD accepted operational responsibility for the McLoughlin Point Wastewater Treatment Plant (MPWWTP) on January 13, 2021, and the other conveyance system components, including pump stations and pipelines, between September 2020 and May 2021. Acceptance of the Arbutus Attenuation Tank, is anticipated by November 2021. As reported in July, the commissioning period for the MPWWTP and the system as a whole is anticipated to extend well into the performance period for the MPWWTP, ending December 2022.

The 2022 Core Area Liquid Waste Management Service budget has been prepared for the Core Area Liquid Waste Management Committee's (Committee) consideration. The Committee will make budget recommendations to the CRD Board through the Committee of the Whole, on October 27, 2021. The 2022 budget reflects the operating costs of the MPWWTP and conveyance system, based on the first year of full system operation in 2021. The budget summary is attached as Appendix A.

As noted last year, the operating budget will continue to be refined over the next few years as:

- The operation of the MPWWTP is optimized through the second year of the contractual performance period.
- Equipment/process Operating and Maintenance (O&M) requirements provided by contractor/equipment supplier that served as the basis for the CRD maintenance management plans are optimized and modified to incorporate worker safety requirements and minimize other impacts such as odour.
- The outcome of the disk filter chemical pilot testing is known (by end of 2022) and the future chemical requirements (alum or ferric chloride) are confirmed.
- Biosolids disposal solutions and costs are determined (beyond three year time period).

2021 Year End Financial Projections

The 2021 budget for conveyance and treatment operations was \$28.2 million. At year end 2021, expenses are estimated to be \$25.3 million. The net variance of \$3.0 million or 10.5% of the 2021 operating budget is primarily a result of:

- Treatment process chemical expenses (ferric chloride) are estimated to be \$1.36 million under budget primarily due to on-going process/chemical use optimization with advice from the contractor (Harbour Resource Partners (HRP)) and the CRD's process engineering consultant in order to maximize the effectiveness of the secondary treatment processes.
- Electricity expenses are estimated to be \$1.5 million under budget primarily due to some electrical equipment operating at less load than anticipated, reducing power consumption and peak load period costs.
- Equipment repair costs are estimated to be \$1.0 million under budget as a result of fewer repairs due to age of equipment.
- Provincial outfall permit costs are estimated to be \$0.5 million over budget due to extension of Clover Point and Macaulay Point outfall permits (for 2021 only) to allow commissioning activities.
- Contracted services to assist with commissioning activities are estimated to be \$0.3 million over budget.

With regards to 2021 capital expenditures, the 2021 budget for the Residuals Treatment Facility (RTF) Hartland Resource Management General Partnership (HRMG) payment under the P3 Agreement was set at \$5.5 million. Based on the terms of the agreement, the two month delay in Service Commencement, drove a \$1 million year end variance. In addition, the 2021 debt expenditures are estimated to be \$0.3 million under budget at year end as a result of deferral of long term borrowing associated with the ongoing capital plan.

The total budget surplus is proposed to be budgeted as follows:

- \$1.3 million additional transfer to the Operating Maintenance Reserve Fund (described further below)
- \$0.6 million additional transfer to the Equipment Replacement Reserve Fund (described further below)
- \$1.5 million additional transfer to the Capital Reserve Fund (described further below)
- \$0.2 million carried forward to offset 2022 budget

2022 Operating Budget

Conveyance and Treatment Operations

The 2022 operating budget for conveyance and treatment operations reflects non-discretionary expenses such as negotiated staff wages/salaries, regulatory program and corporate support services, residuals treatment and disposal costs, and other operating expenses such as chemicals and electricity costs and overhead. With the operational experience gained with the new infrastructure this year, budget realignment and adjustments have been incorporated across the budget including reductions in the chemical and electricity expense budgets. However, staff are not proposing reductions consistent with the projected 2021 variances until more operating experience is gained and longer term operating/cost trends are established. The 2022 budget

also includes \$0.2 million for additional one-time environmental programs staffing expenses and operating supplies for MPWWTP and \$0.4 million in cyclical maintenance expenses funded from the Operating Reserve Fund.

The total 2022 operating expenditures are budgeted at \$28.3 million, an increase of 0.14% or a 1.2% decrease excluding cyclical maintenance costs (funded through operating reserves). The remaining \$21.0 million is associated with liquid and solids treatment operations.

Table 1: 2022 Year over Year Budget Comparison

Expenditure Type	2022 Financial Plan (millions)	2021 Financial Plan (millions)	Change (millions)	% Change
Operations	28.3	28.2	0.0	0.1%
Debt Servicing	7.5	6.7	0.7	11.1%
Capital Funding	5.5	5.5	0	0.0%
Transfers to Reserves	9.8	10.3	-0.5	-5.1%
Total	\$ 51.1	\$ 50.8	\$ 0.3	0.5%

Environmental Services Programs Operations

There are several environmental programs that the Core Area Wastewater Service participates in as part of the liquid waste management function which are also critical to achieving the CRD's commitments under the Liquid Waste Management Plan (LWMP). These programs are summarized below. The requisition impact in 2022 for these programs are within or under the benchmark increase of 2%. As itemized in the service planning staff report on this agenda, service level adjustments with regards to biosolids management and lab services are included in the 2022 budget.

Regional Source Control Program – The program is aimed at reducing contaminants that industries, institutions and households discharge into sanitary sewers. The program will be more important than ever in point-of-discharge contaminant reduction in order to protect the sewage collection and treatment systems, the quality of the treatment plant sludge and biosolids, the marine receiving environment, and public and worker health and safety.

Septage Disposal Program – The program provides oversight for the contract between the CRD and SPL Wastewater Recovery Ltd. who provides septage receiving and processing services for the CRD.

Onsite Sewage System Management Program – The program manages septic system maintenance through bylaw compliance monitoring and educational materials in order to reduce the impacts of failing septic systems on human health and the environment.

Core Area Liquid Waste Management Plan Administration – The program manages the LWMP and oversees implementation of the commitments. The program also conducts all reporting and plan amendment preparation for the service.

Harbours Studies Program – The program provides for the CRD to work in partnership with other stakeholders, including communities, local governments and senior governments, to protect and improve the environmental quality of Victoria and Esquimalt harbours.

Core Area Stormwater Quality Management Program – Using an integrated watershed

management approach, the program coordinates the management of stormwater quality, including investigations to assess shoreline discharges and contaminant sources, in order to protect the marine environment.

Inflow and Infiltration Enhancement Program – The program provides for the CRD to engage with the participants to identify and reduce the amount of rain and ground water that enters the sanitary sewer systems. The program budget is funded through the conveyance and treatment budget.

Marine Monitoring Program - The program provides for the marine environment sampling and testing and regulatory reporting related to the effluent discharges from CRD wastewater facilities. The program budget is funded through the conveyance and treatment budget.

2022 Capital Budget

Capital Plan

As noted last year, long term capital plan has now been prepared for the 5, 10, 20 and 30 year time horizons for the major asset categories. The plan includes projects that will replace infrastructure at end-of-service life to ensure the system continues to operate reliably without service interruptions or risk to property, public health or the environment. The plan also includes projects that add conveyance capacity 'just in time' in order to convey flows to 2045 and utilize the ultimate design capacity of existing conveyance facilities, such as pump stations, and the MPWWTP. The value of the 30 year capital plan is estimated at \$116.4 million.

The capital budget for 2022 is \$36.5 million (including \$26.9 million carried forward from 2021 (Q2 estimate) and excluding Core Area Wastewater Treatment Project (CAWTP) debt); the total 2022-2026 capital budget is \$56.9 million (see Appendix B). This capital program will be funded almost entirely by long-term debt, with three 2022 projects funded by \$1.4 million from the Capital Reserve Fund (2021 budget surplus transfer). There are projects planned in each of the major asset categories including pump stations upgrades, gravity sewer and manhole upgrades and replacements, pressure pipe upgrades, flow meter installations and replacements, system control and communications upgrades, and outfall retrofits.

Capital Funding

There are two primary elements to the capital program funding. There are reserve funds established through annual contributions to allow accumulation of funds for future expenditures or pay-as-you-go funding; there are four reserve funds for the Service which are explained in more detail below. Then there are debt servicing costs (principal and interest payments) associated with long term capital infrastructure financing; in summary, for treatment and conveyance, there are three different debt programs, one associated with legacy conveyance system project financing (debt outstanding estimated at the end of 2021 of \$2.5 million which will be retired by 2025), one associated with the CAWTP financing (debt outstanding estimated at the end of 2021 of \$94.1 million which will be retired by 2032 based on current financing strategy). New financing under the \$57 million loan authorization approved in 2021, will result in long-term debt funding near the end of 2022, as short-term financing is currently used to fund active projects within the Core Area. In summary, future capital funding will be a combination of reserves and debt financing. Debt financing in this case is supporting an appropriate level of investment in system capital while balancing a lower annual funding requirement. As the capital program

progresses, any project surpluses will be used to fund upcoming capital and offset future borrowing requirements.

The 2022 budget for the Residuals Treatment Facility HRMG payment under the P3 Agreement is set at \$5.5 million. Based on the terms of the agreement, this budget amount is fixed until 2040.

Reserve Funding

There are currently four reserve funds established for this service. Reserves serve a number of purposes including stabilizing revenue requirements and funding capital renewal and replacement. Additional organization guidance is provided through the Board approved Asset Management Strategy, Capital Reserve Guidelines, and various financing strategies.

The four reserve funds established by bylaw are:

1. The Operating Maintenance Reserve
2. Equipment Replacement Reserve
3. CAWTP Debt Retirement Reserve
4. Capital Replacement Reserve

The Operating Maintenance Reserve fund is used to pay for significant O&M expenses that do not occur on an annual basis, such as odour control system carbon replacement, marine outfall inspections and pipe pigging/cleaning. 2022 operating maintenance reserve fund contributions are set at \$1.0 million.

The Equipment Replacement Reserve fund is used to pay for 'minor' equipment replacement that typically has a service life of less than five years and/or a value of less than \$25,000. The 2022 equipment replacement reserve fund contributions are set at \$0.9 million. Based on projected expenses to meet operational requirements, this is the anticipated level of annual funding, with inflationary adjustments over time.

CAWTP Debt Retirement Reserve Fund – is used to accumulate funds sufficient to pay down the treatment program debt issuances, in full, as they hit their 10 year renewal option. The establishment of this fund aligns with the financing strategy approved by the Board in 2019 which was designed to deliver the most cost effective financing structure, with the lowest overall cost to the participants. The combined annual contribution to the Debt Retirement Reserve and the debt servicing costs for the CAWTP financing totals \$12 million (plus issuance costs in 2022).

Capital Replacement Reserve Fund – This fund is used to pay for 'major' equipment and infrastructure replacement that has a service life of 5 to 25 years or more, such as major mechanical, electrical and instrumentation equipment, treatment process and odour control equipment and WWTP building equipment such as heating and cooling systems. The replacement and funding of other components of the wastewater system that have a service life of up to 75 years, such as gravity trunk sewers and forcemains, large pumps, electrical distribution systems, concrete tanks and superstructures and major building components, will be part of the long term capital plan and largely funded through a combination of reserves and long term financing. The 2022 reserve fund contribution has been set at \$3.1 million. Based on an evaluation of the service lives and value of the assets that would be replaced using this fund, and given that the need for the funding will significantly increase 20 to 25 years from now, the annual contribution will likely be smaller and vary for the next ten years while the CAWTP debt is paid down. In alignment with the CAWTP financing strategy and Asset Management Strategy, the long term

plan is to increase the annual contribution equal to debt servicing costs once the debt is retired.

In summary and to illustrate the long-range forecasts of the operating, capital and reserve expenditures, Appendix B demonstrates the allocation of total budget.

2022 Budget Context – Conveyance and Treatment

The following tables summarize the total 2022 wastewater conveyance and treatment expenditures and revenues. The totals are also summarized in Appendix C, along with 2021 year end projections and 2022-2026 budget projections.

Table 2: 2022 Budgeted Expenses

Budget Component	2022 Budget (millions)	% of Total
Treatment Plant O&M	14.1	27.6%
Conveyance System O&M	7.3	14.3%
Residuals Treatment Facility Operating	7.0	13.7%
Residuals Treatment Facility Capital	5.5	10.8%
Operating Reserve Fund Contributions	1.0	2.0%
Equipment Replacement Reserve Fund Contribution	0.8	1.6%
Long-term Capital Reserve Fund Contribution	3.1	6.1%
CAWTP Debt Retirement Reserve Fund Contribution	4.8	9.4%
CAWTP Debt Servicing	7.3	14.3%
Capital Renewal & Capacity Upgrades Debt Servicing	0.2	0.4%
Total	\$ 51.1	100.0%

Table 3: 2022 Budgeted Revenue

Budget Component	2021 Budget (millions)	% of Total
Other Municipal Solids - SPWWTP	0.9	1.8%
Hartland Leachate	0.2	0.4%
Core Area Wastewater Operations - Surplus Carryforward	0.2	0.4%
Core Area Wastewater Operations - Ops Reserve	0.3	0.6%
Core Area Wastewater Operations Payments in Lieu	0.8	1.6%
Core Area Wastewater Operations - Requisition	27.7	54.2%
Core Area Wastewater Capital - Payments in Lieu	0.6	1.2%
Core Area Wastewater Capital - Requisition	20.4	39.9%
Total	\$ 51.1	100.0%

Requisition

The 2022 requisition is \$48.0 million after incorporating the requisition for capital and debt servicing of the new and existing conveyance and treatment system works, as well as system operations. The 2022 requisition represents a 0.97% increase over the 2021 requisition.

Requisition levels remain in line with the business case. The final incremental lift to \$40M for

wastewater treatment was in 2021. Total requisition of \$51.1M in 2022 includes funding for both wastewater operations as well as the pre-existing conveyance operations.

ALTERNATIVES

Alternative 1

That the Core Area Liquid Waste Management Committee recommends that the Committee of the Whole recommends that Capital Regional District Board:

1. Review and approve the 2022 Core Area Liquid Waste Management Service operating and capital budgets as presented; and
2. Direct staff to balance the 2021 actual revenue and expenses on the transfer to the operating, equipment, and capital replacement reserves.

Alternative 2

That the Core Area Liquid Waste Management Committee refer the budget back to staff for additional information for the Capital Regional District Board's consideration.

IMPLICATIONS

Environmental Implications

The treated effluent regulatory criteria that apply to the operation of the McLoughlin WWTP and the Core Area System are set out in the CRD's Provincial Registration and the Federal Wastewater System Effluent Regulations. Treatment plant performance continues to improve resulting in more consistent effluent quality and compliance than in the first six months of operation (reported in July).

Disinfection of treated effluent is not required to meet the regulations at this time. However, future consideration of the need to disinfect effluent will be subject to on-going monitoring of the impact of wet weather overflows and treated discharges. Management of wet weather discharges will be advanced through the on-going implementation of CRD and municipal inflow and infiltration reduction programs. Progress on inflow and infiltration initiatives and other commitments under the Core Area LWMP will be reported regularly to the Committee.

Intergovernmental Implications

Staff will continue to work closely with Esquimalt and Songhees First Nations to finalize Wastewater Service Agreements for each Nation.

With respect to residual solids treatment operations, the province has accepted of the short-term biosolids contingency plan. As directed by the province, the CRD will continue to develop the long-term biosolids strategy for implementation by January 1, 2025. The budget implications of the final strategy will be considered by the Committee in advance and will be reflected in future budgets.

Social Implications

The potential neighbourhood impacts related to the operation of the conveyance system and WWTP, including noise and odour, will continue be closely monitored by the CRD. If further modifications to equipment are determined to be necessary to mitigate impacts, staff will report to the Committee. The CRD will continue to respond to concerns and engage with the community groups and committees as necessary.

Financial Implications

As forecasted in previous reports to the Committee, the 2022 operating and capital budgets include requisitions to cover expenditures associated with the operation of the conveyance system, WWTP, RTF, as well as on-going capital investment and longer-term reserve contributions. The operating and capital cost apportionments for each participant are as per CRD Bylaw No. 4304, adopted by the CRD Board in August 2020.

Alignment with Board & Corporate Priorities

The 2019-2022 CRD Corporate Plan is aligned to the Board direction. It highlights the initiatives the CRD needs to deliver over the Board's four-year term to address the region's most important needs. The Corporate Plan identified six initiatives under the Wastewater initiative, that fall under the Core Area Liquid Waste Management Committee's mandate. Progress on these initiatives to date and upcoming initiatives affecting the 2022 budget are set out for the Committee and Board in the Service Planning report.

CONCLUSION

This 2022 Core Area Liquid Waste Management Service budget has been prepared for the Core Area Liquid Waste Management Committee's (Committee) consideration. The Committee will make budget recommendations to the Capital Regional District (CRD) Board through the Committee of the Whole. The 2022 budget reflects the operating costs of the McLoughlin Point Wastewater Treatment Plant (WWTP) and the conveyance system, as well as the existing and new capital costs and reserve fund contributions. The operating budget will continue to be refined over the next two to three years as the operation of the WWTP is optimized through the two year contractual performance period and the CRD gains experience with the new operation. The CRD has resumed investment in the renewal of the conveyance system infrastructure that existed prior to the CAWTP, to ensure the system continues to operate reliably and without impacts on public health or the environment. The financial implications of the 2022 operating and capital budget vary by participant, depending on the operating and capital cost apportionments associated with annual flow and allocated treatment capacity.

RECOMMENDATION

That the Core Area Liquid Waste Management Committee recommends that the Committee of the Whole recommends that Capital Regional District Board:

1. Review and approve the 2022 Core Area Liquid Waste Management Service operating and capital budgets as presented; and
2. Direct staff to balance the 2021 actual revenue and expenses on the transfer to the operating, equipment, and capital replacement reserves.

Submitted by:	Ted Robbins, B.Sc., C.Tech., General Manager, Integrated Water Services
Concurrence	Larisa Hutcheson, P. Eng., General Manager, Parks & Environmental Services
Concurrence	Nelson Chan, MBA, FCPA, FCMA, Chief Financial Officer
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

ATTACHMENTS

Appendix A: Budget Summary
Appendix B: Five Year Capital Plan
Appendix C: Long-term Budget Overview

APPENDIX A

3.717 & 3.798C - Core Area Wastewater Combined Summary

3.717 - OPERATING COSTS:

- Allocation - IWS Operations
- Allocation - Standard Overhead
- Allocation - Enviro Monitoring & Marine Protection Programs
- Biotreatment and Disposal
- Operating - Other
- Repairs & Maintenance
- Electricity & Utilities
- Supplies - Chemical & Other

TOTAL OPERATING COSTS

*Percentage Increase over prior year

3.717 - RESERVE:

Transfer to Operating Reserve
Transfer to Equipment Replacement Fund

3.798C - RESERVE:

Transfer to RTF Capital
Transfer to Capital Replacement Reserve
Transfer to WTP Debt Retirement Reserve

TOTAL CAPITAL / RESERVESCAWTP Debt
CAWW Debt

3.798C - Total Debt Expenditures

MFA Debt Reserve

TOTAL COSTS

*Percentage Increase over prior year

Internal Recoveries

TOTAL COSTS LESS INTERNAL RECOVERIES

*Percentage Increase over prior year

FUNDING SOURCES (REVENUE)

Estimated Balance C/F from 2021 to 2022
Balance C/F from 2020 to 2021
Grants in Lieu of Taxes
Transfer from Operating Reserve
Revenue - Other

TOTAL REVENUE

REQUISITION

*Percentage increase over prior year

PARTICIPANTS: Victoria, Oak Bay, Esquimalt, Saanich, View Royal, Colwood, Langford, Esquimalt FN, Songhees FN

CAPITAL REGIONAL DISTRICT
FIVE YEAR CAPITAL EXPENDITURE PLAN SUMMARY - 2022 to 2026

Service No.	3.798C	Carry						
	Debt - Core Area Wastewater Capital	Forward from	2022	2023	2024	2025	2026	TOTAL
		2021						

EXPENDITURE

Buildings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equipment	\$120,000	\$120,000	\$0	\$0	\$0	\$0	\$0	\$120,000
Land	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Engineered Structures	\$26,575,000	\$36,168,000	\$8,030,100	\$11,280,000	\$17,380,000	\$1,510,000	\$67,868,100	
Vehicles	\$220,000	\$220,000	\$0	\$0	\$0	\$0	\$220,000	
	\$26,915,000	\$36,508,000	\$8,030,100	\$11,280,000	\$17,380,000	\$1,510,000	\$74,708,100	

SOURCE OF FUNDS

Capital Funds on Hand	\$1,697,100	\$1,697,100	\$1,068,100	\$0	\$0	\$0	\$2,765,200	
Debenture Debt (New Debt Only)	\$10,225,000	\$17,515,000	\$6,800,000	\$11,150,000	\$17,350,000	\$1,500,000	\$48,015,000	
Equipment Replacement Fund	\$0	\$828,000	\$162,000	\$130,000	\$30,000	\$10,000	\$960,000	
Grants (Federal, Provincial)	\$14,992,900	\$14,992,900	\$0	\$0	\$0	\$0	\$14,992,900	
Donations / Third Party Funding	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Reserve Fund	\$0	\$1,475,000	\$0	\$0	\$0	\$0	\$1,475,000	
	\$26,915,000	\$36,508,000	\$8,030,100	\$11,280,000	\$17,380,000	\$1,510,000	\$74,708,100	

Service #:3.798C

Service Name:Debt - Core Area Wastewater Capital

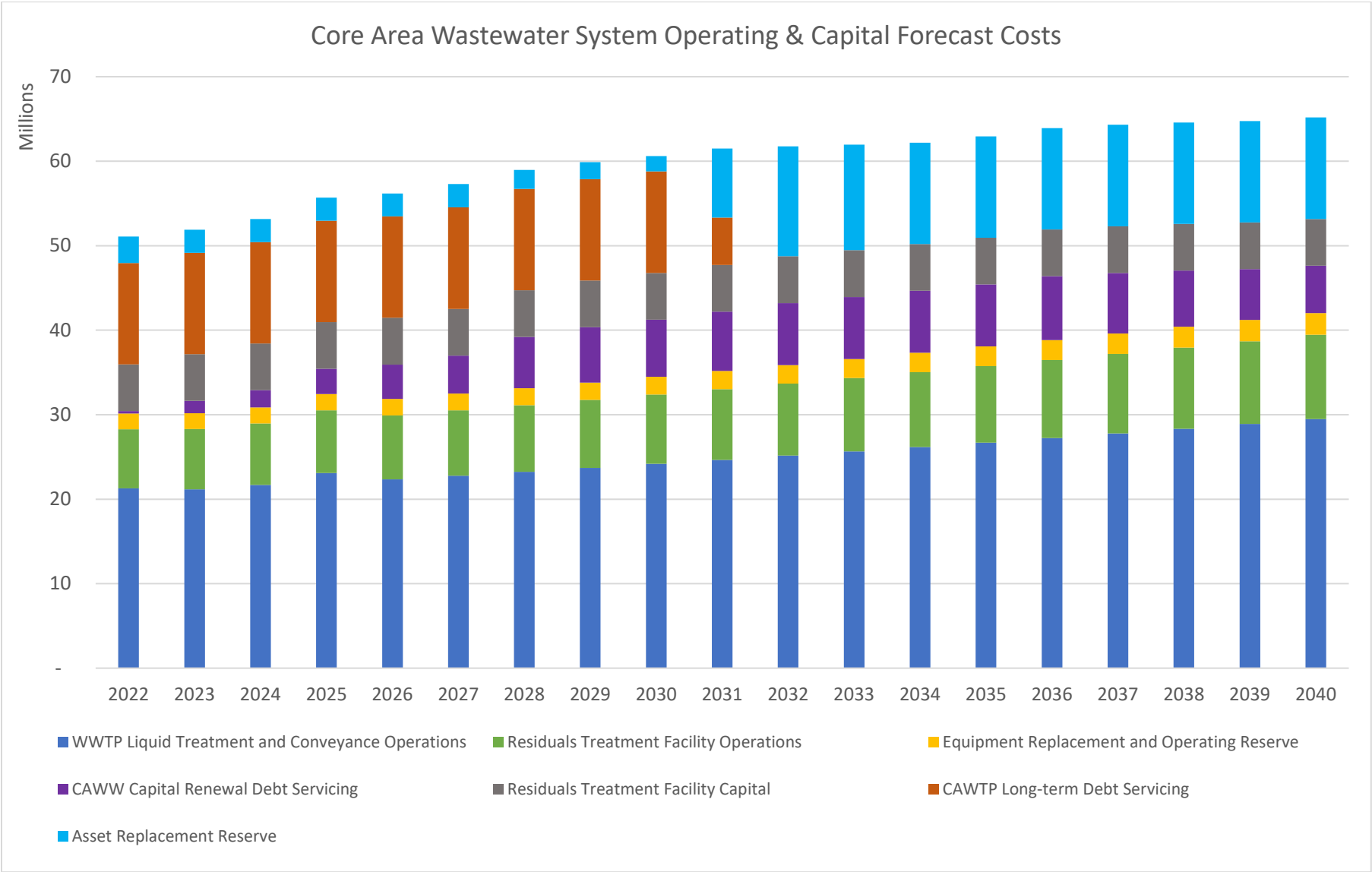
Project List and Budget													
Project Number	Capital Expenditure Type	Capital Project Title	Capital Project Description	Total Project Budget	Asset Class	Funding Source	Carryforward from 2021	2022	2023	2024	2025	2026	5 - Year Total
GRAVITY SEWERS AND MANHOLES													
21-06	Renewal	Shoreline Trunk Sewer Upgrade	The hydraulic model and capacity assessment of the system by KWL in 2018-19, has identified that the Shoreline Trunk must be twinned to prevent overflows into Portage Inlet.	\$2,400,000	S	Debt	\$200,000	\$200,000	\$2,000,000	\$0	\$0	\$0	\$2,200,000
21-07	New	Western Trunk Sewer Twinning	The hydraulic model and capacity assessment of the system by KWL in 2018-19, has identified that the Western Trunk Sewer must be twinned from Aldeane to Craigflower PS to prevent overflows upstream of Parson's siphon. Complete an options study in 2022 and detailed design/construction between 2026-2030.	\$15,000,000	S	Debt	\$400,000	\$400,000	\$0	\$0	\$0	\$0	\$400,000
21-08	Replacement	Boundary Odour Control Replacement	The Boundary UV odour control unit has failed. Based on the 2018 KWL Odour Control Assessment review, a new carbon scrubber located closer to Gorge Siphon inlet chamber maybe more effective.	\$400,000	S	Res	\$0	\$400,000	\$0	\$0	\$0	\$0	\$400,000
21-09	Renewal	Bowker Sewer Rehabilitation	Based on results of CCTV inspection about 1,685m of sewer from North Dairy to Richmond and 1,860m from Foul Bay to Currie PS needs to be relined.	\$8,600,000	S	Debt	\$4,175,000	\$8,475,000	\$0	\$0	\$0	\$0	\$8,475,000
21-10	Renewal	Sewer Cleaning and Inspection	Regional sewers should be cleaned and inspected on a 5-year cycle. The trunk sewers from Prospect to Currie PS and from Bushby to Clover PS will be inspected in 2022. The 5-year cycle will recommence in 2024.	\$600,000	S	Debt	\$75,000	\$75,000	\$0	\$150,000	\$150,000	\$150,000	\$525,000
21-11	Renewal	Manhole Repairs and Replacement	Based upon CCTV and staff inspections on manholes, high priority repairs and replacement of deteriorated MH's.	\$1,500,000	S	Debt	\$500,000	\$500,000	\$250,000	\$250,000	\$250,000	\$250,000	\$1,500,000
23-01	Renewal	Cecelia Ravine Pipe Protection	Based on geotechnical review, a section of the exposed NWT in Cecelia Ravine should be covered & protected from falling rocks upslope from the pipe.	\$300,000	S	Debt	\$0	\$0	\$300,000	\$0	\$0	\$0	\$300,000
PRESSURE PIPES AND APPURTENANCES													
21-12	Renewal	Gorge Siphon Inlet Chamber Upgrade	The control gates are siezed on this chamber and they need to be replaced so that the individual siphons can be isolated or activated.	\$500,000	S	Res	\$0	\$475,000	\$0	\$0	\$0	\$0	\$475,000
21-13	New	Craigflower Forcemain Twinning	The hydraulic model and capacity assessment of the system by KWL in 2018-19, has identified that the Craigflower Forcemain must be twinned to prevent overflows into Portage Inlet.	\$9,600,000	S	Debt	\$300,000	\$300,000	\$300,000	\$4,500,000	\$4,500,000	\$0	\$9,600,000
21-14	Renewal	Marigold Siphon Assessment	The Marigold Siphon section is a pressurized (pre-stressed concrete pipe), nearing 50 years old, and has never been assessed. Assessment and eventual replacement of the pipe is required.	\$8,300,000	S	Debt	\$400,000	\$400,000	\$0	\$0	\$7,900,000	\$0	\$8,300,000
22-02	Renewal	Gorge and Harriet Siphon Assessment	The Gorge and Harriet Siphons are ductile iron pipe, nearing 50 years old, and have never been flushed or assessed. Flushing and assessment of the pipe is required.	\$250,000	S	Res	\$0	\$250,000	\$0	\$0	\$0	\$0	\$250,000
23-02	Renewal	Penrhyn Siphon Assessment	The Penrhyn Siphon is PVC pipe, and has never been flushed or assessed. Flushing and assessment of the pipe is required.	\$400,000	S	Debt	\$0	\$0	\$400,000	\$0	\$0	\$0	\$400,000
24-07	Renewal	Parsons Siphon Assessment	The Parsons Siphons are PVC and steel pipe, and have never been flushed or assessed. Flushing and assessment of the pipe is required.	\$400,000	S	Debt	\$0	\$0	\$0	\$400,000	\$0	\$0	\$400,000
25-01	Renewal	Admirals Siphon Assessment	The Admirals Siphon is PVC pipe, and has never been flushed or assessed. Flushing and assessment of the pipe is required.	\$400,000	S	Debt	\$0	\$0	\$0	\$0	\$400,000	\$0	\$400,000
FLOW METERS													
21-15	Replacement	Parsons Meter Replacement	Based on KWL's 2018-19 Flow Meter Audit review, Parsons meter is to be replaced with two doppler meters and one magmeter on Wilfert PS (includes install of meters, kiosk and conduit).	\$250,000	S	Debt	\$225,000	\$225,000	\$0	\$0	\$0	\$0	\$225,000
21-16	New	Gorge & Chapman Meter	Based on KWL's 2018-19 Flow Meter Audit review, KWL recommended a new flodar meter to measure the unmeterecd	\$130,000	S	Debt	\$130,000	\$130,000	\$0	\$0	\$0	\$0	\$130,000
21-17	New	Esquimalt Nation Meter	Based on KWL's 2018-19 Flow Meter Audit review, KWL recommended a new custom weir, kisok and conduit to measure the unmetered Esquimalt Nation catchment.	\$200,000	S	Debt	\$200,000	\$200,000	\$0	\$0	\$0	\$0	\$200,000
21-18	New	Shoreline Trunk Meter	Based on KWL's 2018-19 Flow Meter Audit review, KWL recommended a new flodar meter to measure the unmetered Shoreline catchment. Includes installation of FloDar meter, kiosk and conduit.	\$240,000	S	Debt	\$50,000	\$240,000	\$0	\$0	\$0	\$0	\$240,000
21-19	New	Selkirk Meter	Based on KWL's 2018-19 Flow Meter Audit review, KWL recommended a new flume meter to measure the unmetered Selkirk catchment (install weir, kiosk and conduit).	\$190,000	S	Debt	\$190,000	\$190,000	\$0	\$0	\$0	\$0	\$190,000
21-20	Replacement	Haultain, Hereward, Langford Replacement	Based on KWL's 2018-19 Flow Meter Audit review, ultrasonic meters are to be replaced with new LUT-440 models.	\$40,000	S	Debt	\$40,000	\$40,000	\$0	\$0	\$0	\$0	\$40,000
21-21	Replacement	Penrhyn Meter	Based on KWL's 2018-19 Flow Meter Audit review, the ADFM insertion probe meter is damaged and needs to be replaced.	\$90,000	S	Debt	\$90,000	\$90,000	\$0	\$0	\$0	\$0	\$90,000

Service #:3.798C

Service Name:Debt - Core Area Wastewater Capital

Project List and Budget													
Project Number	Capital Expenditure Type	Capital Project Title	Capital Project Description	Total Project Budget	Asset Class	Funding Source	Carryforward from 2021	2022	2023	2024	2025	2026	5 - Year Total
GENERAL													
21-22	Study	Asset Management Plan Update	Previous condition assessment studies will be updated and incorporated into a long-term asset management plan to meet expected level-of-service requirements.	\$250,000	S	Debt	\$250,000	\$250,000	\$0	\$0	\$0	\$0	\$250,000
21-23	Study	DCC Program Development	With the completion of CAWTP and amendment of the Service Establishment Bylaw, it was noted that a DCC Program would be established to fund future wastewater projects related to growth. This project is to create the program, consult with stakeholders and prepare a new DCC bylaw.	\$400,000	S	Debt	\$100,000	\$200,000	\$0	\$0	\$0	\$0	\$200,000
21-24	Renewal	Record Drawing and Wastewater Agreement Updates	The old as-built drawings, connection points and wastewater agreements with the contributing municipalities has not been updated in many years. Updates are required to reflect changes in the system, identify clear demarcation points, and reflect updates in the LWMP.	\$600,000	S	Debt	\$50,000	\$150,000	\$100,000	\$100,000	\$100,000	\$100,000	\$550,000
21-25	Renewal	SCADA and Radio Assessment	Majority of the radio and SCADA equipment are nearing end of life, technological advances do not allow for straight replacements, funding is required for assessments of existing equipment and site requirements. Replacement will happen over many years commencing in 2022.	\$3,150,000	S	Debt	\$50,000	\$800,000	\$750,000	\$750,000	\$750,000	\$0	\$3,050,000
22-03	Renewal	Acquisition of Outstanding Right-of-Ways	Some of the infrastructure is located on privately owned land that do not have right-of-ways. A plan is being developed to acquire SRW's for all infrastructure over time. Initial spending requires a study and plan prior to acquisition.	\$1,200,000	S	Debt	\$0	\$200,000	\$0	\$0	\$1,000,000	\$0	\$1,200,000
21-26	Replacement	Annual Provisional Emergency Repairs	Unforeseen and unplanned emergency repairs can occur which require immediate attention.	\$5,000,000	S	Debt	\$0	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$5,000,000
22-04	New	Microwave Radio Upgrades	To provide a high bandwidth communications backbone to the CAWWT system, a microwave communications system will be installed.	\$200,000	S	ERF	\$0	\$200,000	\$0	\$0	\$0	\$0	\$200,000
OUTFALLS													
24-08	Renewal	Clover Point Outfall Retrofit	The existing outfall will see a significant reduction in usage once the Clover Point Pump Station is commissioned and wastewater flows up to 3 times ADWF are redirected to the McLoughlin WWTP. As a result, the existing outfall will need to be assessed for best operational and maintenance practices based on expected limited use instead of current continuous use.	\$500,000	S	Debt	\$0	\$0	\$0	\$500,000	\$0	\$0	\$500,000
25-02	Renewal	Macaulay Point Outfall Retrofit	A section of coating the emergency short outfall has failed and the pipe is corroding, and the long outfall needs to be modified to suit reduced usage. This project is to repair the coating, provide shoreline protection, and modify the deep outfall.	\$750,000	S	Debt	\$0	\$0	\$0	\$0	\$750,000	\$0	\$750,000
RESIDUAL SOLIDS													
21-29	Renewal	Quonset removal	Demo old storage facility	\$100,000	S	Debt	\$0	\$50,000	\$0	\$0	\$0	\$0	\$50,000
GRAND TOTAL				\$849,750,000			\$26,915,000	\$36,508,000	\$8,030,100	\$11,280,000	\$17,380,000	\$1,510,000	\$74,708,100

Appendix C – Long-term Budget Overview



**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, OCTOBER 13, 2021**

SUBJECT Core Area Inflow & Infiltration Program – 2021 Summary

ISSUE

To present a summary of activities and accomplishments of the Core Area Inflow & Infiltration (I&I) Program for the period of 2020 to mid-2021, including infrastructure work carried out by the participating municipalities, and efforts related to private property I&I.

BACKGROUND

The Core Area Liquid Waste Management Plan (CALWMP) sets out goals and commitments for the municipalities, First Nations and Capital Regional District (CRD) to manage I&I through the Core Area I&I Management Plan. Each year, the Core Area I&I Program documents progress toward meeting these commitments in an annual report that is distributed to each of the core area municipalities and First Nations. This staff report summarizes the highlights of that report, the full report, titled Core Area I&I Program 2021 Report, can be found through this site:

<https://www.crd.bc.ca/about/document-library/documents/plans-reports/wastewater-stormwater/2021-reports>

Overviews of municipal I&I actions, along with specific actions from this reporting period, are as follows:

- Colwood diligently inspects its new underground infrastructure to manage and prevent I&I. In 2020, Colwood started to update its Sewer Master Plan and its Sanitary Sewer Model (in progress). As part of the work, sewer flow data loggers were installed at several pump stations including three of Colwood's municipal pump stations and Department of National Defense's Belmont pump station. Colwood camera-inspected approximately 7,500 metres of sewer mains in 2020.
- Esquimalt completed an extensive infrastructure investigation between 2004 and 2016, including the relining of approximately half of its sanitary sewer system. In 2020 to mid-2021, Esquimalt completed a detailed I&I report that includes a 10-year plan for addressing I&I concerns within the township to get below 4xADWF (average dry weather flow). The action items will be combined with other sewer related projects such as those derived from sewer modeling and camera inspections. Esquimalt also carried out a number of sewer repairs and worked with CRD Source Control to determine possible cross connections into the Gorge Waterway (ongoing).

- Langford has a rapidly expanding new sewer system. Langford diligently inspects new connections and is incentivized to monitor and repair the sewer system to preserve sewer capacity for future growth. Since mid-2020, Langford has camera-inspected 2,305 metres of sewer mains and inspected 45 manholes for I&I. It also rehabilitated 27 sewer inspection chambers.
- Oak Bay is working on the Uplands combined sewer separation project. In 2020 to mid-2021, Oak Bay completed a 5-year program to camera-inspect its sanitary sewers, contracted a consultant to build a sanitary sewer model for the municipality (in progress), rehabilitated or replaced 3.66 km of sewer mains, fixed 14 cross-connections and initiated a number of specific infrastructure projects and studies.
- Saanich continues its sewer maintenance and repair program, including camera inspections, sewer relining, smoke testing and flow monitoring. In 2020/2021, Saanich relined or replaced 3,914 metres of sanitary sewer, 125 laterals and 2 manholes. It also completed 5 spot repairs. Saanich camera-inspected 5,656 metres of sewer main. It smoke tested 2,935 metres of the Brett pump station catchment and repaired 7 found cross-connections. During this reporting period, Saanich developed programs and procedures related to smoke testing, and the inspection and replacement of “no-corrode” sewer pipe, and updated its sanitary sewer model. Saanich is currently updating its sewer master plan.
- Victoria continues to manage its sewer repair and replacement work in its sewer master plan. In 2020/2021, Victoria contracted a consultant to complete a comprehensive I&I reduction plan for the municipality. Victoria installed, repaired or replaced 2,852 metres of sewer mains, 167 laterals, 4 manholes and 17 inspection chambers. It also camera-inspected 24,900 metres of sanitary sewer mains, 887 laterals, 650 manholes and added 2 high accuracy flow meters to its monitoring network. A highlight was securing a federal grant to upgrade some of its sewer, storm drain and water main infrastructure over the next 9 years to address challenges related to natural hazards (e.g., earthquakes, climate change).
- View Royal continued its programs related to sewer maintenance and repairs, camera inspections, sewer flushing and flow monitoring. In 2020/2021, View Royal camera-inspected 1,429 metres of sewer pipe. View Royal upgraded the Thetis Cove pump station, which included the addition of a flow meter. View Royal also found and fixed an abandoned sewer main that was contributing I&I to View Royal sewer system.
- Esquimalt Nation hired a consultant to inspect their sewer system and provide recommendations in 2018. Since then, the Nation followed up by removing / capping unused laterals, grouting a leaky manhole and completed a mainline repair. They also renewed/upgraded their pump station.
- Songhees Nation does routine sewer maintenance and repairs as needed. In 2015, the Nation hired a consultant to investigate their sewer system for I&I sources and to provide detailed designs for remediation. The work is ready for tender and awaiting funding from Indigenous Services Canada.

Through the Core Area I&I Program, the CRD continues to work with its municipal and First Nations partners on I&I related management and reduction efforts. This includes regional flow monitoring, standardizing I&I approaches, preparing management plans and annual reports, education programs and private property I&I initiatives. This also involves coordination with municipalities and national organizations that are dealing with similar issues. Key actions completed in 2020/2021 include:

- Updating I&I rates for the core area. Appendix A contains a map summarizing these rates.
- Comparing measured flows to the sewer flow allocations in Bylaw 4304 (Appendix B).
- Working with the CRD's Integrated Water Services Department; vetted sewer flow data and produced monthly municipal sewer reports for each of the core area participant areas - each area gets its own custom report. The key audience for the reports are municipal engineering staff and First Nation's administration. The reports quantify monthly sewer flows and compare it to previous years. They also quantify I&I rates, overflows, and periodically compare the flows to the CRD sewer allocations. The reports are distributed quarterly and started in January 2020. Appendix C contains an example of these reports.
- Working on the 5-year update to the I&I Management Plan. (The last version was submitted to the Province in April 2017).
- Finalizing a project documenting the flow data accuracy from core area municipal pump stations.
- Completing a study looking at downspout disconnection programs and best practices from around Canada.

The work accomplished by all participants will continue to support the regional effort to control and reduce municipal I&I flow rates; however, continued and focused work is still needed to meet the CALWMP commitment of reducing wet weather flows below four times average dry weather flow at the Clover Point and McLoughlin Point wastewater treatment plants by 2030. Municipalities that contribute to Clover Point with older sewers, and inherently higher I&I, will need to allocate additional resources and accelerate efforts to meet their respective I&I reduction targets.

ALTERNATIVES

Alternative 1

That the Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:

That this report be received for information.

Alternative 2

That staff report back to the committee with further information.

IMPLICATIONS

Environmental & Climate Implications

The work documented in the report supports CALWMP commitments related to reducing overflows, which will have a positive impact on local creeks, beaches and ecosystems.

Intergovernmental Implications

As a condition of the Ministry of Environment & Climate Change Strategy's (ENV) conditional approval of Amendment 12 to the CALWMP, the CRD was required to submit an amendment to the commitments pertaining to management of I&I and sanitary sewer overflows for ENV approval by December 31, 2021. Staff have advised ENV that updating the CALWMP I&I and sanitary overflow commitments will be delayed, pending:

1. Operation of all new core area wastewater treatment and conveyance infrastructure during two wet-weather seasons to confirm modelled predictions for sanitary flows, I&I and overflows.
2. Submission of updated detailed municipal I&I management plans, currently anticipated for Q2 2022.

In addition to the above, the CRD is currently preparing to update the CALWMP, which will also require an amendment process approved by ENV. The CRD's current planning process anticipates the update to be prepared for submission in 2023, and staff expect to include the above amendment at that time.

Social Implications

Reduced I&I and overflows will reduce the number of beach closures and impacts on the natural environment. Public education and outreach programs for residents and businesses raise awareness of the issues and provide greater understanding of how everyone can contribute to I&I reduction.

Financial Implications

The CRD engages with core area municipalities and First Nations to identify and reduce the amount of rain and ground water that enters the sanitary sewer system. The core budget for this program is \$425,000.

Municipal infrastructure repair initiatives are funded by the respective municipality. Monitoring, reporting, strategy and leadership are facilitated by the CRD I&I program.

CONCLUSION

This staff report summarizes the I&I related activities and accomplishments of Core Area I&I Program, participating municipalities and First Nations for 2020 to mid-2021. While much work has been done to date, modelling indicates that municipalities contributing to Clover Point, with older sewer catchments, need to enhance their efforts on I&I reduction to meet the commitment

in the CALWMP to prevent overflows for less than 5-year rainfall events by 2030. The annual report will be forwarded to the core area municipal engineers for use in their I&I reduction programs.

RECOMMENDATION

That the Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:

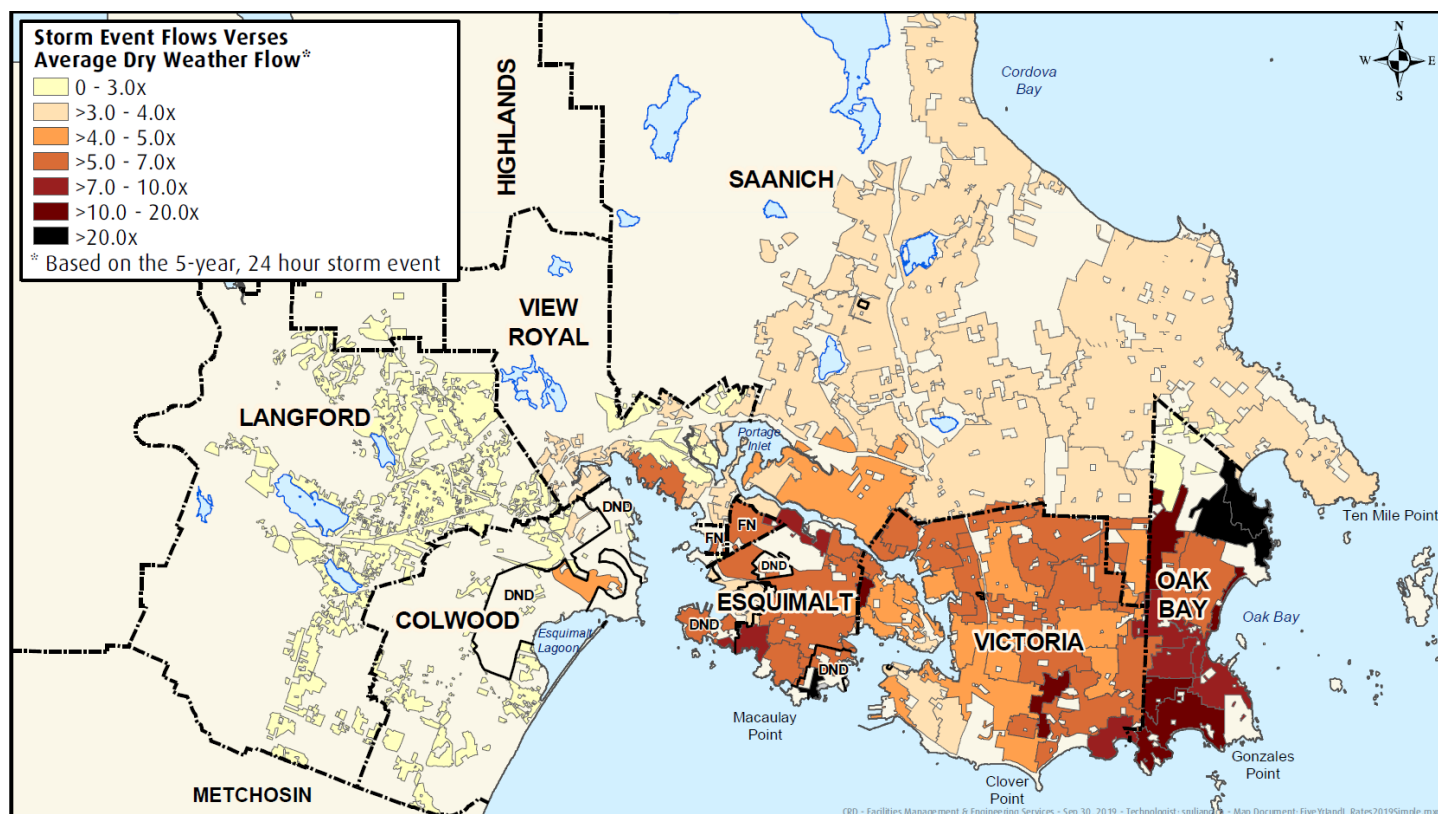
That this report be received for information.

Submitted by:	Stephen May, P.Eng., Senior Manager, Facilities Management & Engineering Services
Concurrence:	Larisa Hutcheson, P.Eng., General Manager, Parks & Environmental Services
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

ATTACHMENTS

- Appendix A: Map Summarizing Inflow & Infiltration in the Capital Regional District's Core Area
- Appendix B: Table Comparing Measured Flows to Allocated Flows in Bylaw 4304
- Appendix C: Example of the Monthly Sewer Reports Distributed to the Core Area
Municipalities and First Nations

Inflow & Infiltration Rates Map for the Capital Regional District Core Area (2021)



Measured Flows vs Allocated Flows from Bylaw 4304

Allocation Point	Allocated Average Dry Weather Flow (ML/day)	Measured Average Dry Weather Flow (Jun + Jul + Aug, 2020)		Allocated Peak Daily Flow (ML/day)	Peak 24-Hour Flow for a 5-Year Storm	
		ML/day	% of Allocated Capacity		ML/day	% of Allocated Capacity
COLWOOD						
Total (Parson's minus Meaford)	4.70	2.92	62%	18.8	8.20	44%
ESQUIMALT						
Esquimalt Panhandle	0.12	0.10	87%	0.48	0.46	96%
Lang Cove Pump Station	1.28	0.63	49%	5.12	2.93	57%
Dockyard	1.01	0.48	48%	4.04	3.89	96%
Kinver	0.44	0.25	56%	1.76	2.25	128%
Pooley Place <i>(Flows are based on a correlation with an adjacent catchment. Catchment is not suitable for metering due to small size and multiple connections to the CRD system.)</i>	0.06	0.04	67%	0.24	0.21	87%
Devonshire	1.85	1.56	84%	7.40	10.00	135%
Wilson	0.37	0.25	69%	1.48	1.29	87%
Head	1.68	1.30	78%	6.72	6.75	100%
Anson	0.24	0.02	7%	0.97	0.63	65%
Total	7.09	4.63	65%	28.36	28.40	100%
LANGFORD						
Total (Meaford)	14.12	7.48	53%	56.48	11.71	21%
OAK BAY						
Windsor	2.92	1.30	45%	11.68	18.01	154%
Humber (combined sewers)	0.60	0.42	71%	2.40	4.29	177%
Rutland (combined sewers)	0.37	0.31	83%	1.48	5.92	400%
Currie Net <i>(Flows won't be suitable for comparing to the bylaw allocations until the treatment plant conveyance system upgrades are complete in late 2021.)</i>	0.97	2.04	211%	3.88	n/a	>125%
Currie Lift Station	1.62	1.35	83%	6.48	12.43	192%
Harling Point Pump Station	0.20	0.09	46%	0.79	2.00	255%
Total <i>(Flows won't be suitable for comparing to the bylaw allocations until the treatment plant conveyance system upgrades are complete in late 2021.)</i>	6.62	5.51	83%	26.48	n/a	>175%

Allocation Point	Allocated Average Dry Weather Flow (ML/day)	Measured Average Dry Weather Flow (Jun + Jul + Aug, 2020)		Allocated Peak Daily Flow (ML/day)	Peak 24-Hour Flow for a 5-Year Storm	
		ML/day	% of Allocated Capacity		ML/day	% of Allocated Capacity
SAANICH						
Marigold PS	13.19	9.89	75%	52.76	34.50	65%
City Boundary	5.88	2.71	46%	23.52	10.50	45%
Harriet	3.27	2.06	63%	13.08	9.36	72%
Townley	0.61	0.39	63%	2.44	2.07	85%
Haultain	0.57	0.18	31%	2.27	1.21	53%
Arbutus	7.08	5.93	84%	28.31	20.95	74%
Haro	0.79	0.18	23%	3.17	0.95	30%
Penrhyn Lift Station	0.93	0.79	85%	3.73	2.74	74%
Total	32.89	22.12	67%	131.56	82.29	63%
VICTORIA						
Cecelia	3.14	2.31	74%	12.57	11.70	93%
Chapman & Gorge <i>(Flows are based on a correlation with an adjacent catchment. Plans are in place to install a meter)</i>	0.35	0.99	281%	1.40	4.98	356%
Selkirk <i>(Flows are based on a correlation with an adjacent catchment. Plans are in place to install a meter)</i>	0.28	0.10	36%	1.11	0.39	35%
Langford - Vic West	0.19	0.10	51%	0.77	1.18	154%
Hereward	1.91	1.84	96%	7.65	7.20	94%
Sea Terrace <i>(The flume surcharges during large storms. Because of this, the Peak 24hr flows are based on a correlation with an adjacent catchment. Options are being explored to address this issue.)</i>	0.33	0.17	52%	1.32	1.50	114%
Trent Net	7.33	5.32	73%	29.32	40.8	139%
Hollywood	0.54	0.66	121%	2.16	7.00	323%
Olive	23.06	17.13	74%	92.24	57.87	63%
Clover Net <i>(The catchment is not suitable for metering due to small size and multiple connections to the CRD system. As a result, the flows are based on a calculation.)</i>	1.50	1.92	128%	6.01	7.68	128%
Total	38.30	28.52	74%	153.19	140.31	92%

Allocation Point	Allocated Average Dry Weather Flow (ML/day)	Measured Average Dry Weather Flow (Jun + Jul + Aug, 2020)		Allocated Peak Daily Flow (ML/day)	Peak 24-Hour Flow for a 5-Year Storm	
		ML/day	% of Allocated Capacity		ML/day	% of Allocated Capacity
VIEW ROYAL						
Craigflower Pump Station	3.54	1.92	54%	14.16	7.10	50%
Shoreline Trunk	0.14	0.12	85%	0.55	0.50	91%
Total	3.54	2.04	58%	14.16	7.1	50%
ESQUIMALT NATION						
Esquimalt Nation <i>(Flows are calculated. Plans are in place to install a meter)</i>	0.07	0.06	79%	0.28	0.35	126%
SONGHEES NATION						
Songhees Nation	0.59	0.48	81%	2.36	3.08	131%
Maplebank	0.010	0.005	50%	0.04	0.005	13%
Total	0.63	0.48	77%	2.52	3.09	122%

CRD IWS
Core Area Wastewater System

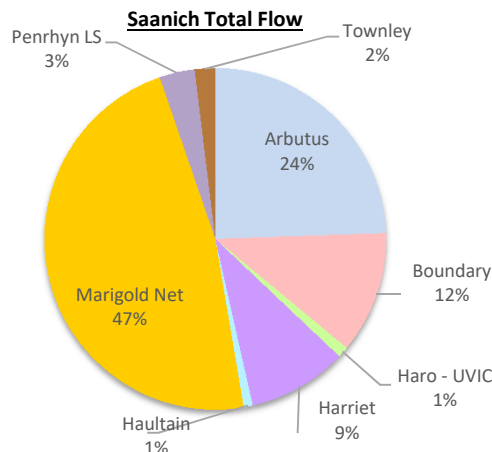
Monthly Wastewater Flow Report for Saanich - November 2020

Disclaimer: The data used in this report is considered preliminary. It may be further corrected in the annual cost requisition report.

1. Monthly Wastewater Flow Data: Nov 2020

This data summarizes the volume of flow measured from catchments contributing to Saanich's total flow (map on page 3).

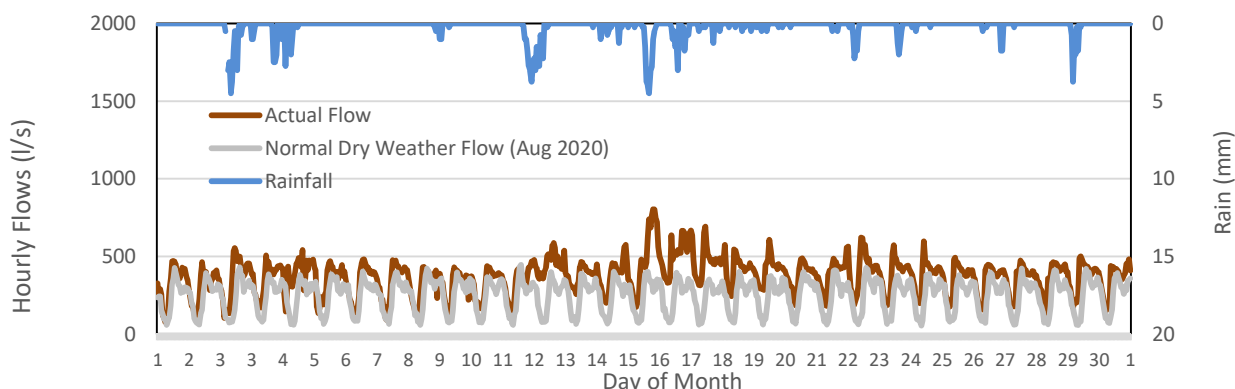
Flow Meter Name	Total Monthly Flow	
	m ³	%
Arbutus	235,905	24%
Boundary	111,578	12%
Haro - UVIC	10,113	1%
Harriet	90,688	9%
Haultain	8,351	1%
Marigold Net	457,052	47%
Marigold PS	511,005	
(Minus Hartland Leachate)	- 53,953	
Penrhyn LS	32,241	3%
Townley	18,717	2%
Monthly Flow	964,645	100%



SAANICH FLOW = Marigold Net + Boundary + Harriet + Townley + Haultain + Arbutus + Haro + Penrhyn

2. Saanich Hourly Sewer Flows Nov 2020

This graph shows actual flow (brown) and rainfall (blue), per day, for the month and compares it to normal dry weather flow (grey).



3. Key Wastewater Flow Stats: Nov 2020

Overflows (monitored by CRD): Nov 2020

Metric	Flow (m ³) ¹
Total Monthly Flow	964,645
Average Daily Flow	32,155
Minimum Daily Flow	25,752
Peak 24hr Flow (PWVF) ²	47,453
Peak 1hr Flow ³	69,441
Average Dry Weather Flow (ADWF) ⁴	22,118
Estimated Daily Domestic Flow ⁵	16,608

Location	Date
Finnerty Outfall	None

¹ Excludes overflows that may have occurred (overflow volumes are not measured).

² Calculated as maximum rolling 24 hr flow for the month.

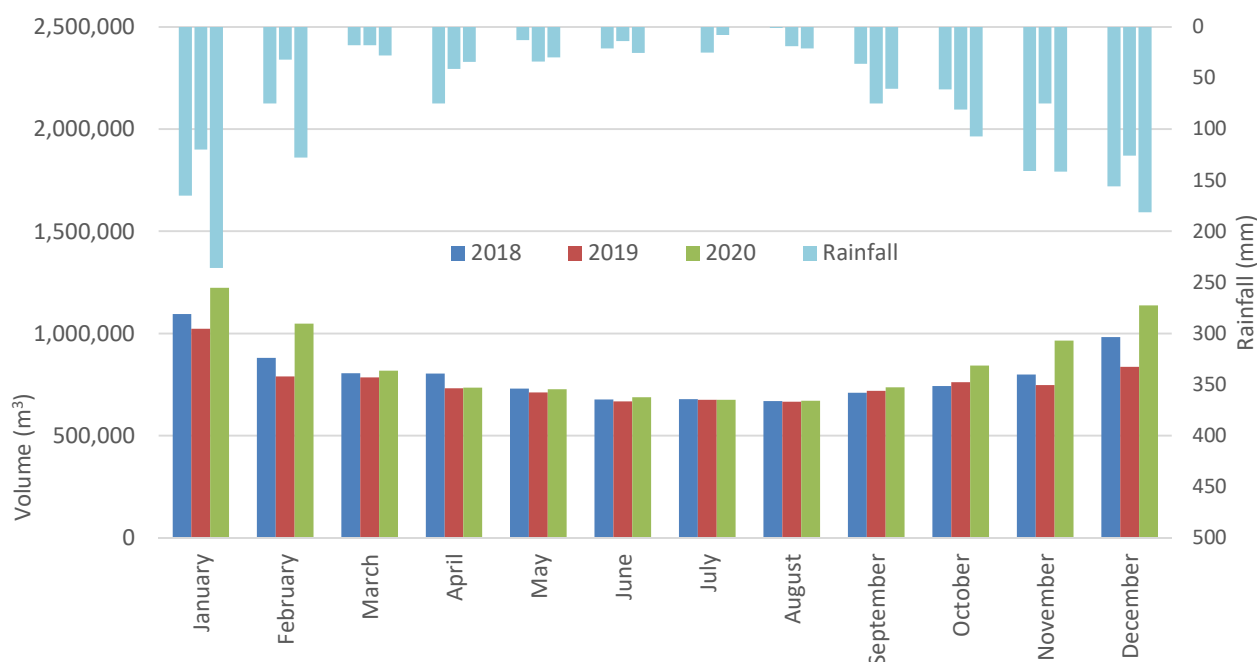
³ Expressed as 24 hour flow (peak 1 hr flow x 24).

⁴ Average daily flow from most recent Jun 1 to Aug 31 data. Includes groundwater infiltration over that period.

⁵ Calculated as ADWF minus summer groundwater (70% of minimum hourly flow x 24 hours).

4. Monthly Wastewater Flow: Historical vs. Current

This graph shows the total Saanich flow for each month and compares it with previous years.



5. Inflow & Infiltration Flow Summary: Nov 2020

Key I&I Metrics	Value ¹
Total Monthly Flow (m ³)	964,645
Estimated Domestic Flow for Month (m ³) ²	498,244
I&I Volume for Month (m ³) ³	466,401
I&I Volume for Month (% total flow)	48%
Peak 24hr Flow (PWWF) ⁴	2.1 x ADWF
Peak 1hr Flow ⁵	3.1 x ADWF

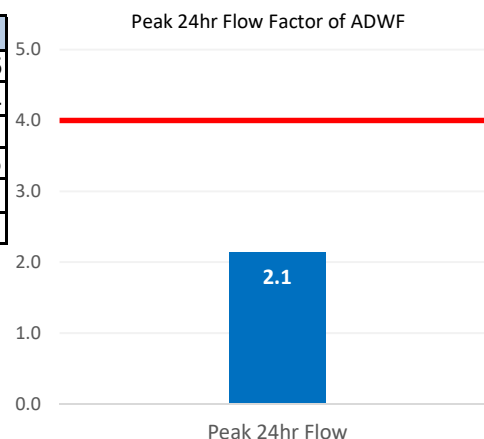
¹ Excludes overflow volume

² Determined by (Est. Daily Domestic flow from section 3.) x (number of days per month)

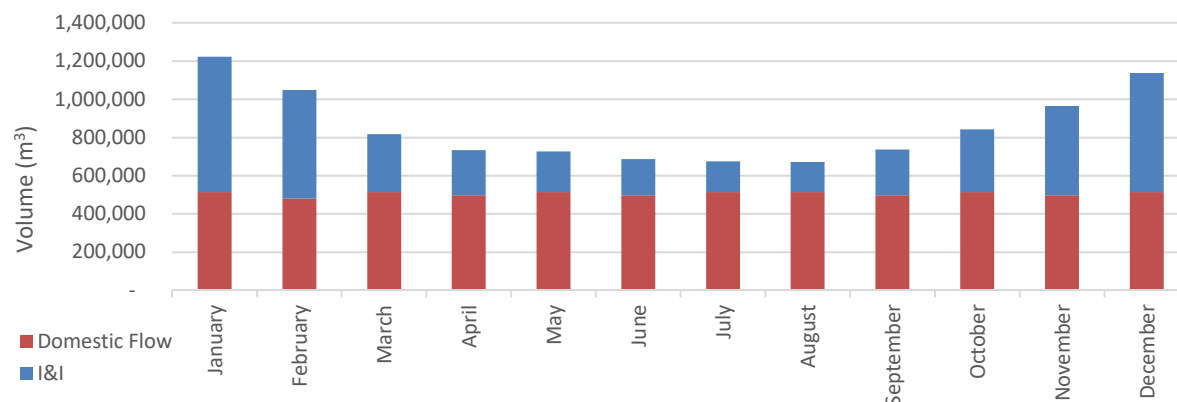
³ Determined by subtracting Estimated Domestic Flow from Total Monthly Flow

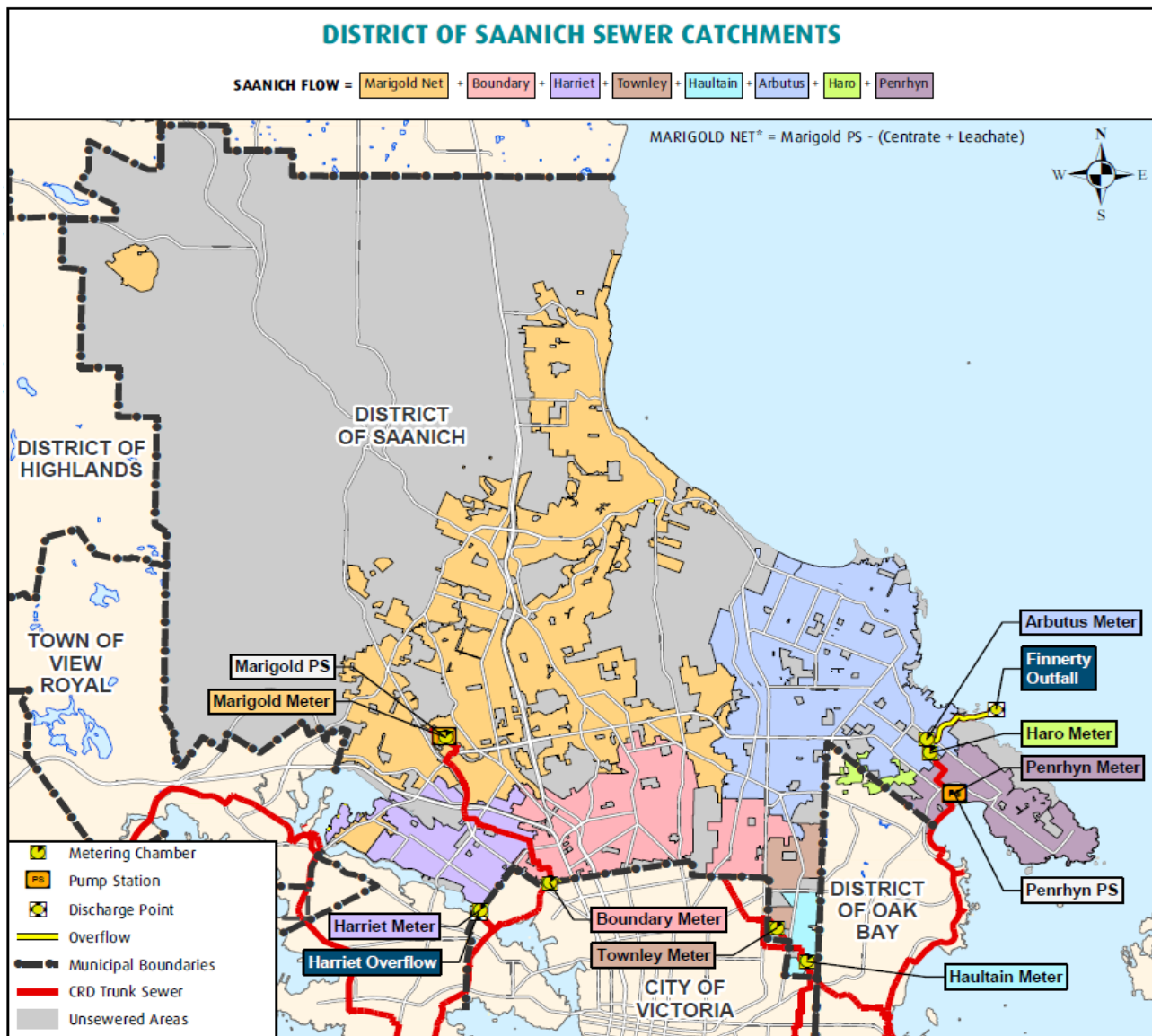
⁴ Determined by dividing Peak 24hr Flow from section 3. by ADWF

⁵ Determined by dividing Peak 1hr Flow from section 3. by ADWF



6. Monthly Flows: I&I and Domestic Flow (2020)

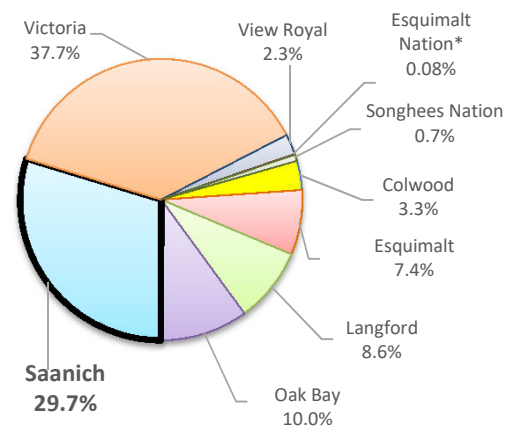




7. Regional Flow Data: Nov 2020

Participant Area	Total Monthly Flow	
	m ³	%
Colwood	108,796	3.3%
Esquimalt	241,596	7.4%
Langford	280,509	8.6%
Oak Bay	326,535	10.0%
Saanich	964,645	29.7%
Victoria	1,224,481	37.7%
View Royal	75,982	2.3%
Esquimalt Nation*	2,725	0.08%
Songhees Nation	23,902	0.7%
Total	3,249,171	100.0%

*Flows are calculated based on engineering estimates



**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, OCTOBER 13, 2021**

SUBJECT **Core Area Wastewater Treatment Project Closeout**

ISSUE SUMMARY

To provide the Core Area Liquid Waste Management Committee (CALWMC) with the Core Area Wastewater Treatment Project closeout summary.

BACKGROUND

In May 2021, the Capital Regional District (CRD) Board received the *CRD Wastewater Treatment Project - Project Completion Report* (Appendix A – Completion Report) and the *CRD Wastewater Treatment Project Governance Transition Report* (Appendix B – Transition Report). The reports presented an outline of the Project-related commitments and activities that were to extend beyond May as well as committed funds associated with fulfilling the remaining items.

In July 2021, the CALWMC received a report that provided an update on the wastewater system commissioning, operation, and construction completion status. The construction across all of the Project components is now substantially complete. Although staff will continue to work with the various contractors and consultants to address final construction deficiencies and deliverables, these will be relatively minor in scope and not material in value.

Given the status of the Project, staff have determined that this is an appropriate time to close out the Project budget at the end of 2021.

Project Budget Summary

The Business Case established the Control Budget of \$765 million. In May 2019 the CRD Board approved an increase in the Project's budget by \$10 million to \$775 million.

Table 8 in the Completion Report summarized the comparison of total forecast cost against the allocated control budget. The total forecast cost to completion in May 2021 was \$766.7 million, leaving \$8.3 million in Program Reserve for a total of \$775 million. The total forecast cost to final completion is now \$768.7 million as the forecast cost to completion for third party commitments is now \$10.5 million, reducing the Program Reserve to \$6.3 million to remain within the \$775 million budget. Appendix C provides a more detailed Project Cost Report as of September 30, 2021 with cost forecast to final completion. Staff will transfer the Program Reserve from the project to the service's operating reserve to fund potential Project liabilities that arise on a go forward basis.

With regard to the third party commitments, the Transition Report referenced the committed project funding for obligations remaining to be fulfilled in the Project's Land Access Agreements and Agreements with First Nations, including Transport Canada, Township of Esquimalt, City of Victoria, City of Colwood, District of Saanich and WSANEC Leadership Council. It is anticipated that the agreement payments will be negotiated and issued by year end, or where necessary, project funds will be held in reserve for on-going payments.

Table 5 in the Transition Report summarized the status of the Project's funding agreements at May 2021 including agreements with the Federal Government, the Province of BC, and the Federation of Canadian Municipalities (FCM) Green Municipal Fund grant/loan program. During the months of June and July, the CRD received the final \$5 million holdback of federal funding from the Green Infrastructure Fund. The CRD also received the \$20 million loan from FCM, and the additional \$2.75 million in grant funding. Cumulatively, the CRD has received \$358.8 million of the estimated \$462.3 million in eligible grant revenue. The remaining (up to) \$103.5 million is expected to be received by the end of the year.

ALTERNATIVES

Alternative 1

The Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:

That Core Area Wastewater Treatment Project Closeout Report be received for information.

Alternative

The Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:

That the Core Area Wastewater Treatment Project Closeout Report be referred back to staff for additional information.

IMPLICATIONS

Any Project liabilities that drive a financial impact that cannot be accommodated with the Program Reserve will be brought to the Committee for consideration. Likewise, in the event there is a grant funding shortfall that cannot be accommodated with the Program Reserve will also be brought to Committee for consideration.

CONCLUSION

Construction across all of the Project components is now substantially complete. Given the status of the Project, staff have determined the end of 2021 is an appropriate time to closeout the Project budget. The total forecast cost to final completion is \$768.7 million as the forecast cost to completion for third party commitments is now \$10.5 million, reducing the Program Reserve to \$6.3 million to remain within the \$775 million budget. Cumulatively, the CRD has received \$358.8 million of the estimated total of \$462.3 million in eligible grant revenue. The remaining (up to) \$103.5 million is expected to be received by the end of the year.

RECOMMENDATION

The Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:

That Core Area Wastewater Treatment Project Closeout Report be received for information.

Submitted by:	Ted Robbins, B.Sc., C.Tech., General Manager, Integrated Water Services
Concurrence:	Nelson Chan, MBA, FCPA, FCMA, Chief Financial Officer
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

ATTACHMENTS

Appendix A: CRD WTP Project Completion Report
Appendix B: CRD WTP Governance Transition Report
Appendix C: Project Cost Report



**Wastewater
Treatment Project**
Treated for a cleaner future

CRD Wastewater Treatment Project

Project Completion Report

Reporting Period: May 2016 to May 2021

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1 Executive Summary

1.1 Wastewater Treatment Project

The Wastewater Treatment Project (the Project) provides tertiary treatment of wastewater from the core area municipalities of Victoria, Esquimalt, Saanich, Oak Bay, View Royal, Langford and Colwood, and the Esquimalt and Songhees Nations.

The Wastewater Treatment Project was built to meet the provincial and federal regulations for treatment by December 31, 2020. The Project consists of three main components:

- **McLoughlin Point Wastewater Treatment Plant:** located at McLoughlin Point in Esquimalt, the treatment plant provides tertiary treatment to the core area's wastewater.
- **Residuals Treatment Facility:** residual solids from the wastewater treatment plant are piped to a Residuals Treatment Facility at Hartland Landfill, where they are turned into what are known as Class A biosolids. These biosolids are a high-quality byproduct treated such that it is safe for further use.
- **Conveyance System:** the conveyance system refers to the 'pumps and pipes' of the Wastewater Treatment Project. This system carries wastewater from across the core area to the treatment plant, and residual solids to the Residuals Treatment Facility at Hartland Landfill, and also includes an attenuation tank that temporarily stores wastewater flows during high volume storm events to reduce the number of sewer overflows.

The Capital Regional District (the CRD) planned, procured and constructed the Wastewater Treatment Project over the period from May 2016 to May 2021, with some obligations remaining to be fulfilled beyond that date, as summarised in Section 7 of this report. The federal and provincial governments assisted the Capital Regional District in funding the project.

1.2 Project Performance

1.2.1 Achievement of Project Goals

The CRD Board established the following four goals for the Wastewater Treatment Project:

- Meet or exceed federal regulations for secondary treatment by December 31, 2020.
- Minimize costs to residents and businesses (lifecycle costs) and provide value for money.
- Optimize opportunities for resource recovery and greenhouse gas reduction.
- Deliver a solution that adds value to the surrounding community and enhances the liveability of neighbourhoods.

The Wastewater Treatment Project met all four of these goals.

The McLoughlin Point Wastewater Treatment Plant met and exceeded federal regulations when it commenced treating the Core Area's wastewater to a tertiary level before December 31, 2020. Lifecycle costs were considered at every stage of Project planning and delivery in order to minimize the costs to residents and businesses, and provide value for money. By way of example:

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- Starting at the planning stage, a cost effective Project scope and configuration were selected and funding agreements were executed with senior levels of government for a significant portion (60%) of the Project's total cost;
- During the procurement stage competitive selection processes were used to ensure competitive pricing was received for the construction of the Project, and the lifecycle costs of the Project's facilities were evaluated as part of those procurements;
- Lifecycle costs were also considered during design development; and
- Proactive risk management was undertaken at every stage of Project delivery.

Environmental considerations were part of every major decision for the Project, with the result that:

- residual solids produced by the McLoughlin Point Wastewater Treatment Plant are processed into Class A biosolids at the Residuals Treatment Facility: this is the highest quality product allowing for the broadest range of beneficial uses; and
- the design of each of the new major Project facilities (being the McLoughlin Point Wastewater Treatment Plant, the Residuals Treatment Facility and the Macaulay and Craigflower Pump Stations) incorporated Leadership in Energy and Environmental Design (LEED) principles.

To enhance the livability of neighbourhoods, the Wastewater Treatment Project worked with the surrounding communities to identify amenities and/or infrastructure improvements that were either funded by the Project, or funded and delivered by the Project. In addition and in order to minimize the impact of the Project on host communities, all Project components include advanced odour treatment such that there will be no discernible odour by residents.

Section 5.1 of this report provides more detail regarding how each of the Project's goals were achieved.

1.2.2 Key Performance Indicators at Project Completion

The realization of the Project's vision and goals was monitored against the key performance indicators approved by the Project Board. The Project Director reported performance against these key performance indicators to the Project Board on a monthly basis, and their status at Project Completion has been assessed to be as shown in Table 1.

Safety was the Project's top priority: safety of the public, construction workers and CRD staff, including those responsible for delivery of the Project and for its ongoing operation and maintenance. As of May 2021, the vast majority of construction has been completed (the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining) with zero fatalities and a safety-first culture maintained within the CRD and all Project Contractors.

Schedule was a critical Project driver, specifically the need to meet or exceed federal regulations for secondary treatment by December 31, 2020. As already noted, the McLoughlin Point Wastewater Treatment Plant met and exceeded federal regulations when it commenced treating the Core Area's wastewater to a tertiary level before December 31, 2020, and, through the addition of the Project components to the core area wastewater system, the system can be operated in compliance with provincial and federal wastewater regulations.

Cost was an important consideration throughout Project planning and delivery. While the total Project cost will not be known until total completion of all contracts, which is anticipated to occur

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in the last quarter of 2021, it is forecast that the total Project cost will be approximately \$766.7M, which is within the approved budget of \$775M. The total Project cost is therefore forecast to exceed the Project's Control Budget (of \$765M) by 0.2%, but be well within the budget subsequently-approved by the CRD Board (of \$775M).

Over the period of Project delivery, budget pressures included inflation in the cost of labour and materials and design changes from stakeholder input. Considering the constraints of the Project's schedule (which necessarily required an ambitious schedule in order to meet the federal regulations for treatment of wastewater by December 31, 2020) and the onset and continuation of a global health pandemic over the final year of the Project's construction schedule, delivering the Project within 0.2% of the Project's original budget is a significant achievement.

APPENDIX A*Table 1 – Status of Key Performance Indicators at Project Completion*

Key Performance Indicator			Comments
Safety	Deliver the Project safely with zero fatalities and a total recordable incident frequency (TRIF) of no more than 1*.		As of May 2021, the vast majority of construction has been completed (the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining), there have been zero fatalities and the TRIF was 1.5. While this exceeds the Project's ambitious target of no more than 1, it was less than half the industry average: WorkSafe BC records the TRIF for various industries, and for 2018 (the most recent year for which information has been published) the TRIF for heavy construction was 3.2.
Environment	Protect the environment by meeting all legislated environmental requirements and optimizing opportunities for resource recovery and greenhouse gas reduction.		The Project met all legislated environmental requirements and, through the design of the various components optimized opportunities for resource recovery and greenhouse gas reduction. Over the course of construction there were a relatively small number of environmental incidents: they were all diligently-managed, appropriately-reported and mitigated as required, with the result that there weren't any long-term impacts. An unexpectedly-significant environmental benefit of the Project included the remediation of McLoughlin Point.
Regulatory Requirements	Deliver the Project such that the Core Area complies with provincial and federal wastewater regulations.		Through the addition of the Project components to the core area wastewater system, the system can be operated in compliance with provincial and federal wastewater regulations.
Stakeholders	Continue to build and maintain positive relationships with First Nations, local governments, communities, and other stakeholders.		Significant efforts were made to engage with and provide accurate and timely information to stakeholders throughout the delivery of the Project. Through these efforts and the achievement of the Project's goals, positive relationships were built and maintained with First Nations, local governments, communities, and other stakeholders.
Schedule	Deliver the Project by December 31, 2020.		The Project completed the majority of construction by December 31, 2020, and achieved its schedule-related goal, which was to meet or exceed federal regulations for secondary treatment of wastewater by December 31, 2020. All aspects of the Project that were required to meet the regulatory requirements were delivered by December 31, 2020. As of May 2021, commissioning of the Residuals Treatment Facility is ongoing and is anticipated to be complete in June 2021, and the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining.
Cost	Deliver the Project within the Control Budget (\$765 million).		While the total Project cost will not be known until total completion of all contracts, which is anticipated to occur in the last quarter of 2021, it is forecast that the total Project cost will be approximately \$766.7M, which is within the approved budget of \$775M. The total Project cost is therefore forecast to exceed the Project's Control Budget (of \$765M) by 0.2%, but be well within the budget subsequently-approved by the CRD Board (of \$775M).

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* A TRIF of no more than 1 means that there is 1 or fewer recordable incidents (being a work-related injury or illness that requires medical treatment beyond first aid or causes death, days away from work, restricted work or transfer to another job, or loss of consciousness) for every 200,000 person-hours of work

Status	Description
	Significant adverse effect of KPI not being met
	KPI not met but outcome managed
	KPI achieved

Section 5.2 of this report provides more detail regarding Project delivery with respect to the Project's key performance indicators.

1.3 Purpose of this Project Completion Report

The purpose of this Project Completion Report is to mark the completion of the Wastewater Treatment Project by:

- assessing the Project's performance against the goals established by the CRD Board (see section 5.1) and the key performance indicators approved by the Project Board (see section 5.2);
- identifying variances from the baseline plans prepared by the Project Board and/or Project Team, in terms of the Project's scope (see section 4), schedule (see section 5.2.5) and cost (see section 5.2.6);
- identifying Project successes and challenges (see section 6); and
- outlining the Project-related commitments and activities that extend beyond May 2021 (see section 7).

Note that another document (the Governance Transition Report) provides more details regarding the project closure activities that have been completed to-date, and the Project-related commitments that extend beyond May 2021.

2 Project Context

2.1 Project Need

The Capital Regional District (CRD) was incorporated in 1966 to provide regional decision-making on issues that transcend municipal boundaries and to enable effective service delivery to residents regionally, sub-regionally and locally. Today, the CRD is the regional government for 13 municipalities and three electoral areas on southern Vancouver Island and the Gulf Islands, serving more than 425,000 people.

The Core Area of the CRD includes seven municipalities and two First Nations within the CRD with a total land area of approximately 215 km². The Core Area communities are the Cities of Victoria, Langford, and Colwood, the Districts of Oak Bay and Saanich, the Township of Esquimalt, the Town of View Royal, and the Songhees and Esquimalt Nations. One of the services that the CRD provides for the Core Area is the regional sewage system, which serves a population of approximately 320,000 (as estimated in 2019) in the Core Area.

Until 2020, all wastewater from the Core Area was conveyed to preliminary treatment facilities at Clover Point in Victoria and Macaulay Point in Esquimalt, where it was screened prior to marine discharge. Preliminary treatment was provided by 6 mm fine screening to remove rocks and solids, plastic, and floatable materials. The removed materials were trucked to, and disposed of, at the Hartland Landfill. No other treatment occurred prior to the wastewater being discharged into the marine environment from one of two outfalls, located at Clover Point and Macaulay Point. The CRD was the last major coastal community in North America discharging untreated sewage into the marine environment.

Provincial Municipal Wastewater Regulations (“MWR”) under the Environmental Management Act came into effect in 2012 to, “protect public health and the environment”. The Municipal Wastewater Regulations prescribes the minimum standards of municipal wastewater quality for marine water, fresh water, or ground discharge.

Federal Wastewater System Effluent Regulations (“WSER”) under the Fisheries Act also prescribe effluent quality performance standards. WSER's objective is to decrease the level of deleterious and harmful substances discharged through wastewater effluent. Facilities discharging effluent quality not equivalent to or better than the secondary treatment performance standards are required to be upgraded. Facilities considered high risk, such as those at Macaulay Point and Clover Point were required to be upgraded by December 31, 2020, in accordance with the deadline set out in the transitional authorizations for those facilities.

Failure to comply with the WSER and the MWR could have resulted in regulatory enforcement action in the form of prosecution, fines, imprisonment, and other remedial penalties.

2.2 First Nations

The Core Area, and therefore the Project components, lie within or near the traditional territories of 16 First Nations.

The First Nations most closely associated with the Wastewater Treatment Project are the Esquimalt and Songhees. Their communities are located in the Core Area within close proximity to the McLoughlin Point Wastewater Treatment Plant and other Project components. The

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Esquimalt and Songhees First Nations are participants in the Core Area Liquid Wastewater Service and the CRD is currently establishing updated service agreements with the Nations.

There are four First Nations with communities near the Core Area, but outside the Core Area wastewater system. They are the Tsawout, Tseycum, Tsartlip, and Pauquachin (the W̱SÁNEĆ Nations). The Residuals Treatment Facility and parts of the Conveyance System are located within their traditional territories.

Additionally, there are ten other First Nations with Treaty rights in the general vicinity of the Core Area, which are primarily fishing rights in the Strait of Juan de Fuca. These Nations are the Scia'new (Beecher Bay), Stz'uminus, Halalt, Penelakut Tribe, T'Sou-ke, Lyackson, MÁLEXEL (Malahat), Lake Cowichan, Cowichan Tribes, and Nanoose First Nation (which is included because it is represented by a tribal association, the Te'mexw Treaty Association, which was formed by some of these Nations).

3 Project Delivery

3.1 Governance

3.1.1 CRD Board

The CRD is governed by a 24-member Board of Directors, composed of one or more elected official from each of the local governments within the CRD's boundaries.

In order to meet federal and provincial wastewater regulations, on May 25, 2016 the Regional Board of the CRD (the “CRD Board”) established the Wastewater Treatment Project Board (the “Project Board”) under Bylaw 4109 (the “CRD Core Area Wastewater Treatment Board Bylaw No. 1, 2016”) for the purposes of administering the Project. The CRD Board adopted by resolution terms of reference (“Terms of Reference”) for the Project Board for the purposes of establishing principles governing the Project. The Terms of Reference are attached as Schedule “A” to the CRD Core Area Wastewater Treatment Board Bylaw No. 1, 2016. The CRD Board asked the Project Board to review the wastewater treatment issues and, by September 2016, recommend to the CRD and senior levels of government a plan to comply with the law and to preserve senior government funding.

On May 25, 2016 the CRD Board also delegated certain of its powers, duties and functions to the Project Board under Bylaw 4110 (the “CRD Core Area Wastewater Treatment Project Board Delegation Bylaw No. 1, 2016”). Notwithstanding the delegation of authority from the CRD Board to the Project Board, the delegation bylaw included the requirement that approval from the CRD Board would be required for any alteration to the scope, schedule or budget of the Project that would result in the Project not meeting provincial and federal regulations governing the Project, exceeding approved funding for the Project, or increasing costs to taxpayers from those stated in the Business Case.

The CRD Board had previously established the CRD Core Area Liquid Waste Management Committee (“CALWMC”) to oversee and make recommendations to the CRD Board regarding the Core Area Liquid Waste Management Plan, and progress on the Project was reported to the CRD Board through the CALWMC.

3.1.1.1 Project Vision and Goals

The Project Board’s Terms of Reference (as established by the CRD Board) included the following vision for the Project:

- Deliver a sewage treatment and resource recovery system that is innovative, achievable and optimizes benefits - economic, social and environmental (including climate change mitigation) - for the long term.
- Approach the Project from the perspective that waste materials should be treated as resources and managed as such, with a long term objective to create a system that supports the principles of Integrated Resource Management (“IRM”).
- Give consideration to, and reflect, public input received with an objective of being responsive to community values and concerns.

The Terms of Reference included the following goals to support achieving the vision:

- Meet or exceed federal regulations for secondary treatment by December 31, 2020.

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- Minimize costs to residents and businesses (lifecycle costs) and provide value for money.
- Optimize opportunities for resource recovery and greenhouse gas reduction.
- Deliver a solution that adds value to the surrounding community and enhances the liveability of neighbourhoods.

3.1.2 Project Board

In accordance with the bylaw that established it (the “CRD Core Area Wastewater Treatment Board Bylaw No. 1, 2016”), the Project Board consisted of seven members appointed by the CRD Board, one of whom was the Chief Administrative Officer of the CRD.

The Project Board’s role and function as defined in the Terms of Reference was as follows:

- Be responsible for overall planning, Project management, site acquisition, expenditures, and liquid waste management planning for the purposes of the Project.
- Select a Project Director to oversee all aspects of the Project.
- Provide direction and guidance to the Project Director on Project matters, including the development of a decision making framework, business priorities, strategies and resource approval, and appropriate Project controls and reporting procedures.
- Manage the development of a comprehensive Business Case for submission to the federal and provincial governments to confirm funding to proceed to Project implementation.
- Appoint or confirm advisors including fairness advisor and conflict of interest adjudicator.
- Oversee Project scope, schedule and budget as the Project progresses through planning, procurement and implementation phases, with particular attention to risk identification and risk management.
- Work with the Project Director to resolve material issues that may arise over the course of the Project.
- Oversee Project communications, information and consultation activities.

3.1.2.1 Final Report and Business Case

Upon establishment, the Project Board heard delegations and presentations from the public, industry professionals, and a CRD Director. The Project Board Chair and Vice Chair also met with staff from the CRD and all of the Core Area municipalities, and with Esquimalt and Songhees Nations representatives.

The Project Board reviewed the previous technical work and extensive public commentary and developed a methodology to review and evaluate all options. This methodology included evaluation of a large number of options to identify a short list that best addressed the Project goals.

The Project Board developed detailed cost estimates for the short-listed options, ranked the short list using triple bottom line (economic, social and environmental) criteria, and identified the best option. This option was the basis of the final report of the Project Board with respect to its recommendation for the Project, dated September 7, 2016 (the “Final Report”).

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On September 14, 2016 the CRD Board received the Final Report and approved the business case attached as Appendix 1 (the “Business Case”) to the Final Report. The Business Case defined the scope of the Project and established the control budget of \$765 million (the “Control Budget”).

Following the CRD Board’s approval of the Business Case, the CRD submitted amendment number 11 (“Amendment 11”) to the Core Area Liquid Waste Management Plan (“CALWMP”) to the British Columbia Ministry of Environment. The CALWMP is a 25-year plan under the Environmental Management Act which outlines the CRD’s wastewater management strategies, including wastewater treatment.

On September 30, 2016, the British Columbia Ministry of Environment provided conditional approval of Amendment 11 to the CALWMP, and on November 18, 2016 provided a revised conditional approval that superseded the September 30, 2016 approval. The November 18, 2016 conditional approval clarified: that primary treatment is to be guaranteed for Clover Point catchment flows of up to three times average dry weather flows¹; and that a definitive plan providing a solution for the beneficial use of biosolids that does not incorporate multi-year storage of biosolids within a biocell was to be submitted to the British Columbia Ministry of Environment by June 30, 2019. The November 18, 2016 conditional approval further mandated that the CRD’s solution for the beneficial use of biosolids meet the requirements for beneficial use specified in the Canadian Council of Ministers of the Environment ‘Canada-Wide Approach for the Management of Wastewater Biosolids’ (October 11, 2012).

The CRD therefore needed to develop a definitive plan for the beneficial use of the biosolids to be produced at the Residuals Treatment Facility, that met the requirements of the British Columbia Ministry of Environment’s conditional approval.

Once the Project had concluded the procurement for the Residuals Treatment Facility, the nature of the biosolids to be beneficially-used was known. At that point the CRD undertook a process (separate to the Project and based on the nature of the biosolids to be produced by the Residuals Treatment Facility) with the participation of municipalities and First Nations, to review its regional waste management policy and develop a definitive plan for the beneficial use of biosolids and integrated resource management.

3.1.3 Project Director

In accordance with the CRD Core Area Wastewater Treatment Project Board Delegation Bylaw No. 1, 2016, in December 2016 the Project Board appointed a Project Director to oversee all aspects of the Project. In accordance with the Terms of Reference, the Project Director was responsible for leading a Project team to plan, procure, and implement the Project.

The Project Board also appointed a Deputy Project Director. The Project Director and Deputy Project Director were delegated authority in accordance with Bylaw 4186 (the “CRD Delegation Bylaw No. 1, 2017”), which delegates to the CRD’s officers and employees the authority to acquire and purchase goods and services on behalf of the CRD, subject to the CRD’s purchasing policies and procedures, and signing authority limitations.

¹ The average dry weather flow (ADWF) is the average daily flow during the dry weather season: the average dry weather season for the core area is from June 1 to August 31.

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3.2 Project Delivery Strategy

3.2.1 Project Team

In accordance with the Terms of Reference, the Project Director assembled a Project team:

- to carry out the work of the Project on behalf of the Project Board; and
- that included the relevant expertise required for the Project, including financial, technical, estimating, communication and consultation, procurement and legal expertise.

The Terms of Reference noted that membership of the team was to reflect the requirements of the work at a particular time and may change over time. The Project Director established the Project Team based on the contracting strategies outlined in Table 2 (in the following sub-section). The composition of the Project Team is outlined in the Project Management Plan, and was supported by consultants as required to provide specialist expertise and balance the changing resource needs over the course of Project delivery.

The Project Team reported directly to the Project Director and Deputy Project Director and as part of their overall Project execution and delivery responsibilities had the following duties:

- Project execution and delivery;
- Stakeholder relations, communication management and reporting;
- Project controls, including document control, cost control, schedule, risk management and reporting;
- Financial management, primarily through integration with CRD's Finance Department, including for: cash flow management, payment processing, and financial controls;
- Managing scope and monitoring engineering and construction activities;
- Overseeing the Project contractors' safety, environmental and quality performance; and
- Integrating with CRD departments throughout the delivery of the Project.

The Project Director determined that it would be useful for the Project Team to refer to guidance documents as they delivered the Project, and to this end the following documents were prepared by the Project Team and approved by the Project Board:

- **Project Charter:** the Project Charter included the Project's goals (as defined by the CRD Board), and established the parameters and mandate for the Project Team to execute and deliver the Wastewater Treatment Project, including key performance indicators against which delivery of the Project could be assessed. The Project Charter was first approved by the Project Board on April 4, 2017, and was subsequently updated twice to account for progress made on delivering the Project, with each update approved by the Project Board (on April 27, 2018 and September 30, 2019).
- **Project Management Plan:** the Project Management Plan specified the project management objectives and approaches intended to be used to achieve the key performance indicators (as established in the Project Charter); and stated the key organizational roles and responsibilities anticipated to be required to provide effective management, administration and control of the Project. The Project Management Plan was approved by the Project Board on September 26, 2018.

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- **Risk Management Plan:** the Project's Risk Management Plan included the risk management process, roles and responsibilities, management escalation hierarchy and requirements for risk meetings and reporting cycles, in order to direct and empower the Project Team to: develop and maintain a 'risk aware' culture; provide a comprehensive risk identification and control process; and to proactively forecast and report on risks. The Project's Risk Management Plan was approved by the Project Board on March 29, 2018.
- **Communications and Engagement Plan:** the Project's Communications and Engagement Plan defined the Project's communications and engagement goals, described the communications and engagement activities and described the roles and responsibilities of the Project's Communications and Engagement Team, which included CRD staff, consultants and representatives from the contractors for each component of the Project. The Project's Communications and Engagement Plan was first approved by the Project Board on April 4, 2017, and was subsequently updated twice to account for progress made on delivering the Project, with each update approved by the Project Board (on July 26, 2018 and July 25, 2019).

3.2.2 Prime Contractors

Given the risk profile, overall scale and diverse scope, the Project Board determined that the Project would be delivered through a number of contracts with a variety of contracting strategies, and in the Business Case outlined the rationale for: the McLoughlin Point Wastewater Treatment Plant to be delivered through a design-build-finance contract; the Residuals Treatment Facility to be delivered through a design-build-finance-operate-maintain contract; the Macaulay and Clover Point Pump Stations to be delivered through design-build contracts, and the remainder of the conveyance system to be delivered through design-bid-build contracts. The Project Team determined the packaging for the conveyance system, with consideration of: market capacity; the design, construction and commissioning schedule for each aspect of the conveyance system; and the interfaces between each Project component. The selected contracting and packaging strategy is outlined in Table 2.

The Project Team ran competitive selection processes to select a construction contractor for each Project component. The procurements were open for any interested party to participate in, were advertised on BC Bid (a website that allows public sector organizations to advertise opportunities for contracts for a wide range of goods and services), and followed CRD's purchasing policy as applicable to the procurement. The construction contractors selected through these processes are summarised in Table 2.

In order to manage scope and interface risks the Project Team used a single owner's engineer to develop the indicative design for all critical Project components with significant interfaces. The indicative design formed the basis for defining the key interfaces between Project components. Stantec were retained as the owner's engineer for the overall Project, as they had been engaged by the CRD during an earlier stage of Project development. In addition and as shown in Table 2, the Project Team retained a design consultant for each Project component delivered through a design-bid-build contract.

APPENDIX A*Table 2 – Contracting Strategy, Design Consultant and Construction Contractor*

Project Component	Contract	Contracting Strategy	Design Consultant	Construction Contractor
McLoughlin Point Wastewater Treatment Plant	McLoughlin Point Wastewater Treatment Plant	Design-build-finance	Harbour Resource Partners (Graham Infrastructure and AECOM Canada)	
Residuals Treatment Facility	Residuals Treatment Facility	Design-build-finance-operate-maintain	Hartland Resource Management Group (Synagro Capital, Maple Reinders PPP Ltd., Bird Construction Inc.)	
Conveyance System	Clover Point Pump Station	Design-build	Kenaidan Contracting Ltd.	
	Clover Forcemain	Design-bid-build	Kerr Wood Leidal	Windley Contracting Ltd.
	Macaulay Point Pump Station & Forcemain	Design-build	Kenaidan Contracting Ltd.	
	Craigflower Pump Station ²	Design-bid-build	Associated Engineering	Jacob Bros Construction
	Residual Solids Conveyance Line	Design-bid-build	Parsons	Don Mann Excavating Ltd.
	Residual Solids Pump Stations	Design-bid-build	Parsons	Knappett Projects Inc.
	Arbutus Attenuation Tank	Design-bid-build	Kerr Wood Leidal	NAC Constructors Ltd.
	Trent Forcemain	Design-bid-build	Stantec	Jacob Bros Construction

3.2.3 CRD Integration and Support

CRD integration and support was critical to the successful delivery of the Project. The Project Board and Project Team completed the tasks delegated to them with:

- ongoing co-ordination between the Project Team and the two CRD departments that have responsibilities for commissioned Project components, being:
 - the CRD's Integrated Water Services department, who are responsible for the operation and maintenance of all Project components (upon commissioning) other than the Residuals Treatment Facility; and
 - the CRD's Parks and Environmental Services department, who are responsible for: the CRD's Core Area Liquid Waste Management Plan; the environmental monitoring and regulatory compliance reporting for the core area wastewater system; and the administration of the Residuals Treatment Facility contract post May 2021; and

² The Craigflower Pump Station was delivered by the CRD between 2013 and 2015, before the Project Board were established.

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- the support of many CRD departments, including Corporate Communications, First Nations Relations, Human Resources, Legislative and Corporate Services, and Finance and Technology.

The CRD integration and support occurred through various avenues, including the following:

- The Chief Administrative Officer's appointment as a member of the Project Board;
- Monthly executive leadership meetings attended by the Project Director, Deputy Project Director and the CRD's Chief Administrative Officer, Chief Financial Officer, and General Managers of Parks and Environmental Services and Integrated Water Services;
- Monthly project coordination meetings attended by Project Team members and members of relevant CRD departments, including Integrated Water Services, Parks and Environmental Services, First Nations Relations, and Properties;
- The participation in design review and hazard and operability workshops of members of the Integrated Water Services and Parks and Environmental Services departments;
- The review of contract submittals (e.g. operating plans) by members of the Integrated Water Services and Parks and Environmental Services departments; and
- Interaction between designated CRD and Project Team personnel responsible for ensuring integration on specific subjects, as outlined in Appendix 3 of the Project Management Plan.

Particular support and integration was provided by the following CRD individuals and departments:

- The CRD's Chief Financial Officer - both directly and through finance staff seconded to the Project Team and through information technology support - was responsible for:
 - ensuring compliance with local government financial reporting requirements;
 - coordinating with the Project Team's Finance Manager to efficiently structure Project cash flows and financing;
 - seeking the CRD Board's approval for the means by which the Project's cash flow and financing needs were met;
 - shaping the overall financing strategy of the Project; and
 - providing information technology support to the Project.
- The CRD's Senior Manager, Human Resources and Corporate Safety was responsible for all aspects of human resources, labour relations, organizational development, and occupational health and safety leadership, direction and support for the CRD. Specific to the Project:
 - all matters regarding employment were overseen by the CRD's Human Resources and Corporate Safety division, under the direction of the CRD's Senior Manager, Human Resources and Corporate Safety and the authority of the CRD's Chief Administrative Officer; and
 - the CRD's Manager, Corporate Occupational Health & Safety was responsible for supporting the Project Team's Safety Manager in the performance of their responsibilities by periodically reviewing the status of the Project's safety activities and initiatives.
- The CRD's Senior Manager, Corporate Communications was point of contact for media, responsible for coordinating with the Project Team to manage media inquiries

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- related to the Project. This included local, regional, provincial, national, and at times international, media.
- The Manager of CRD's First Nations Relations was responsible for:
 - the ongoing maintenance of CRD's government-to-government relationships with First Nations; and
 - coordinating with the Project Team on Project-related First Nations engagement.
 - The CRD's Corporate Services Department:
 - provided professional advice and expertise related to legislative services, information services, risk and insurance management, real estate services; and
 - was responsible for administration of the Freedom of Information and Protection of Privacy Act;
 - Representatives from CRD's Integrated Water Services department were engaged in the review of design and construction submittals and provided input regarding CRD standards and operations and maintenance considerations. Specific responsibilities included participating in design review and hazard and operability workshops, and reviewing and providing comments on relevant contract submittals (e.g. design reports, drawings and operating plans).
 - Representatives from CRD's Parks and Environmental Services department were engaged in the:
 - review of applications for permits and authorizations that extend beyond the Project delivery period, including the registration of the McLoughlin Point Wastewater Treatment Plant under the Municipal Wastewater Regulations; and
 - review of specific design and construction submittals for the Residuals Treatment Facility. Specific responsibilities included: participating in design review workshops, and reviewing and providing comments on contract submittals (e.g. design reports, drawings, operating plans), with a focus on the interfaces between the operations of the Hartland Landfill and the Residuals Treatment Facility.

Each service that the CRD provides has its own budget and must be accounted for and reported on separately: the CRD Financial Plan consists of more than 200 individual service budgets, which fund delivery of regional, sub-regional and local services. In accordance with this, the Project's budget included annual payments to the CRD departments that supported the Project Board and Project Team.

3.2.4 Project Reporting

The reporting requirements for the Project were defined with consideration of the Project Board Terms of Reference, the approved senior government funding agreements and the financial and accounting reporting cycle of the CRD. The Project Board's Terms of Reference required the Project Board to provide the CRD Board with monthly progress reports and a comprehensive quarterly report on the Project.

Throughout the delivery of the Project, the Project Team prepared comprehensive monthly and quarterly reports which described the status of the Project, and specifically addressed the progress with respect to scope, budget, commitments, project expenditures, schedule and risk status. The reports included a dashboard and executive summary which highlighted material

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changes in any of these areas, and summarised progress on the delivery of each Project component. These reports were presented to the Project Board in open reports, and subsequently to the Core Area Liquid Waste Management Committee and CRD Board

4 Project Scope

This section summarises the scope delivered by the Project, as well as any variances in the delivered scope compared to that defined in the Business Case.

In furtherance of the Project's goal to minimize costs to residents and businesses, the Project Team undertook value engineering and reviewed the scope of each Project component in advance of commencing detailed design and initiating a competitive selection process to procure a construction contract. In some cases this value engineering led to the delivered scope exceeding that defined in the Business Case, and in some cases to the delivered scope being reduced from that defined in the Business Case.

Project Board approval was sought for variances in scope from the Business Case: CRD Board approval was not required as none of the variances resulted in any of the effects listed in CRD Core Area Wastewater Treatment Project Board Delegation Bylaw No. 1, 2016 (being: the Project not meeting provincial and federal regulations governing the Project, exceeding approved funding for the Project, or increasing costs to taxpayers from those stated in the Business Case).

4.1 McLoughlin Point Wastewater Treatment Plant

The McLoughlin Point Wastewater Treatment Plant can treat up to 108 megalitres of wastewater per day to a tertiary level, and discharge treated effluent into the ocean through a new outfall approximately 2km from shore and 60m deep.

The primary treatment process is the physical separation of solids from wastewater. Secondary treatment uses a biological process that removes dissolved and suspended organic compounds. During tertiary treatment wastewater passes through a 5 micron fabric disc filter, removing many pharmaceutical, hormones, microplastics and other contaminants from the discharged effluent.

Located at McLoughlin Point in Esquimalt, the McLoughlin Point Wastewater Treatment Plant is situated at the entrance of Victoria Harbour. Its appearance respects the setting and incorporates the highest standards of design, materials and aesthetics. It has been built to minimize visual impacts from the water and includes a multi-level green roof, mature landscaping, an observation deck, and a multi-use education space.

The McLoughlin Point Wastewater Treatment Plant's Operations and Maintenance building is designed to Leadership in Energy and Environmental Design (LEED) Gold standard and over 80% (or 1,600 m²) of its roof is planted to increase on-site habitat and provide storm water management. A heat recovery system has also been incorporated: prior to discharge to the ocean, the effluent passes through heat exchangers which remove heat from the wastewater and use it to heat the Operations and Maintenance building at the facility.

The McLoughlin Point Wastewater Treatment Plant includes state-of-the-art odour control and a 24-hour odour control monitoring system. All treatment processing tanks are covered which result in one of the highest levels of odour capture and treatment in the industry. The odour control systems reduce odour emissions to a level not detectable by humans at the property line. The odour control system includes back-up odour control equipment and back-up power generators, reducing the possibility of odour escaping the facility if there is an equipment failure.

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The McLoughlin Point Wastewater Treatment Plant has been designed for post-disaster operation in accordance with the 2012 British Columbia Building Code. The Code stipulates that post-disaster facilities must be designed to withstand the size or magnitude of earthquake that could occur once in every 2,475 year which translates approximately to a magnitude 6.5 earthquake. This means the facility will remain operational after a major earthquake, as well as other natural disasters, such as tsunamis.

The McLoughlin Point Wastewater Treatment Plant was designed and built by Harbour Resource Partners, as the design-build contractor. Harbour Resource Partners is a consortium of AECOM Canada and Graham Infrastructure.

Photographs of the McLoughlin Point Wastewater Treatment Plant are shown in Figures 1 and 2.



Figure 1 – Looking west at the McLoughlin Point Wastewater Treatment Plant

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Figure 2 – Looking east over the McLoughlin Point Wastewater Treatment Plant

4.1.1 McLoughlin Point Wastewater Treatment Plant: Variance in Delivered Scope Compared to the Business Case

The McLoughlin Point Wastewater Treatment Plant delivered by the Project exceeds the scope defined in the Business Case in two key respects: the capability to increase the capacity of the plant (from 108 megalitres of wastewater per day to 124 megalitres per day), enabling it to accommodate population growth beyond 2040; and the capability to include effluent disinfection.

The Business Case required the McLoughlin Point Wastewater Treatment Plant to have the capacity to effectively accommodate the future population growth, and this was achieved: based on wastewater flow projections, the Plant has sufficient capacity to treat the core area's wastewater and accommodate regional population growth to at least 2040. In addition to that capacity, and providing a lifecycle cost benefit to the CRD, the Plant has been designed and built such that the capacity could be increased to accommodate population growth beyond 2040.

The Business Case required the McLoughlin Point Wastewater Treatment Plant to provide tertiary treatment, which it does. Disinfection of the treated effluent is not necessary to meet the regulatory requirements, and was not required by the Business Case. The Marine Environmental Impact Study undertaken for the Project by qualified professionals found that, based on extensive flow monitoring, hydraulic modelling and dispersion modelling, there would be little to no benefit to installing disinfection at this time. However, the McLoughlin Point Wastewater Treatment Plant has been designed to allow disinfection to be added at a future date if required. Specifically, after tertiary treatment, the treated effluent flows through dedicated channels which are sized to allow for the placement of ultraviolet equipment with minimal interruption to the operation of the Wastewater Treatment Plant. This configuration

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allows for disinfection to be added, if desired at a later date, at a lower cost than if it had not been considered during Project delivery.

4.2 Residuals Treatment Facility

The Residuals Treatment Facility receives residual solids produced by the McLoughlin Point Wastewater Treatment Plant and processes them into Class A biosolids, the highest quality product suitable for beneficial use.

At the Residuals Treatment Facility residual solids undergo an anaerobic digestion process in which microorganisms break down biodegradable material in the absence of oxygen and produce biogas. The residual solids are then dewatered and heated to a very high temperature creating Class A biosolids.

The biogas produced during the digestion process is collected and reused within the facility as fuel for the dryer. The operations and maintenance building was designed and constructed in accordance with Leadership in Energy and Environmental Design (LEED) principles, and the process buildings incorporate sustainable design initiatives such as long-lasting building materials and water and energy efficiency.

All treatment processes are completed within closed containers and odour control systems are in place to ensure that there will be no discernible odour to residents once the commissioning phase is complete and the facility is fully-operational.

The Residuals Treatment Facility is located within the footprint of the Hartland Landfill. Key benefits of the Hartland Landfill location include:

- locating the Residuals Treatment Facility next to the existing, active landfill and within the footprint of the landfill allows for future integration between the region's solid waste and liquid waste management plans;
- the land is owned by the CRD;
- the land is not part of the Agricultural Land Reserve, park or ecological land reserve; and
- distance from residential neighbours.

The Residuals Treatment Facility has been designed for post-disaster operation in accordance with the 2012 British Columbia Building Code. The Code stipulates that post-disaster facilities must be designed to withstand the size or magnitude of earthquake that could occur once in every 2,475 year which translates approximately to a magnitude 6.5 earthquake. This means the facility will remain operational after a major earthquake.

The Residuals Treatment Facility was designed and built, and will be operated and maintained for twenty years by Hartland Resource Management Group, as the design-build-finance-operate-maintain contractor. Hartland Resource Management Group are a consortium comprising Synagro Capital, Maple Reinders PPP Ltd., and Bird Construction Inc.

Photographs of the Residuals Treatment Facility are shown in Figures 3 and 4.

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Figure 3 – Looking southwest toward the Residuals Treatment Facility



Figure 4 – Looking east toward the Residuals Treatment Facility

APPENDIX A**4.2.1 Residuals Treatment Facility: Variance in Delivered Scope Compared to the Business Case**

The Residuals Treatment Facility delivered by the Project exceeded the scope defined in the Business Case in a key respect (namely the ability to process and receive residual solids from other municipalities in addition to those from the McLoughlin Point Wastewater Treatment Plant), and incorporated one of the scope elements through alternative means (being interim storage).

In furtherance of the Project's goal to provide value for money, the Project included a capital investment that exceeded the scope defined in the Business Case. The Residuals Treatment Facility was required to treat residuals solids produced by the McLoughlin Point Wastewater Treatment Plant. The Residuals Treatment Facility has been designed and constructed with the receiving facilities to enable it to also treat up to 3,100 kg/day of other municipal residual solids, while the Residuals Treatment Facility has surplus capacity (i.e. while the actual flow from the McLoughlin Point Wastewater Treatment Plant is less than the 2040 expected flow). This capital investment provides the CRD with a cost sharing and/or recovery option, and municipalities outside of the Core Area with a means to convert residual solids into a product capable of beneficial use.

Regarding interim storage, the Business Case anticipated the need to store the class A biosolids produced by the Residuals Treatment Facility at Hartland Landfill on an interim basis pending the introduction of an integrated resource management solution for all waste streams. The interim storage was to be configured with the ability to recover leachate and biogas.

To this end, after the CRD Board approved the Business Case (on September 14, 2016) the CRD submitted Amendment No. 11 to the Core Area Liquid Waste Management Plan to the Ministry of Environment (on September 16, 2016), inclusive of a biocell to store product on an interim basis to allow time for a long-term beneficial use option to be designed and implemented. On September 30, 2016 the Ministry of Environment provided conditional approval of Amendment No. 11, and on November 18, 2016 clarified the conditional approval. One condition of the clarified approval was the requirement that the CRD develop a definitive plan for the beneficial use of biosolids that did not incorporate multi-year storage of biosolids within a biocell.

The conditional approval therefore reduced the scope of the interim storage from that envisioned in the Business Case. The Project delivered the reduced scope through the following means:

- i) recovery (and use) of biogas within the Residuals Treatment Facility: biogas produced during the treatment process is utilized as an energy source, making the facility thermally self-sufficient; and
- ii) the inclusion of storage within the Residuals Treatment Facility, so as to allow for a period of five continuous days at 2040 maximum load conditions without offtake of any biosolids.

The Project Board approved this variance in scope from the Business Case necessitated by the Ministry's conditional approval: CRD Board approval was not sought as the alteration to the scope did not result in any of the effects listed in CRD Core Area Wastewater Treatment Project Board Delegation Bylaw No. 1, 2016 (being: the Project not meeting provincial and federal regulations governing the Project, exceeding approved funding for the Project, or increasing costs to taxpayers from those stated in the Business Case).

4.3 Conveyance System

4.3.1 Clover Point Pump Station

The Clover Point Pump Station was upgraded and expanded as part of the Wastewater Treatment Project. The original pump station was built in the 1970s and pumped wastewater directly into the ocean. The expanded pump station pumps wastewater from Victoria, Saanich, and Oak Bay to the McLoughlin Point Wastewater Treatment Plant for tertiary treatment, and provides bypass pumping to the existing outfall during storm events. Specifically, and in exceedance of the British Columbia Ministry of Environment's approval of Amendment 11 to the CALWMP (which required that primary treatment be guaranteed for Clover Point catchment flows of up to three times average dry weather flows³), the Clover Point Pump Station is capable of conveying four times the 2021 average dry weather flow of the Clover Point catchment to McLoughlin Point Wastewater Treatment Plant for treatment, and will convey storm flows in excess of that amount out of the Clover Point outfall.

In addition to pumping wastewater to the McLoughlin Point Wastewater Treatment Plant for treatment and providing bypass pumping during storm events, the Clover Point Pump Station functions as one of two headworks for the McLoughlin Point Wastewater Treatment Plant: all wastewater conveyed to the pump station is screened to remove stones, paper, cloth, plastics and other debris, and then passes through a grit removal system. The grit and screenings are compacted and trucked to the Hartland landfill.

The Clover Point Pump Station is underground and below the grade of the adjacent section of Dallas Road. The expanded facility has been constructed out of materials that allow it to blend with the existing facility and surrounding area. The pump station now includes upgraded odour and noise control features, such that there will be no discernible odour or noise to residents.

The Clover Point Pump Station has been designed for post-disaster operation in accordance with the 2012 British Columbia Building Code. The Code stipulates that post-disaster facilities must be designed to withstand the size or magnitude of earthquake that could occur once in every 2,475 year which translates approximately to a magnitude 6.5 earthquake. This means the facility will remain operational after a major earthquake, as well as other natural disasters, such as tsunamis.

The Clover Point Pump Station was designed and built by Kenaidan Contracting Limited, as the Design-Build Contractor.

As part of their scope of work, Kenaidan were also responsible for the construction of a number of public amenities, such as public washrooms, pedestrian and bicycle paths, bicycle facilities, a public plaza, street furniture and road intersection improvements.

Photographs of construction progress at Clover Point are shown in Figures 5 and 6.

³ The average dry weather flow (ADWF) is the average daily flow during the dry weather season: the average dry weather season for the core area is from June 1 to August 31.

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Figure 5 – Looking west towards Clover Point Pump Station (construction in progress)



*Figure 6 – Entrance to the expanded Clover Point Pump Station
(construction in progress: public amenities and landscaping still to be completed)*

APPENDIX A**4.3.1.1 Clover Point Pump Station: Variance in Delivered Scope Compared to the Business Case**

The upgrade and expansion of the Clover Point Pump Station delivered by the Project exceeds the scope defined in the Business Case, which required an expansion to the existing pump station and the replacement of the storm pump motors in the existing station. As a result of considering lifecycle costs, the Project replaced the entire storm pumping system (rather than simply the storm pump motors) and replaced the odour control system with an improved two-stage system.

4.3.2 Clover Forcemain

The Clover Forcemain conveys wastewater from the Clover Point Pump Station to the McLoughlin Point Wastewater Treatment Plant for tertiary treatment. The Forcemain alignment is along Dallas Road from Clover Point to Ogden Point, where it connects to the Victoria cross-harbour undersea pipe. The pipe is 3.2km long and 1.2m in diameter.

The Clover Forcemain alignment was developed in collaboration with the City of Victoria and considered the protection of the Dallas Road bluffs, the location of mature trees and sensitive vegetation, and traffic impacts during construction.

The CRD constructed infrastructure improvements along the alignment of the Clover Forcemain to add value and enhance the livability of the surrounding neighbourhoods. This included a cycle path along the forcemain route, line painting, bike racks and plantings, four new crosswalks, pathway lighting, and a bike dismount area at the entrance to Clover Point.

The Clover Forcemain was constructed by Windley Contracting Ltd., as the Construction Contractor.

A photograph showing the cycle path constructed as part of the Clover Forcemain, and a map of the Clover Forcemain route, are shown in Figures 7 and 8, respectively.

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Figure 7 – New cycle path amenity delivered with the construction of the Clover Forcemain

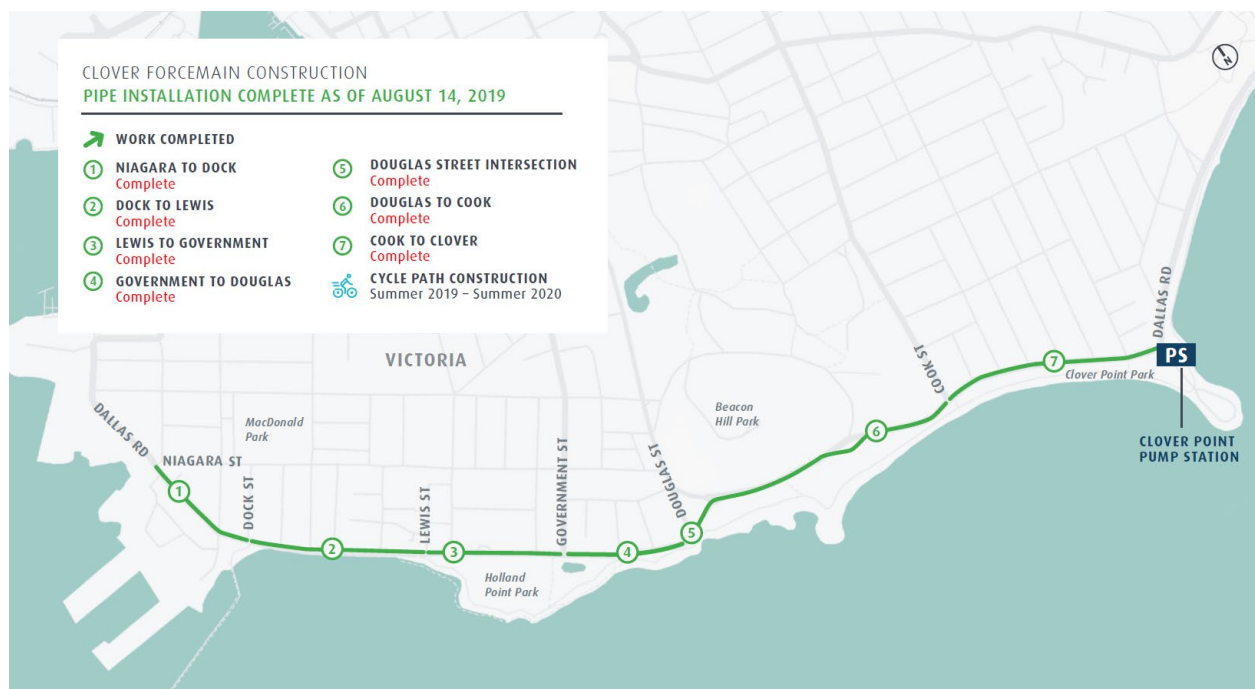


Figure 8 – Map of Clover Forcemain Route

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4.3.2.1 Clover Forcemain: Variance in Delivered Scope Compared to the Business Case

The Clover Forcemain has been delivered as defined in the Business Case: there was no variance in the delivered scope compared to the Business Case.

4.3.3 Macaulay Point Pump Station and Forcemain

The new Macaulay Point Pump Station pumps wastewater from western core area municipalities and the Esquimalt and Songhees Nations to the McLoughlin Point Wastewater Treatment Plant for tertiary treatment. It was built to replace the original pump station that pumped wastewater directly into the ocean. The new Macaulay Point Pump Station will provide bypass pumping to the Macaulay Point outfall during heavy rainfall events. Specifically, the Macaulay Point Pump Station is capable of conveying six times the 2021 average dry weather flow⁴ of the Macaulay Point catchment to McLoughlin Point Wastewater Treatment Plant for treatment, and will convey storm flows in excess of that amount out of the Macaulay Point outfall.

In addition to pumping wastewater to the McLoughlin Point Wastewater Treatment Plant for treatment and providing bypass pumping during storm events, the Macaulay Point Pump Station functions as one of two headworks for the McLoughlin Point Wastewater Treatment Plant: all wastewater conveyed to the pump station is screened to remove stones, paper, cloth, plastics and other debris. It is then put through a vortex grit removal system which uses centrifugal force to keep the organic material suspended while grit settles and is removed. The grit and screenings are compacted and trucked to the Hartland landfill.

The Macaulay Forcemain is a 1350mm diameter pipe that connects the Macaulay Point Pump Station to the McLoughlin Point Wastewater Treatment Plant.

The design of the pump station considers its location on the waterfront, greatly improving the visual impact of the building compared to the previous pump station, and creating a park-like amenity for the community to enjoy.

The new pump station is mostly below-grade with one storey above ground and a pitched roof that slopes towards the ocean. The design applies Leadership in Energy and Environmental Design (LEED) principles including a rain garden, native plants to reduce irrigation requirements, low-level lighting to minimize light pollution, and a green roof.

The Macaulay Point Pump Station has been designed for post-disaster operation in accordance with the 2012 British Columbia Building Code. The Code stipulates that post-disaster facilities must be designed to withstand the size or magnitude of earthquake that could occur once in every 2,475 year which translates approximately to a magnitude 6.5 earthquake. This means the facility will remain operational after a major earthquake, as well as other natural disasters, such as tsunamis.

⁴ The average dry weather flow (ADWF) is the average daily flow during the dry weather season: the average dry weather season for the core area is from June 1 to August 31.

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Landscaping has been used to integrate the building with the surrounding area. The design maximizes vegetation opportunities and landscape functionality: it has transformed what was an almost entirely impermeable lot into an environmentally-rich, park-like setting with public amenities.

The Macaulay Point Pump Station and Forcemain was designed and built by Kenaidan Contracting Limited, as the Design-Build Contractor.

Photographs of the Macaulay Point Pump Station are shown in Figures 9 and 10.



Figure 9 – Macaulay Point Pump Station

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Figure 10 – Looking north towards the Macaulay Point Pump Station (construction in progress, landscaping still to be completed)

4.3.3.1 Macaulay Point Pump Station: Variance in Delivered Scope Compared to the Business Case

The Macaulay Point Pump Station delivered by the Project exceeds the scope defined in the Business Case, which required upgrades including improvements to the existing building and landscaping. As a result of considering lifecycle costs, rather than simply upgrade the existing pump station the Project replaced the existing Macaulay Point Pump Station.

The original Macaulay Point Pump Station was built in 1972 and would have required significant upgrades to allow it to continue to be safely operated as well as a significant expansion to allow it to pump wastewater to the McLoughlin Point Wastewater Treatment Plant.

The Project Team ran a competitive selection process for the design and build of the upgrade and expansion required to the Macaulay Point Pump Station, and selected a proposal that entailed demolition of the existing pump station and replacing it with a new pump station. This solution provides improved operating efficiency, and therefore lower operating and maintenance costs: investing in a new pump station as part of the Project, rather than paying to upgrade and maintain the existing pump station, provides better overall value to the CRD.

4.3.4 Craigflower Pump Station

The Craigflower Pump Station was delivered by the CRD between 2013 and 2015, before the Project Board were established.

The Craigflower Pump Station directs wastewater from View Royal, Colwood, Langford and Esquimalt, as well as Songhees and Esquimalt First Nations, to the Macaulay Point Pump Station. It replaced a previous pump station that was built in 1971, in order to increase the capacity of the conveyance system and prevent wastewater overflows into Portage Inlet.

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The design incorporated Leadership in Energy and Environmental Design (LEED) principles including a rain garden, native plants to reduce irrigation requirements, low-level lighting to minimize light pollution, and windows designed to allow daylight in to minimize indoor lighting requirements.

The Craigflower Pump Station was built for post-disaster operation in accordance with the 2012 British Columbia Building Code. The Code stipulates that post-disaster facilities must be designed to withstand the size or magnitude of earthquake that could occur once in every 2,475 year which translates approximately to a magnitude 6.5 earthquake. This means the facility will remain operational after a major earthquake.

The Craigflower Pump Station was constructed by Jacob Bros. Construction Inc., as the Construction Contractor.

A photograph of Craigflower Pump Station is shown in Figure 11.



Figure 11 – Craigflower Pump Station

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4.3.4.1 Craigflower Pump Station: Variance in Delivered Scope Compared to the Business Case

The Craigflower Pump Station was delivered by the CRD before the development of the Business Case: there was therefore no variance in the delivered scope compared to the Business Case.

4.3.5 Residual Solids Conveyance Line

The Residual Solids Conveyance Line includes two pipes and three small pump stations, to connect the McLoughlin Point Wastewater Treatment Plant to the Residuals Treatment Facility at Hartland Landfill.

The first pipe is 250mm in diameter and 19.3km long, and transports residual solids from the McLoughlin Point Wastewater Treatment Plant to the Residuals Treatment Facility for treatment. The second pipe is 300mm in diameter and 12.4km long, and returns the liquid removed from the residual solids during the treatment process at the Residuals Treatment Facility to the Marigold Pump Station. From there it is returned to the McLoughlin Point Wastewater Treatment Plant through the existing conveyance system.

The alignment was developed with the District of Saanich, Township of Esquimalt and City of Victoria based on technical, environmental, social, and economic considerations.

The three pump stations built along the route of the Residual Solids Conveyance Line pump the residual solids from the McLoughlin Point Wastewater Treatment Plant (which is at sealevel) to the higher elevation of the Residuals Treatment Facility. The pump stations are located within road rights of way. The locations of the pump stations were determined based on the grade of the route and flow rates, and accounted for community consultation.

The pump stations are designed with state-of-the-art odour control systems that contain and suppress odour so there is no discernible smell in the community. Landscaping features include a variety of trees, shrubs and ground coverings.

The Residual Solids Conveyance Line was constructed by:

- Don Mann Excavating Ltd., as the Construction Contractor for the Residual Solids Pipes; and
- Knappett Projects Inc., as the Construction Contractor for the Residual Solids Pump Stations.

A photograph of one of the Residual Solids Pump Stations (located along the Interurban Trail in Saanich) and a map of the Residual Solids Conveyance Line route are shown in Figures 12 and 13.

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*Figure 12 – Residual Solids Pump Station located along the Interurban Rail Trail in Saanich
(Construction in progress, landscaping still to be completed)*

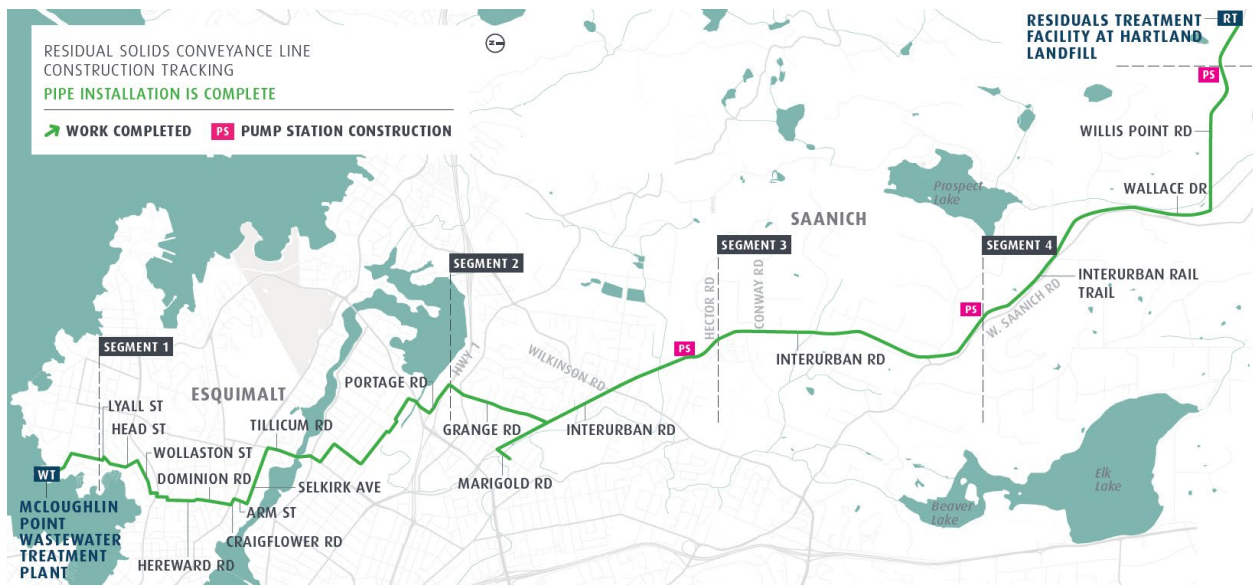


Figure 13 – Map of Residual Solids Conveyance Line Route

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4.3.5.1 Residual Solids Conveyance Line: Variance in Delivered Scope Compared to the Business Case

The delivered Residual Solids Conveyance Line exceeds the scope defined in the Business Case. The Project designed and built the return Residual Solids Conveyance Line with sufficient capacity to convey leachate from Hartland Landfill - as well as centrate from the Residuals Treatment Facility – to Marigold Pump Station, from where it will be conveyed to the McLoughlin Point Wastewater Treatment Plant through the CRD's existing conveyance system.

While this increased the capital cost to the Project it provided significant value to the CRD, as the new pipe has been designed in accordance with seismic criteria, and compared to utilising the existing leachate pipe it has the following advantages: advanced monitoring, increased capacity and reliability.

4.3.6 Arbutus Attenuation Tank

The Arbutus Attenuation Tank is a 5,000m³ underground concrete tank that temporarily stores wastewater flows during high volume storm events in order to reduce the number of sewer overflows. High volume storm events usually occur in the winter and during these events excess wet weather flows in the eastern portion of the conveyance system will be diverted into the Arbutus Attenuation Tank. The Arbutus Attenuation Tank will function in a similar manner to the Marigold attenuation tank in the western portion of the conveyance system. Once the high storm flow has passed, the tank will empty back into the existing sewer system to direct wastewater to the Clover Point Pump Station and then onto the McLoughlin Point Wastewater Treatment Plant for tertiary treatment.

Once the tank is emptied, an automatic cleaning system will be activated to clean the floors, walls and columns of the tank. CRD staff will inspect the tank after each use to ensure it is cleaned and that all wastewater has drained back into the sewer system. The temporary storage of wastewater will reduce the number of overflows and resultant impacts along the coastline. The tank will be kept under negative air pressure to draw air within the tank directly into an activated carbon absorber system that will contain and suppress potential odours.

The Arbutus Attenuation Tank is located in Haro Woods and the site will be planted with vegetation appropriate for the local woodland setting.

The Arbutus Attenuation Tank was constructed by NAC Constructors Ltd., as the Construction Contractor. As at May 2021, some minor construction and commissioning activities are required to complete this Project component, and it is expected to be operational in June, 2021.

A photograph of the Arbutus Attenuation Tank is shown in Figure 14.

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*Figure 14 – Arbutus Attenuation Tank
(Construction in progress)*

4.3.6.1 Arbutus Attenuation Tank: Variance in Delivered Scope Compared to the Business Case

The Arbutus Attenuation Tank has been delivered as defined in the Business Case: there was no variance in the delivered scope compared to the Business Case.

4.3.7 Trent Forcemain

The section of Trent Forcemain delivered by the Project is an extension of the portion of forcemain constructed by the CRD in 2007 as part of the Trent Pump Station Project. The extension allows the Trent and Currie Pump Stations to operate at full design capacity: it increases the capacity of the eastern branch of the Capital Regional District's core area conveyance system (which collects wastewater from Saanich, Oak Bay, and Victoria, directing it to the Clover Point Pump Station), thereby reducing the number of wet weather overflows.

The Trent Forcemain is 2km of pipe installed from the intersection of Chandler Ave and St Charles Street to the Clover Point Pump Station. The Trent Forcemain consists of a section of 0.9m diameter pipe and a 1.5m diameter pipe.

The Trent Forcemain was constructed by Jacob Bros. Construction Inc., as the Construction Contractor.

A map of the Trent Forcemain route is shown in Figure 15.

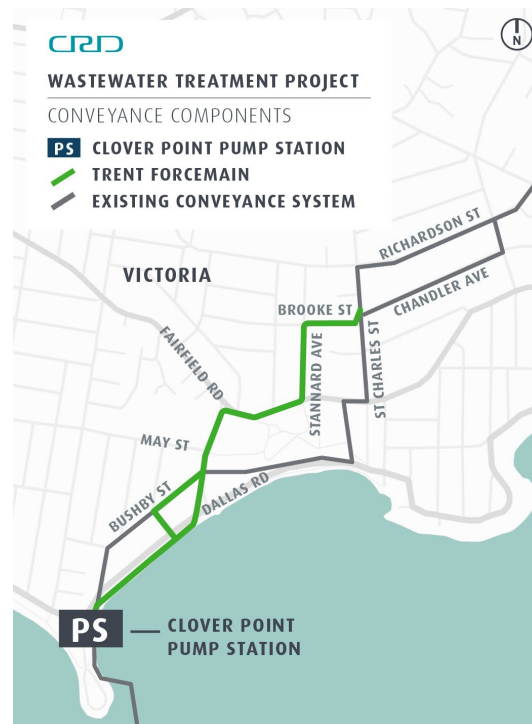
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Figure 15 – Map of Trent Forcemain Route

4.3.7.1 Trent Forcemain: Variance in Delivered Scope Compared to the Business Case

The Business Case anticipated the need for upgrades to the conveyance system consistent with previous plans, which included the following four components:

- Capacity expansion of the Currie Pump Station;
- Twinning of the Currie Forcemain;
- Twinning of the East Coast Interceptor; and
- Extension of the Trent Forcemain.

These four components are shown in Figure 16. The need for these components was identified in 2004, and they were designed to convey excess wet weather flows to Clover Point, where they could be discharged out of the long outfall, rather than through a number of shorter outfalls in Oak Bay.

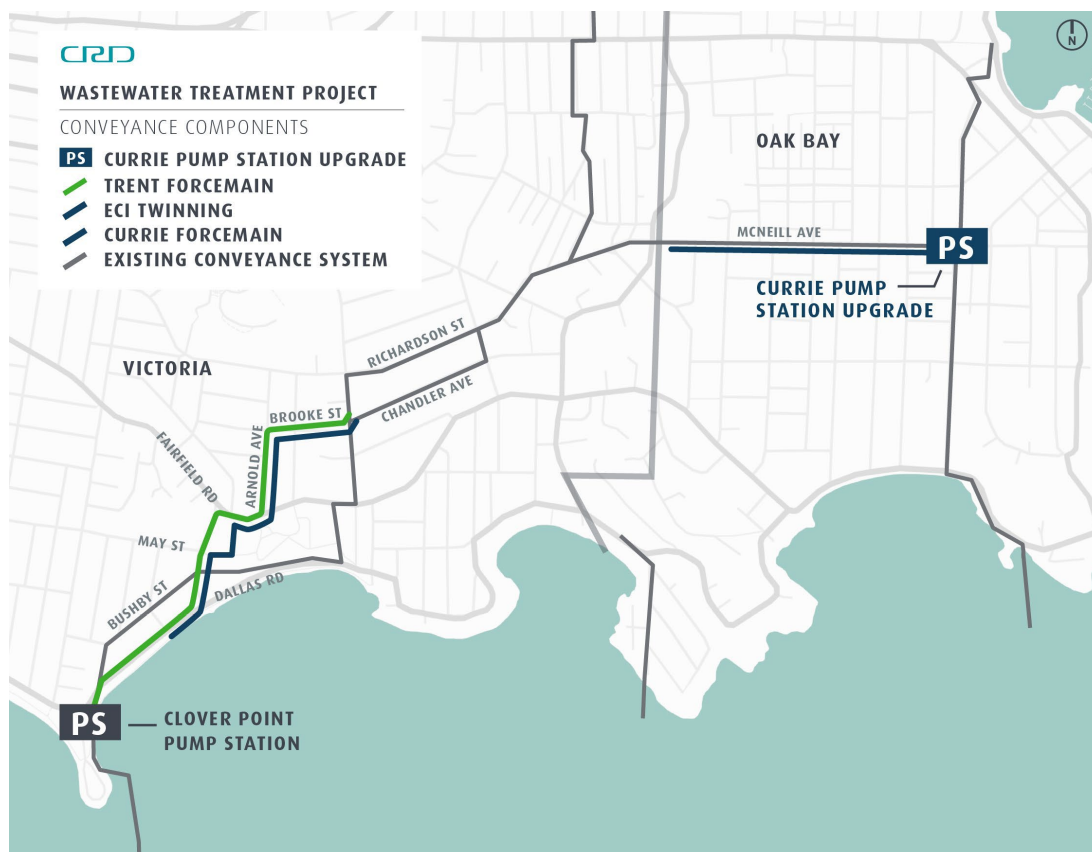
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Figure 16 – Four Anticipated Components of the Conveyance Scope, as Identified in 2004

Over the last 15 years there were significant changes to factors influencing the need for these components including the availability of considerably more flow data that indicates a substantial reduction in water use per person. The Project therefore engaged the consulting engineering firm Kerr Wood Leidal to develop an updated model of the core area's wastewater system and assess the need for the components. This model will also be useful to the CRD outside of the Project as it will allow informed decisions to be made regarding capital investments required to meet future demands.

Based on extensive flow monitoring data and future wastewater flow estimates, KWL determined that only one of the remaining components (the extension of the Trent Forcemain) had any benefit and was required to meet federal and provincial regulations. Three components (capacity expansion of the Currie Pump Station, twinning of the Currie Forcemain, and twinning of the East Coast Interceptor) would not provide any benefit now, or in the future. Based on KWL's work, the Project Board approved refining the Project's scope to remove the three components that would provide no benefit to CRD residents.

The existing Currie Pump Station is still required to be operated for the core area wastewater system to function as intended, and as equipment reaches the end of its service life it will need to be rehabilitated or replaced. The CRD's Integrated Water Service Department is responsible for planning this work, and has included it in the current five-year capital plan for the core area wastewater system.

The Project Board approved this variance in scope from the Business Case: CRD Board approval was not sought as the alteration to the scope did not result in any of the effects listed

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in CRD Core Area Wastewater Treatment Project Board Delegation Bylaw No. 1, 2016 (being: the Project not meeting provincial and federal regulations governing the Project, exceeding approved funding for the Project, or increasing costs to taxpayers from those stated in the Business Case).

4.4 Business Case: Scope Delivered Independently

The following items were included in the Business Case, however, either by jurisdiction or because of subsequent discussions, they were not within the scope of the Project or the Project Director's accountabilities:

- Advance studies for a wastewater treatment proposal in Colwood: provision for this was included in the Business Case but as a result of subsequent discussions between the CRD and Colwood a \$2 million reserve has been established and funded by the Project's budget;
- Comprehensive planning and consultation process to develop a waste policy, including management of municipal solid and biosolid waste streams as part of an integrated resource management plan: this process is being led by the CRD outside of the Project; and
- The development of a multi-year capital plan to improve CRD sewage facilities to mitigate their impacts on host communities as part of the capital planning and project delivery progress. This process is being led by the CRD outside of the Project.

5 Project Performance Assessment

5.1 Achievement of Project Goals

As noted in Section 2.3, the Project Board's Terms of Reference included the following goals:

- Meet or exceed federal regulations for secondary treatment by December 31, 2020.
- Minimize costs to residents and businesses (lifecycle costs) and provide value for money.
- Optimize opportunities for resource recovery and greenhouse gas reduction.
- Deliver a solution that adds value to the surrounding community and enhances the liveability of neighbourhoods.

The Wastewater Treatment Project met all four of these goals, and the following sub-sections summarise the Project's performance against the goals.

5.1.1 Meet or exceed federal regulations for secondary treatment by December 31, 2020

The McLoughlin Point Wastewater Treatment Plant met and exceeded federal regulations when it commenced treating the Core Area's wastewater to a tertiary level before December 31, 2020.

Tertiary treatment is one of the highest levels of wastewater treatment available. For context:

- Two key regulated parameters for wastewater are total suspended solids (TSS) and carbonaceous 5-day biochemical oxygen demand (BOD₅);
- The Federal Wastewater Systems Effluent Regulations, which fall under the Fisheries Act, require the Core Area's wastewater to be treated such that the effluent discharged from the McLoughlin Point Wastewater Treatment Plant not exceed 25 mg/litre for those two key parameters (TSS and BOD₅); and
- The McLoughlin Point Wastewater Treatment Plant is capable of treating effluent such that those two key parameters (TSS and BOD₅) do not exceed, on average, 10 mg/litre.

Tertiary treatment was included in the Project as, during the development of the Business Case (which defined the scope of the Project), the Project Board concluded that there was a benefit to tertiary treatment for the following reason: the region places a high value on the environment and the public commentary suggested a widespread desire to do as much as is reasonably possible to treat the effluent, while recognizing cost implications.

The provision of tertiary treatment means that, in addition to treating the effluent such that it has lower TSS and BOD₅ than would be the case if the McLoughlin Point Wastewater Treatment Plant only met the federal regulatory requirements, more compounds of emerging concern, such as pharmaceuticals, hormones, microplastics and other contaminants are also removed from the effluent prior to discharge into the ocean.

5.1.2 Minimize costs to residents and businesses (lifecycle costs) and provide value for money

The Project met this goal through:

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- identifying a cost effective Project scope and configuration;
- the capacity of the McLoughlin Point Wastewater Treatment Plant (which is sufficient to accommodate regional population growth) and its ability to: treat wastewater to a tertiary level, and add disinfection in the future if required;
- the execution of funding agreements for a significant portion (60%) of the Project's total cost;
- the use of competitive selection procurement processes for all construction contracts, to ensure competitive pricing was received, and the consideration of lifecycle costs in the evaluation of those procurements;
- the consideration of lifecycle costs during design development; and
- proactive risk management.

As part of the scoping of the Project, and as detailed in the Business Case, the Project Board evaluated a large number of options to identify a short list that best addressed the Project's goals. The Project Board developed detailed cost estimates for the short-listed options, ranked the short list using triple bottom line (economic, social and environmental) criteria, and identified the Project's scope and configuration as the best option to meet the Project goals and provide a sensible, cost-effective solution that was consistent with the views expressed by CRD residents.

Several design elements were included to allow the McLoughlin Point Wastewater Treatment Plant to meet the region's future capacity and treatment requirements more cost-effectively than if the Plant was to be retrofitted at a later date:

- Based on wastewater flow projections, the McLoughlin Point Wastewater Treatment Plant has been built with sufficient capacity to treat the core area's wastewater and accommodate regional population growth to at least 2040, and the Plant has been designed and built such that the capacity could be increased to accommodate population growth beyond 2040.
- The inclusion of tertiary treatment exceeds the current regulatory requirements. There are many compounds of emerging concern that are currently unregulated, but are being researched and may become regulated in the future. The provision of tertiary treatment at the McLoughlin Point Wastewater Treatment Plant means that it has the capability to meet more stringent regulations than exist today.
- The Plant has been built with the flexibility to add ultra-violet disinfection treatment to the process in the future if desired. While disinfection is not included in the Plant at this time (see section 4.1.1 for information regarding why there would be little to no benefit to installing disinfection at this time), building the Plant with the space for disinfection allows for it to be more cost-effectively added in the future if required.

After the CRD Board approved the Project's scope and configuration, funding agreements were executed with the federal and provincial governments, providing funding for 60% of the Project's budget. Table 3 summarises the total committed funding, and the funding received to-date. Note that the timing for the provision of Government of British Columbia and Government of Canada's funding differs by funding source. The Project Team have, and the CRD will continue to, submit claims to the funding partners in accordance with the relevant funding agreements. In accordance with the funding agreements, the remainder of the funding cannot be claimed until the Residuals Treatment Facility obtains service commencement.

APPENDIX A*Table 3 - Project Funding*

Funding Source	Funding Received To-Date	Total Funding Committed
Government of Canada (Building Canada Fund)	\$120M	\$120M
Government of Canada (Green Infrastructure Fund)	\$45M	\$50M
Government of Canada (P3 Canada Fund)	-	\$41M
Government of British Columbia	\$186M	\$248M
Federation of Canadian Municipalities	-	\$0.3M
Total Federal and Provincial Funding	\$351M	\$459.3M

Competitive selection procurement processes were used for all construction contracts. These were advertised on BC Bid and open for participation by any interested party to ensure competitive pricing was received. In addition, lifecycle costs were factored into the evaluation of proposals received in response to competitive selection processes. Some examples of factoring lifecycle costs into procurement evaluations include:

- **Residuals Treatment Facility:** the evaluation was based on the total cost to the CRD (inclusive of the estimated costs of transporting and beneficially-using the biosolids produced by the Residuals Treatment Facility) rather than just that portion to be funded by the Project (being the capital cost of constructing the facility).
- **Replacement of the existing Macaulay Point Pump Station:** the Project scope approved in the Business Case included an upgrade to the existing Macaulay Point Pump Station - to include a new building and alterations to the existing building. The original Macaulay Point Pump Station was built in 1972 and would have required significant upgrades to allow it to continue to be safely operated as well as a significant expansion to allow it to pump wastewater to the McLoughlin Point Wastewater Treatment Plant. The Project Team ran a competitive selection process for the design and build of the upgrade and expansion required to the Macaulay Point Pump Station, and selected a proposal that entailed demolition of the existing pump station and replacing it with a new pump station. This solution provides improved operating efficiency, and therefore lower operating and maintenance costs: investing in a new pump station as part of the Project, rather than paying to upgrade and maintain the existing pump station, provides better overall value to the CRD.
- **Clover Point Pump Station:** the evaluation accounted for the life cycle costs associated with the proponent's design solution, including the forecast cost of powering, operating, maintaining and replacing certain systems, equipment and portions of the pump station.

Throughout the design development and delivery of each Project component, lifecycle costs were factored into decisions. Some examples of lifecycle costs driving design decisions include:

- **The replacement of the Macaulay inlet sewer:** the original design was based on utilizing the existing inlet sewer to convey wastewater to the new pumping station. When the inlet sewer was exposed it was clear that corrosion had degraded the integrity of the pipe to the point where it could no longer be utilized. Options were

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developed and evaluated on the basis of their construction cost and value to the CRD, and the replacement of the inlet sewer was selected as the option that minimized the lifecycle cost.

- Adding the capability to clean the Clover inlet channel: construction of the Clover Point Pump Station revealed substantive debris build-up in the inlet channel, from years of operations. Project funds have been committed to install infrastructure that will allow the CRD to clear debris from the inlet channel as needed.
- Capital investment at the Residuals Treatment Facility, to enable it to treat other municipal residual solids: while not part of the base scope of the Project (as defined in the Business Case), the inclusion of receiving facilities at the Residuals Treatment Facility provides value to the CRD as it allows the Residuals Treatment Facility to treat up to 3,100 kg/day of liquid and dewatered residual solids, while the Residuals Treatment Facility has surplus capacity (i.e. while the actual flow from the McLoughlin Point Wastewater Treatment Plant is less than the 2040 expected flow). This capital investment provides the CRD with a cost sharing and/or recovery option.
- Building the return Residual Solids Conveyance Line with sufficient capacity to convey leachate from Hartland Landfill - as well as centrate from the Residuals Treatment Facility – to Marigold Pump Station, from where it will be conveyed to the McLoughlin Point Wastewater Treatment Plant through the CRD's existing conveyance system: while this significantly-increased the capital cost borne by the Project it provided significant value to the CRD, as it allowed for: the existing line to be decommissioned, and provided a new line with increased capacity and lower maintenance costs.

Risk management on the Project involved the identification, analysis, oversight, management and monitoring of the Project risks. Project risks were reported monthly, and by proactively managing these risks the Project was able to address risks in a cost-effective way throughout the delivery of the Project. This was supported by the findings of Ernst and Young when they conducted an independent project execution review part-way through Project delivery (in April 2019), and reported:

- a strong risk-aware culture that was supported by well-defined processes and risk registers;
- the Project Team had put careful consideration into risk transfer when structuring contracts. Notable and leading industry practices around controlling mechanisms are in place, including incentive and penalty clauses; and
- Project reporting to be comprehensive and forward-looking, with commentary to provide the necessary context around key items.

5.1.3 Optimize opportunities for resource recovery and greenhouse gas reduction

The Project met this goal by:

- considering environmental implications when defining the Project's scope and configuration: the configuration of the Project was selected from a shortlist of options using a triple bottom line approach (economic, social and environmental). The

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environmental aspect of this approach rated options based on the carbon footprint and potential for resource recovery; and

- constructing Project facilities with the following features:
 - the operations and maintenance building at the McLoughlin Point Wastewater Treatment Plant was built to the level of LEED (Leadership in Energy and Environmental Design) Gold, providing energy and water consumption reductions that exceed building code requirements. Some of the design features that contributed to the operations and maintenance building being built to the level of LEED Gold are:
 - the heat recovery system: prior to discharge to the ocean, the effluent passes through heat exchangers which remove heat from the wastewater and use it to heat water which is in turn circulated throughout the building to air handling units, and unit heaters, to heat the operations and maintenance building.
 - a green roof covering 80% of the operations and maintenance building (over 1,600 m²) increases onsite habitat, provides stormwater management and contributes to reducing the heat island effect.
 - at the Residuals Treatment Facility:
 - the operations and maintenance building was designed and constructed in accordance with Leadership in Energy and Environmental Design (LEED) principles,
 - the process buildings incorporate sustainable design initiatives such as long-lasting building materials and water and energy efficiency
 - biogas produced during the treatment process is captured and utilized as an energy source, making the facility thermally self-sufficient.
 - the design of the Macaulay Point pump station incorporates LEED principles and sustainable design elements, such as:
 - rainwater run-off control using a rain garden and storm water management system;
 - the use of native plants to reduce irrigation requirements;
 - low-level lighting to minimize light pollution; and
 - green roof and increased open space.

5.1.4 Deliver a solution that adds value to the surrounding community and enhances the livability of neighborhoods

The Wastewater Treatment Project met this goal through working with the Township of Esquimalt, the City of Victoria, the District of Saanich, the Esquimalt and Songhees Nations, the Greater Victoria Harbour Authority and the Department of National Defence to identify amenities and/or infrastructure improvements that were either funded by the Project, or funded and delivered by the Project.

All Project components have also been designed to minimize their impacts on their host communities, including through the inclusion of advanced odour treatment such that there is no detectable odour by residents.

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5.1.4.1 Township of Esquimalt

As part of the Host Community Impact 5-year Agreement the CRD has provided \$17 million to the Township of Esquimalt, with:

- \$7 million to be used for the improvement of waterfront parks;
- \$5 million to be used for the improvement of public space within recreational facilities; and
- \$5 million to be used for the construction, addition or improvement of emergency services and public safety facilities within the Township.

The delivered Project scope also considered the appearance of CRD wastewater facilities and the addition of neighbourhood amenities and public space improvements, including:

- Situated at the entrance of Victoria Harbour, the design of the McLoughlin Point Wastewater Treatment Plant respects the setting and incorporates the highest standards of design, materials and aesthetics. The design includes a multi-level green roof, mature landscaping, observation deck, and education space.
- The Macaulay Point Pump Station was designed to reflect its location on the waterfront and integrate it into the surrounding area. It transformed an almost entirely impermeable lot into an environmentally-rich, park-like setting with public amenities for the community to enjoy.

5.1.4.2 City of Victoria

Public space improvements were made by the Project as part of constructing the Clover Point Pump Station and the Clover Forcemain. Delivered improvements fully-funded by the Project included:

- At Clover Point: a public plaza, public washroom, bicycle facilities and drinking fountains; and
- Along the route of the Clover Forcemain: a multi-use path, benches, wayfinding signage, new sidewalks, and intersection improvements.

In addition to the above improvements that were fully-funded by the Project, the Project Team worked with the City of Victoria to incorporate streetscape improvements that were funded by the City and delivered by the Project's contractor more cost-effectively and with less construction impacts to residents than would otherwise have been possible.

5.1.4.3 District of Saanich

A land exchange was organized with the District of Saanich which added 2.8 hectares of land to Saanich's park inventory and secured the long-term preservation of the vast majority of Haro Woods. It also allowed the Arbutus Attenuation Tank to be installed on lands that were already partially cleared and previously disturbed. A blanket easement was also granted to the District of Saanich to allow for recreational use of the Arbutus Attenuation Tank site which will be planted with vegetation considering the local woodland setting following construction.

Funding will also be provided to the District of Saanich for infrastructure improvements including a new bike lane, sidewalk, and storm water management improvements along Arbutus road, next to the Arbutus Attenuation Tank, as well as providing traffic calming measures and pedestrian connectivity in neighbourhoods along the Residual Solids Conveyance Line.

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As part of the work for the Residuals Treatment Facility, improvements were made to the level of water service to properties in the vicinity of the Hartland Landfill.

5.1.4.4 Songhees and Esquimalt Nations

Support agreements were signed with the Songhees and Esquimalt Nations, providing a number of benefits, including the provision of funding to assist in the upgrading and development of the Westbay Marine Village Marina and R.V. Park. The CRD also worked with the Songhees and Esquimalt Nations to procure Indigenous art for display outside the Macaulay Point Pump Station. Further context is provided in sections 2.2 and 5.2.4.1 of this report.

5.1.4.5 Greater Victoria Harbour Authority

After installing a portion of the Clover Forcemain within land owned by the Greater Victoria Harbour Authority (GVHA) and using a plot of GVHA's land as a temporary staging area for the Project, the Project worked with the GVHA to discuss how the land should be restored. After the GVHA reviewed and approved the restoration plan for this location the Project restored the land to a condition that met their needs, which included planting grass and installing a gravel parking lot.

5.1.4.6 Department of National Defence

Temporary laydown areas were put in place on several parcels of land owned by the Department of National Defence (DND). Restoration of this land was completed in consultation with DND staff and the Project implemented identified improvements including: the construction of a new fenced and lit storage yard; improvements to the fencing and grading at the community garden; planting of boulevard trees to provide shade to resident housing and improvements to staff parking areas near Macaulay Point.

5.2 Key Performance Indicators Dashboard

As established in the Project Charter, the realization of the Project's vision and goals was monitored against the Project's key performance indicators, and the Project Director reported performance against these key performance indicators to the Project Board on a monthly basis. The key performance indicators at Project Completion have been assessed to be as shown in Table 4, and as described in the following sub-sections of this report.

APPENDIX A*Table 4 – Status of Key Performance Indicators at Project Completion*

Key Performance Indicators		Project Overall	Comments
Safety	Deliver the Project safely with zero fatalities and a total recordable incident frequency (TRIF) of no more than 1*.		As of May 2021, the vast majority of construction has been completed (the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining), there have been zero fatalities and the TRIF was 1.5. While this exceeds the Project's ambitious target of no more than 1, it was less than half the industry average: WorkSafe BC records the TRIF for various industries, and for 2018 (the most recent year for which information has been published) the TRIF for heavy construction was 3.2. See section 5.2.1.
Environment	Protect the environment by meeting all legislated environmental requirements and optimizing opportunities for resource recovery and greenhouse gas reduction.		The Project met all legislated environmental requirements and, through the design of the various components optimized opportunities for resource recovery and greenhouse gas reduction. Over the course of construction there were a relatively small number of environmental incidents: they were all diligently-managed, appropriately-reported and mitigated as required, with the result that there weren't any long-term impacts. An unexpectedly-significant environmental benefit of the Project included the remediation of McLoughlin Point. See section 5.2.2 for further information.
Regulatory Requirements	Deliver the Project such that the Core Area complies with provincial and federal wastewater regulations.		Through the addition of the Project components to the core area wastewater system, the system can be operated in compliance with provincial and federal wastewater regulations. See section 5.2.3 for further information.
Stakeholders	Continue to build and maintain positive relationships with First Nations, local governments, communities, and other stakeholders.		Significant efforts were made to engage with and provide accurate and timely information to stakeholders throughout the delivery of the Project. Through these efforts and the achievement of the Project's goals, positive relationships were built and maintained with First Nations, local governments, communities, and other stakeholders. See section 5.2.4.
Schedule	Deliver the Project by December 31, 2020.		The Project completed the majority of construction by December 31, 2020, and achieved its schedule-related goal, which was to meet or exceed federal regulations for secondary treatment of wastewater by December 31, 2020. All aspects of the Project that were required to meet the regulatory requirements were delivered by December 31, 2020. As of May 2021, commissioning of the Residuals Treatment Facility is ongoing and is anticipated to be complete in June 2021, and the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining. See section 5.2.5 for further information.
Cost	Deliver the Project within the Control Budget (\$765 million).		While the total Project cost will not be known until total completion of all contracts, which is anticipated to occur in the last quarter of 2021, it is forecast that the total Project cost will be approximately \$766.7M, which is within the approved budget of \$775M. The total Project cost is therefore forecast to exceed the Project's Control Budget (of \$765M) by 0.2%, but be well within the budget subsequently-approved by the CRD Board (of \$775M). See Section 5.2.6 for further information.

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* A TRIF of no more than 1 means that there is 1 or fewer recordable incidents (being a work-related injury or illness that requires medical treatment beyond first aid or causes death, days away from work, restricted work or transfer to another job, or loss of consciousness) for every 200,000 person-hours of work

Status	Description
	Significant adverse effect of KPI not being met
	KPI not met but outcome managed
	KPI achieved

5.2.1 Safety

Safety was the Project's top priority: safety of the public, construction workers and CRD staff, including those responsible for delivery of the Project and for its ongoing operation and maintenance.

The Project's safety key performance indicator was to deliver the Project safely with zero fatalities and a total recordable incident frequency (TRIF) of no more than 1. A TRIF of no more than 1 is an ambitious target that means that there is 1 or fewer recordable incidents (being a work-related injury or illness that requires medical treatment beyond first aid or causes death, days away from work, restricted work or transfer to another job, or loss of consciousness) for every 200,000 person-hours of work.

Safety information for the Project is summarised in Table 5 for the period up to May 2021, at which time the vast majority of construction was complete (the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining), there have been zero fatalities and the TRIF was 1.5. While this exceeds the Project's ambitious target of no more than 1, it was less than half the industry average: WorkSafe BC records the TRIF for various industries, and for 2018 (the most recent year for which information has been published) the TRIF for heavy construction was 3.2.

Table 5: Project Safety Information

	Project Total
	Person Hours (Sept 2016 – May 2021)
Project Management Office Hours	171,264
Project Contractor Hours	2,364,950
Total Person Hours	2,536,222
	Number of Incidents (Sept 2016 – May 2021)
Near Miss Reports	49
High Potential Near Miss Reports	7
Report Only	190
First Aid	69
Medical Aid	12
Medical Aid (Modified Duty)	2
Lost Time	5
Total Recordable Incidents	19
	Project Frequency (from January 1, 2017)
First Aid Frequency	5.4
Medical Aid Frequency	1.1
Lost time Frequency	0.4
Total Recordable Incident Frequency	1.5

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The responsibility for safety on each of the Project sites was delegated to a prime contractor (being the contractor for that Project site) under section 118 of the Workers Compensation Act (British Columbia). Each prime contractor was required to designate a site safety representative and submit site safety management and traffic management plans for the Project Team's review prior to commencing construction.

The Project Team validated that each contractor met their safety requirements through a robust oversight and audit program. The Project Team continued to emphasise the importance of safety to every prime contractor, including through:

- mandating and participating in hazard and operability safety reviews during design progression;
- reviewing and commenting on design submittals considering safety impacts;
- reviewing and commenting on contractors' safety and traffic management plans;
- monitoring contractors' performance for conformance to their safety and traffic management plans; and
- reviewing the prime contractors' and their subcontractors' safety performance.

In addition, while the Project Team understood that, although the responsibility for safety on each Project site was delegated to a prime contractor, safety remains everybody's responsibility at all times, and maintained a strong safety-first culture throughout the delivery of the Project.

The Project Team believe that the ambitious TRIF target, focus on safety as the Project's top priority, and commitment to continuous improvement in safety management resulted in the Project being delivered more safely than would otherwise have been the case. The effectiveness of this focus was demonstrated by the independent review of the Project's safety management system, conducted by Allman Safety part-way through Project delivery in April 2019, which found that:

- There was strong and obvious commitment from senior management to remove or minimize risk in the workplace.
- The Safety Management System meets or exceeds industry health and safety standards and regulatory requirements.
- Prime contractor safety programs have improved under the direction of the project team to be complete and compliant.
- The communication strategy for safety improvement from contractors to the project team and from the project team to the contractors is both electronic and verbal and is effective in both directions.
- There is evidence that the organization has continuing strategies to reduce unsafe conditions.
- Leading and lagging indicators are reported and reviewed to focus attention on target areas.
- There has been continuous improvement in safety response by contractors, with still more room for improvement.

5.2.2 Environment

The Project's environment key performance indicator was to protect the environment by meeting all legislated environmental requirements and optimizing opportunities for resource recovery and greenhouse gas reduction.

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The Project met this key performance indicator: see Section 5.1.3 for how the Project optimized opportunities for resource recovery and greenhouse gas reduction; the Project also protected the environment by meeting all legislated environmental requirements.

The Project Team's approach to environmental and regulatory management was multi-faceted and included activities during design, procurement and construction, including:

- Preparing Environmental Impact Studies, to inform the design and configuration of the Project in order to minimise environmental impacts at the outset, and to identify mitigation measures to reduce potential environmental impacts;
- Designing the Project to ensure the scope meets: legislative requirements, approval conditions, and incorporates Leadership in Energy and Environmental Design (LEED) or equivalent principles, as applicable;
- Retaining an archaeological advisor to provide advice and assistance with respect to archaeological management for the Project as a whole;
- Including robust environmental protection, monitoring and reporting requirements in construction contracts, including the requirement for each contractor to appoint a qualified professional to monitor the contractor's compliance with environmental laws, environmental aspects of applicable permits, archaeological protection, and contaminated soil management;
- Reviewing contractors' environmental management plans, environmental protection plans and regulatory approval plans – both upon initial submission and as construction progresses to ensure that the plans remain valid and are updated as warranted by, for example, the introduction of new work methods or regulatory requirements; and
- Auditing contractors' environmental performance, including through:
 - The review of any environmental incidents to confirm the accuracy and sufficiency of reporting, to discuss "lessons learned", and to go over how corrective actions are implemented;
 - conducting site tours and monitoring contractors' construction activities to confirm contractors are following their environmental protection plans; and
 - conducting periodic meetings with contractor's site and environmental representatives to review environmental performance.

This approach was effective in protecting the environment throughout the course of construction – which occurred at over 26 active work sites - as evidenced by the fact that there were a relatively small number of environmental incidents, and they were all diligently-managed, appropriately-reported and mitigated as required, with the result that there weren't any long-term impacts.

Most environmental incidents were minor in nature and did not result in any impacts on the environment. A typical example would be a low-volume release of hydraulic fluid as a result of equipment breakage, with the release being immediately contained.

Three environmental incidents occurred that were more significant and had the potential to have adverse effects, but the rapid implementation of appropriate mitigative action and oversight by environmental professionals avoided any significant long-term impacts:

- In November 2018, Vancouver Pile Driving, a subcontractor to Harbour Resource Partner (Harbour Resource Partners, the Design-Build Contractor for the McLoughlin

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- Point Wastewater Treatment Plant) towed a scow loaded with material dredged as part of the construction of the McLoughlin Point Wastewater Treatment Plant outfall to Bamberton in the Saanich Inlet. The scow was towed to Bamberton as the dredged material was previously identified as contaminated (from activities unrelated to the Project) and there is a suitable disposal site near Bamberton. The scow was tied up for the night and the following morning the starboard stern corner of the scow was observed to be listing heavily. Van Pile notified Harbour Resource Partners, the Coast Guard and Provincial Emergency Management Program. The Coast Guard arrived on site that morning and deployed containment booms around the scow. Van Pile initiated activities to right the scow and by the morning of November 16, 2018 the scow was floating safely and crews offloaded the remaining dredged material. The Coast Guard returned that morning and removed the containment booms. Coast Guard and Transport Canada investigations determined that no hydrocarbons were released to the environment during the incident, and Van Pile determined that no dredged material entered the water. Harbour Resource Partners' qualified environmental professionals took water samples on November 15 and 16, 2018 to assess potential effects on water quality. They determined that inside of the containment boom the incident resulted in Provincial Water Quality standards for turbidity and total suspended solids being exceeded for a period of less than 24 hours. Outside of the containment boom there were no water quality guideline exceedances. The Province determined that the incident was not reportable, and Harbour Resource Partners' qualified environmental professionals determined that there were no adverse environmental impacts from the incident.
- In August 2019, Knappett (the Construction Contractor for Residual Solids Pump Stations), was preparing to install the Residual Solids Conveyance Line under the Colquitz Creek and experienced challenges with dewatering and isolation of the work area, leading to sediment releases that resulted in short-term increases in turbidity. The sediment releases were reported to federal and provincial authorities and instream work was temporarily-suspended while the construction plan was revised. The water quality remained within BC Water Quality Guidelines, and due to the short duration of the turbidity increases, Knappett's qualified environmental professional determined it is unlikely that there were any adverse effects on fish or fish habitat. In September once the new plan was implemented, work resumed and a different isolation methodology was employed, allowing the Residual Solids Conveyance Line to be installed successfully. Prior to placement of spawning gravel and completion of backfilling, a large rain event resulted in the isolated work area being inundated. In response, Knappett removed the isolation dams, as they were no longer required to finish the work. The inundation and dam removal also led to sediment releases that created short-term turbidity increases, but again, water quality remained within BC Water Quality Guidelines, and due to the short duration of the turbidity increases, Knappett's qualified environmental professional determined it was unlikely that there were any adverse effects on fish or fish habitat. The instream work was completed without further incident, and restoration and stream enhancement work conducted. This included placement of spawning gravel, removal of invasive plant species and planting of native riparian vegetation. The stream enhancement was successful, and Coho spawners have been observed using the installed spawning gravel.
 - In October 2020, there was a release of residual solids at the Residuals Treatment Facility site. A temporary pipe failed during the commissioning process. Some of the

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residual solids were contained on-site (within Hartland Landfill) but some travelled through a culvert and collected in a nearby low area in the CRD's Mount Work Regional Park. The release was reported to Emergency Management BC, in accordance with the Spill Reporting Regulation. Qualified environmental professionals assessed the affected area and provided oversight over remediation activities, including on the appropriate monitoring and testing protocols. It was determined that there was no surface flow to Durrance Lake but samples were taken as a precaution: microbiological indicators in the samples were present at consistent or slightly lower levels than prior to the incident, demonstrating that the release did not impact Durrance Lake.

The fundamental purpose of constructing the Project was to treat the core area's wastewater prior to its discharge into the marine environment, thereby reducing pollution in the Strait of Juan de Fuca and contributing to the overall health of aquatic ecosystems in the area.

In addition to the fundamental environmental benefit of constructing the Project, an unexpectedly-significant environmental benefit of the Project was the remediation of McLoughlin Point. The McLoughlin Point site was contaminated as a result of its previous use as an oil tank farm. As part of the Project a significant amount of contaminated materials were removed from the site (and disposed of in regulated landfills), and the site was remediated to meet the applicable standards set by the Environmental Management Act ("EMA") and the Contaminated Sites Regulation ("Regulation") - as documented by the Certificate of Compliance issued by the Province.

5.2.3 Regulatory Requirements

The Project's regulatory requirements key performance indicator was to deliver the Project such that the Core Area complies with provincial and federal wastewater regulations.

The Project met this key performance indicator: see Section 5.1.1 for how the Project exceeded federal wastewater regulations; the delivered Project also complies with provincial wastewater regulations, as demonstrated by the registration of the Project under the Municipal Wastewater Regulation.

For further context, the provincial regulations comprise two main elements:

- Effluent quality requirements for treated wastewater discharged out of McLoughlin Point outfall, which the Project enables the CRD to meet through the provision of tertiary treatment at the McLoughlin Point Wastewater Treatment Plant; and
- The circumstances under which untreated wastewater can be discharged out of the core area's other outfalls, which the Project enables the CRD to meet through the Project components that expand the existing conveyance capacity (namely the construction of the Trent Forcemain and Arbutus Attenuation Tank). For context, in addition to the McLoughlin Point outfall (a new, 2km-long outfall built as part of the Project), the core area wastewater system includes a number of outfalls and overflow locations that are utilised in wet weather events. The provincial regulation requires that an overflow must not occur during storm or snowmelt events with a return period of less than five years, other than, as allowed by the Core Area Liquid Waste Management Plan.

The addition of the Project components to the core area wastewater system means that, based on current wastewater flow projections:

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- The McLoughlin Point Wastewater Treatment Plant has sufficient capacity to treat the core area's wastewater and accommodate regional population growth to at least 2040; and
- The conveyance system has sufficient capacity to meet and exceed the following Core Area Liquid Waste Management Plan (CALWMP) commitments past 2045:
 - all wet weather flows up to four times the average dry weather flow (4 x ADWF) from the Macaulay Point catchment will be conveyed to McLoughlin Point for treatment;
 - all wet weather flows up to 3 x ADWF from the Clover Point catchment will be conveyed to McLoughlin Point for treatment;
 - no overflows will occur for a wet weather event with less than a 100-year return period at any of the high sensitivity receiving waters along the East Coast (i.e. Broom Road or Bowker Creek); and
 - no overflows will occur for a wet weather event with less than a 5-year return period at any of the receiving waters along the East Coast (i.e. Finnerty and McMicking Points), with the exception of those associated with the combined sewer system.

Note that there will continue to be overflows at Humber and Rutland. These overflows occur as portions of the collection system in Oak Bay have combined sewer systems that carry both sanitary (municipal wastewater) and storm flows. The Project was not scoped to reduce these overflows: Amendment No. 12 to the CALWMP – which entails undertakings independent of the Project - is intended to address this.

5.2.4 Stakeholders

The Project's stakeholders key performance indicator was to continue to build and maintain positive relationships with First Nations, local governments, communities, and other stakeholders. Significant efforts were made to engage with and provide accurate and timely information to stakeholders throughout the delivery of the Project. Through these efforts, which are summarised in the following subsections, and the achievement of the Project's goals, positive relationships were built and maintained with First Nations, local governments, communities, and other stakeholders.

5.2.4.1 First Nations

As outlined in section 2.2 of this report, the Core Area lies within or near the traditional territories of 16 First Nations. The CRD has been engaged in consultations with First Nations relating to wastewater treatment since 2006, and in relation to the Project since 2014.

The First Nations most closely associated with the Project are the Esquimalt and Songhees, historically known as the "*Lekwungen*". Their communities are located in the Core Area within several kilometres of the McLoughlin Point Wastewater Treatment Plant and other important components of the Project. The Esquimalt and Songhees support the goals of the Project and are participants in the Core Area wastewater system through service agreements. The Chiefs from each Nation are members of the Core Area Liquid Waste Management Committee. The Esquimalt and Songhees have leased land in the Victoria Harbour to the Project for use during construction. In recognition of their assistance in the planning and development of the wastewater system, and in recognition of their right to be consulted about the potential impacts of the Project on their Douglas Treaty rights, the CRD entered into support agreements with each of them. These agreements provide, amongst other things, for an Esquimalt Nation liaison

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position and a Songhees Nation liaison position for the four year term of the Project. The liaison representatives have been assisting the CRD in its communications with the Esquimalt and Songhees communities, in the administration of protocols involving potential impacts on ancestral remains and their traditional lands, and in the discussion and management of other important Project-related issues.

There are four First Nations with communities near the Core Area, but outside the Core Area wastewater system. They are STÁUTW (Tsawout), WSIKEM (Tseycum), WJOLELP (Tsartlip), and BOKEĆEN (Pauquachin). These Nations are known as the WSÁNEĆ Nations, and the Residuals Treatment Facility and parts of the conveyance system are located on municipal roads or CRD lands within their traditional territories. The CRD and the WSÁNEĆ Leadership Council engaged in discussions about the construction and operation of Wastewater Treatment Project components in WSÁNEĆ Territory, and in December 2019 entered into a Memorandum of Understanding to provide capacity funding to allow this productive engagement to continue. In addition to providing capacity funding, the Memorandum of Understanding commits the CRD to move toward a negotiated agreement that considers the Project's presence within WSÁNEĆ territory, and engage in further discussions towards an agreement involving the broader relationship between CRD and the WSÁNEĆ Nations that takes into consideration CRD's operations within WSÁNEĆ territory and the recommendations of CRD's First Nations Task Force Final Report as adopted by the Board of the CRD.

There are ten other First Nations with Treaty rights in the general vicinity of the Core Area, which are primarily fishing rights in the Strait of Juan de Fuca. These Nations are the Scia'new (Beecher Bay), Stz'uminus, Halalt, Penelakut Tribe, T'Sou-ke, Lyackson, MÁLEXEL (Malahat), Lake Cowichan, Cowichan Tribes, and Nanoose First Nation (which is included because it is represented by a tribal association, the Te'mexw Treaty Association, which was formed by some of these Nations). The CRD concluded that the construction and operation of the Project, including the construction of outfall pipes, will not conflict with any of the Douglas Treaty rights of these Nations but, throughout the delivery of the Project, kept them informed of Project activities, especially as they relate to beneficial outcomes in the marine environment.

5.2.4.2 Communications and Engagement Plan

The key focus of the Project's communications and engagement activities were to keep residents and stakeholders informed of project plans, progress and construction information, and to receive and respond to questions and concerns raised by the community. Working in conjunction with CRD Corporate Communications, and utilising tools and developed relationships, the engagement and communications program included:

- Communications Planning, which involved developing plans and strategies in support of the Project;
- Community Relations, which involved building and maintaining positive relationships with First Nations, local governments, communities and other stakeholders, and keeping them informed through ongoing, two-way communications regarding the Project, and responding to inquiries in an effective and timely manner;
- Public Engagement, which involved gathering and receiving public input on certain aspects of the Project;
- Media Relations, which involved providing the media with progress reports and updates on the Project and responding to issues raised; and

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- Construction Communications, which involved developing traffic management plans and a process to keep the public and stakeholders advised in a timely manner about matters relating to construction progress, schedules and impacts.

The Project Team prepared, implemented and annually updated a Project Communications and Engagement Plan. A variety of communications tools and engagement activities were utilized to support the implementation of the plan and ensure that information was easily accessible and distributed through a variety of methods. These included stakeholder meetings, Project website updates, social media posts, media updates for key Project milestones, construction notifications, door-to-door notifications, and a public inquiry program, among other methods.

The Project facilitated ongoing two-way community and stakeholder communications to ensure the public and stakeholders were well-informed; responded to inquiries; and ensured that Project managers were mindful of community interests and concerns. The communications and engagement team communicated with stakeholders, community groups, businesses and the public regarding Project schedules, progress, developments and construction information.

A liaison committee was set up for the Township of Esquimalt to provide a forum for the discussion of issues related to the construction and operation of the Wastewater Treatment Plant, the Macaulay Point Pump Station and Forcemain, and the Residual Solids Conveyance Line. The committee includes representatives from the Township of Esquimalt, West Bay Residents Association, Lyall Street Action Committee, Macaulay Elementary School Parent Advisory Committee, Department of National Defence, CRD, McLoughlin Point Wastewater Treatment Plant contractor Harbour Resource Partners, Macaulay Point Pump Station and Forcemain contractor Kenaidan Contracting Ltd. and Residual Solids Conveyance Line contractor Don Mann Excavating. This committee met monthly during construction and will continue to meet semiannually now that the McLoughlin Point Wastewater Treatment Plant is operating.

The Project Team met as necessary with three neighbourhood groups in Victoria that were in close proximity to Project Construction: the James Bay Neighbourhood Association, the Fairfield Gonzales Community Association, and the Victoria West Community Association. Engagement with these neighbourhood and community associations was focused on construction progress and disturbance mitigation measures.

The Project Team met with the Saanich Community Association Network (SCAN) and established a relationship with the Willis Point Community Association to provide updates on construction of the Residuals Treatment Facility at Hartland Landfill and the Residual Solids Conveyance Line.

In advance of commencing construction in a new area, community information open houses were a valuable communication tool to provide information about the different components of the Project to the public. Twenty open houses in Esquimalt, Victoria and Saanich were held for this purpose, as summarized in Table 6. Over 1,200 people attended these meetings, which were publicized widely through mailed notices to residents, email, newspaper advertisements, social media, and on the Project website.

APPENDIX A*Table 6 – Community Information Open Houses*

Date	Community
January 11, 2017	Victoria - Fairfield Gonzales
January 11, 2017	Victoria - James Bay
January 12, 2017	Esquimalt
January 14, 2017	Esquimalt
January 18, 2017	Department of National Defence
April 5, 2017	Victoria - James Bay
April 12, 2017	Esquimalt
November 15, 2017	Saanich
November 18, 2017	Saanich
November 22, 2017	Esquimalt
November 27, 2017	Victoria
January 10, 2018	Victoria - James Bay (50%)
January 11, 2018	Victoria - Fairfield Gonzales (50%)
February 21, 2018	Niagara Street Information Meeting
February 24, 2018	Niagara Street Information Meeting
March 13, 2018	Esquimalt - Macaulay
September 25, 2018	Victoria – James Bay, Fairfield Gonzales
September 26, 2018	Victoria – James Bay, Fairfield Gonzales
November 27, 2018	Saanich
November 28, 2018	Saanich

Project updates were produced on a regular basis and at key Project milestones to provide information about the Project. This newsletter-style document highlights construction updates across various components of the Project. The updates were posted to the website, distributed to stakeholders, including MLAs, municipal Mayors and Councillors, and hand delivered to community centres.

In addition, 19 information sheets were developed to provide more details regarding the different Project elements. These information sheets were posted online, emailed to stakeholders and had hard copies distributed as appropriate.

To share specific and targeted information about upcoming construction impacts, 143 construction notices were developed. Each construction notice was hand delivered to residents near the work site, posted online and circulated to stakeholders via email as appropriate. Approximately 9,800 construction notices were hand delivered for this Project.

The Project communications and engagement team worked with the CRD's Senior Manager of Corporate Communications to brief journalists to ensure that local, regional, provincial, national and international media were informed about key Project milestones, and to provide information for timely media responses. The Deputy Project Director was the Project's spokesperson, and regularly spoke to media to provide Project updates.

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An inquiry response program was established to track, record and provide accurate and timely responses to questions or concerns from the public and stakeholders. It comprised an email address (wastewater@crd.bc.ca) and a 24/7 Project information telephone line 1-844-815-6132. Since September 2016, the Project Team responded to 2,127 inquiries, as summarised in Table 7.

Table 7 – Project Inquiries

Inquiry Source	Contacts (September 2016 - May 2021)
Information phone line inquiries	1,221
Email inquiries responded to	906
Total inquiries responded to	2,127

5.2.5 Schedule

The Project's schedule key performance indicator was to deliver the Project by December 31, 2020. The Project completed the majority of construction by that date, and achieved its schedule-related goal, which was to meet or exceed federal regulations for secondary treatment of wastewater by December 31, 2020.

All aspects of the Project that were required to meet the regulatory requirements were delivered by December 31, 2020: in the third quarter of 2020, the Clover Point and Macaulay Point Pump Stations diverted the Core Area's wastewater, through the Clover and Macaulay Forcemains, respectively, to the McLoughlin Point Wastewater Treatment Plant, for tertiary treatment; and from the third quarter of 2020, the Residuals Solids Conveyance Line conveyed residual solids to the Residuals Treatment Facility.

The Residuals Treatment Facility commenced production of class A biosolids later than anticipated, in January 2021, and commissioning of the facility is ongoing and is anticipated to be complete in June 2021.

On the conveyance component of the Project, the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining. The Arbutus Attenuation Tank is being built to increase the capacity of the conveyance system and is expected to be operational in June 2021, and the remaining work on the Clover Point Pump Station is expected to be complete in fall 2021: it has been delayed by the need to remove debris from the inlet channel that has built-up over decades of use.

Figure 17 shows a comparison of the achieved Project schedule against that forecast in the Project Charter – which was a high-level schedule that was developed to be optimised and refined as the Project and planning progressed.

It was noted in the Project Charter that, in order to meet the federal regulations for treatment of the Core Area's wastewater by December 31, 2020, the Project schedule was ambitious. It was further noted that while the Project schedule was achievable there was no float.

Therefore, despite the Project schedule not including an allowance for a global health pandemic (that impacted workforce availability, workforce productivity and equipment and material deliveries), the Project met the goal of meeting or exceeding federal regulations for secondary

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treatment of wastewater by December 31, 2020, and completed the majority of construction by December 31, 2020.

As of May 2021, the vast majority of construction has been completed (the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining). The works remaining under each construction contract are summarised in section 7 of this report, and the Project budget includes committed funds to complete the remaining works and close-out the construction contracts.

Wastewater Treatment Project Schedule

Construction + Commissioning

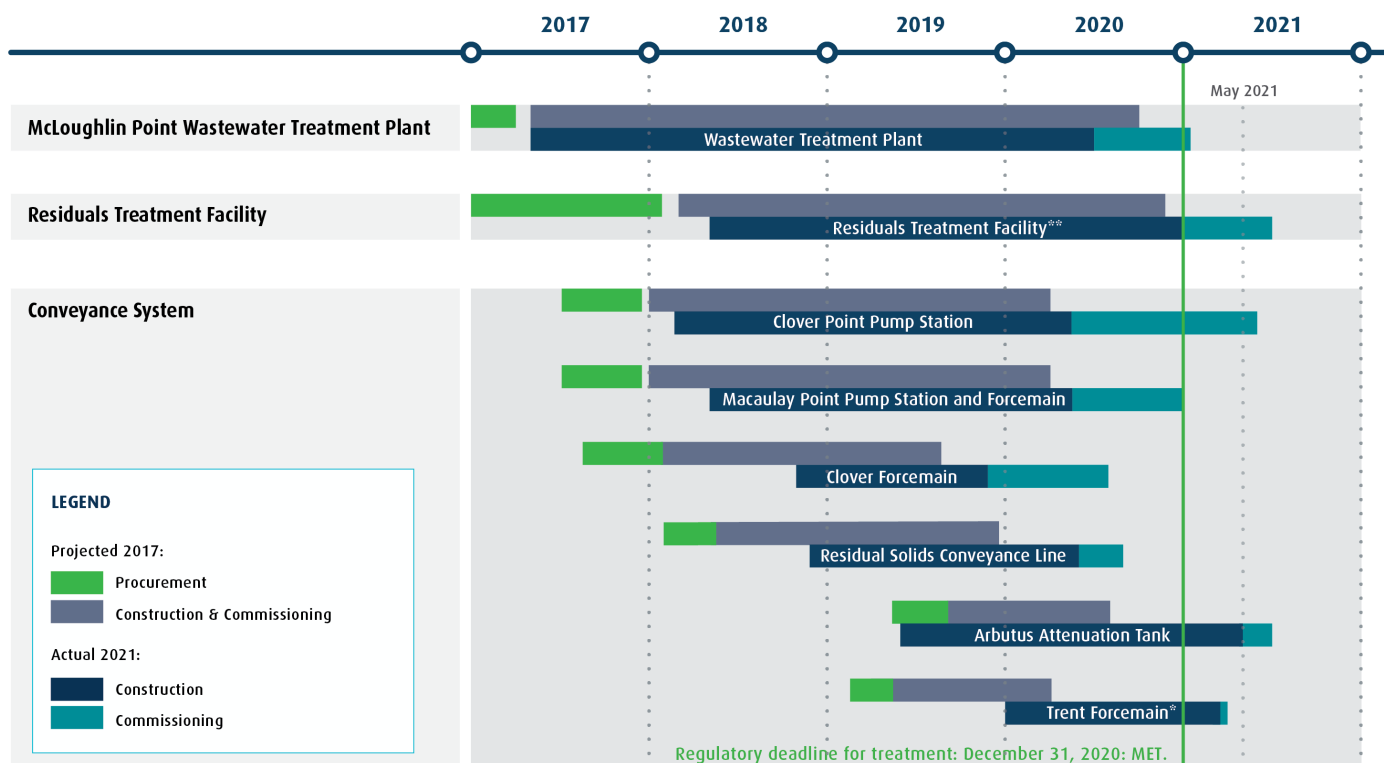


Figure 17 - Schedule comparison: March 2017 forecast to May 2021 actual

Notes to Figure 17:

* In 2019, the Wastewater Treatment Project's scope was refined to remove three components of the conveyance system (expanding the capacity of the Currie Pump Station, twinning the Currie Forcemain and twinning the East Coast Interceptor), as they would provide no benefit to the CRD's residents and businesses.

** The Residuals Treatment Facility commenced production of class A biosolids later than anticipated, in January 2021, and commissioning of the facility is ongoing and is anticipated to be complete in June 2021.

*** The commissioning time period shown is the timeline for each Project contractor to complete their commissioning requirements. Upon each Project contractor completing their commissioning requirements, the responsibility for operating the component is transferred from the relevant Project contractor to the CRD's Integrated Water Services department, who are then responsible for managing the optimisation of the operation of each Project component and any resultant impacts on the operation of the other components of the core area wastewater system.

APPENDIX A**5.2.6 Cost**

The Business Case established the Control Budget of \$765 million. The Project's cost key performance indicator was to deliver the Project within the Control Budget (\$765 million). In May 2019 the CRD Board approved an increase in the Project's budget by \$10M to \$775M.

While the total Project cost will not be known until total completion of all contracts, which is anticipated to occur in Q4 2021, it is forecast that the total Project cost will be approximately \$766.7M, which is within the approved budget of \$775M. The total Project cost is therefore forecast to exceed the Project's Control Budget (of \$765M) by 0.2%, but be well within the budget subsequently-approved by the CRD Board (of \$775M).

The total Project cost forecast of \$766.7M includes:

- costs expended to-date to plan, procure, construct and commission the Project;
- the forecast cost to complete the activities remaining to close-out the construction contracts and the obligations remaining to be fulfilled in the Project's funding, First Nation and land access agreements; and
- an appropriate amount of contingency (\$2.74M), based on the Project Team's assessment of the: status of each component; the risks associated with the remaining work and the outstanding obligations; and the funds and resources committed to complete these.

The total Project cost forecast includes all Project costs, being those incurred in order to plan, procure, construct and commission the Project components. The Project budget does not include the costs to operate and maintain the Project components, which are included in CRD operating budgets. Operating and maintaining costs include (but are not limited to) the costs of: optimising the operation of the Project components after handover from the relevant Project contractor to the CRD's Integrated Water Services department; the cost of the transportation and use of biosolids produced by the Residuals Treatment Facility; the amount by which the operating period payments for the Residuals Treatment Facility exceed the net present value of the capital cost; and the cost of CRD's management of any required warranty work (the Project budget covers the cost of each Project component's warranty, but not the cost of CRD's oversight of warranty work).

Several factors resulted in the Project not meeting its cost KPI. The Project Team reported budget pressures through its monthly reports to the Project Board (and CRD Board) since September 2017, primarily as a result of inflation in the Vancouver Island construction market. Other factors that contributed to budget pressures include: design development to incorporate stakeholder input; geotechnical considerations including removal and disposal of a significant quantity of contaminated material; and schedule constraints associated with the requirement to provide wastewater treatment by the regulatory deadline of December 31, 2020.

In addition, since the onset of the global health pandemic, the Project Team reported cost impacts from the COVID-19 public health emergency. Impacts included labour availability and productivity (as a result of work modifications required to comply with provincial guidelines), and delays to the delivery of equipment and supplies.

Countering these budget pressures, Project risks were diligently and proactively managed, and there were significant cost savings in the Project's forecast financing costs. As outlined in

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section 6.4, these resulted from the CRD's financing strategy, combined with low interest rates and early payment of a significant proportion of the Province's funding.

Attached as Appendix B to this report is a cost report for the Project, showing a detailed breakdown of the budget at April 30, 2021, including costs expended and the forecast funds and contingency required to complete the Project-related commitments and activities that extend beyond May 2021 (see section 7 of this report for further information on those commitments and activities).

5.2.6.1 Project Cost Comparison

Table 8 shows a comparison of total forecast cost compared to the allocated Control Budget approved by the Project Board on June 6, 2017, and Table 9 provides the main reasons for the differences. The allocated Control Budget was used as the basis for the Project Team's management of the budget and reporting, including to control costs, commitments, use of contingency and manage cash flow.

One component of the allocated Control Budget is the Project Management Office (PMO) budget, which was approved by the Project Board on January 10, 2017. At that time, KPMG carried out an exercise to review and benchmark the PMO budget against industry standards. KPMG found that industry standards were that the PMO budget of a project should make up between 5 and 13% of the total project cost, exclusive of engineering costs. KPMG considered the complexity of the Wastewater Treatment Project, and noted that the Project entailed: complex procurements with a number of different contract types (DBB, DBF and DBFOM); integration and commissioning of multiple components; and a significant number of internal and external stakeholders. Based on this assessment of complexity, and the fact that the Project's PMO budget, inclusive of engineering costs, was 10% of the total project cost, KPMG determined that the PMO Budget was well within industry standards.

Table 8 – Comparison of Total Forecast Cost against the Allocated Control Budget (all in \$ millions)

Project Component	Control Budget Approved June 6, 2017	Total Forecast Cost ¹	Variance
McLoughlin Point Wastewater Treatment Plant	\$331.4	\$336.3	(\$4.9)
Residuals Treatment Facility	\$159.4	\$140.2	\$19.2
Conveyance System	\$158.2	\$206.5	(\$48.3)
Project Management Office	\$75.8	\$72.5	\$3.3
BC Hydro	\$12.9	\$2.7	\$10.2
Third Party Commitments	\$8.1	\$8.5	(\$0.4)
Sub-Total	\$745.9	\$766.7²	(\$20.8)
Program Reserve	\$19.2	\$8.3	\$10.9
Total	\$765.0	\$775.0	(\$10.0)

Notes to Table 8:

1. Total forecast cost is the forecast cost at completion, and comprises:

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- a. *\$617.2M of costs expended at April 30, 2021, which includes invoices received and processed before the cut-off for the April 2021 cost period;*
 - b. *\$157.8M of funds to cover:*
 - i. *work completed but not yet invoiced (i.e. invoices for work already completed but not yet invoiced by the cut-off for the April 2021 cost period); and*
 - ii. *the work required to complete the Project-related commitments and activities that extend beyond May 2021 (see section 7 of this report for further information on those commitments and activities); and*
 - c. *\$2.74M of contingency to manage the risks associated with completing the Project-related commitments and activities that extend beyond May 2021, comprising:*
 - i. *\$1M to cover the potential performance incentive payment to HRP, that is payable after the completion of the performance period (which concludes on January 12, 2023), and will be payable at an amount (of up to \$1 million) to be determined based on performance against milestones over the two year performance period; and*
 - ii. *\$1.74M for the conveyance component, which is anticipated to be more than sufficient given the nature of the remaining commitments and activities (see section 7 of this report for further information on those commitments and activities).*
2. *While the total Project cost will not be known until total completion of all contracts, which is anticipated to occur in Q4 2021, it is forecast that the total Project cost will be approximately \$766.7 M, which is within the approved budget of \$775M.*
 3. *A program reserve of \$19.2 million was included in the Control Budget to manage risks impacting the entirety of the Project, or the interface between any of the Project components.*
At April 30, 2021, \$8.3 million remains in program reserve; this is in addition to \$2.74M of contingency that is included within the total forecast cost of \$766.7M, as outlined in note 1 to manage the risks associated with completing the Project-related commitments and activities that extend beyond May 2021.

Table 9 summarises the main reasons for the differences between the total forecast cost compared to the allocated Control Budget approved by the Project Board on June 6, 2017

APPENDIX A*Table 9 – Principal Factors causing Variances between the Total Forecast Cost and the Allocated Control Budget*

Project Component	Variance (\$ millions)	Principal Factors Driving Variance
McLoughlin Point Wastewater Treatment Plant	(\$4.9)	- Significantly greater contamination at site than forecast: see section 5.2.2 for further information - Cost impacts from the COVID-19 public health emergency: impacts included labour availability and productivity (as a result of work modifications required to comply with provincial guidelines). + Lower than forecast financing costs: see section 6.4 for further information
Residuals Treatment Facility	\$19.2	+ Strong market response to procurement (opportunity big enough to attract qualified contractors from across North America) + Rescoping of storage area: see section 4.2.1 for further information
Conveyance System	(\$48.3)	- Inflation in the Vancouver Island construction market - Design development to incorporate stakeholder input + Value engineering combined with substantial reduction in water use per person reduced required scope: see section 4.3.7.1 - Cost impacts from the COVID-19 public health emergency: impacts included labour availability and productivity (as a result of work modifications required to comply with provincial guidelines). + Lower than forecast financing costs: see section 6.4 for further information
Project Management Office	\$3.3	+ Efficient delivery
BC Hydro	\$10.2	+ Efficient delivery
Third Party Commitments	(\$0.4)	- Commitments slightly greater than estimated
Program Reserve	\$10.9	A program reserve of \$19.2 million was included in the Control Budget to manage risks impacting the entirety of the Project, or the interface between any of the Project components. At April 30, 2021, \$7.8 million remains in program reserve.
Total	\$-	

6 Project Successes and Challenges

The most significant Project challenges, and actions that contributed to the successful management of them, are summarised in the following sections.

6.1 Safety

Maintaining safety as the Project's top priority was critical given the scope, scale and complexity of construction, and its performance in an urban environment during a period of time that included a global health pandemic.

Key to meeting this challenge was:

- All of the Project's Prime Contractor's continued commitment to safety as the number one priority on the Project;
- All of the Project's Prime Contractor's implementation of additional precautions during the global health pandemic to comply with provincial guidelines and protect their workers, CRD staff and the public;
- The Project Team's maintenance of a strong safety-first culture – beginning with the evaluation of contractors' safety performance, personnel and practices as part of all construction procurements, and progressing through chartering sessions to ensure new Project contractors understood the primary importance of safety, and a robust oversight and audit program that included regular site inspections, reviewing safety incidents with prime contractors to discuss lessons learned and how corrective actions are being implemented as a result of these reviews, and the sharing of trending observations or similar incidents between Project contractors;
- Comprehensive monthly reporting of safety incidents, including descriptions of the incident, the outcome and corrective actions – for all categories of safety incidents from near misses to recordable incidents; and
- Acknowledgement that safety is everyone's responsibility.

6.2 Schedule: Project Delivery to meet the Regulatory Deadline

As noted in the Project Charter, in order to meet the federal regulations for treatment of the Core Area's wastewater by December 31, 2020, the Project schedule was ambitious. To plan, procure, construct and commission the Project within five years - from the time the Project Board was appointed to the regulatory deadline for treatment – required:

- the co-operation of multiple parties and governance bodies; and
- procuring and constructing some components through multiple contracts in order to optimise the design, procurement, construction and commissioning schedule, which necessitated the Project Team expending a greater effort on contractor and interface management.

Key to meeting this challenge was:

- The CRD Board's delegation of authority to the Project Board, as this allowed for appropriate oversight and governance by a body with expertise in major project management and construction that could focus solely on delivery of the Project in order to achieve the goals established for it;

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- The inclusion of the CRD's Chief Administrative Officer on the Project Board, as this facilitated CRD integration and support, and the identification and implementation of CRD policies and procedures relevant to the Project's delivery;
- The establishment of a Project Team with the relevant expertise required to deliver the Project;
- The full support of the CRD, and the integration of CRD departments in Project delivery, as this provided institutional knowledge and expertise that was critical to allowing the immediate commencement of, and expeditious progress to be made in, Project planning and delivery;
- The input and engagement of the Project's First Nations partners;
- The collaboration and cooperation of host municipalities, funding partners and regulatory authorities;
- Schedule mitigation by the Project's contractors;
- The engagement of community and neighbourhood associations which assisted in the identification of concerns and interest allowing the Project to respond or adjust plans as appropriate;
- The willingness of transit and other service providers to coordinate with our contractors to work around impacted areas while continuing to provide service to the community; and
- The patience of the CRD's residents, commuters, businesses and stakeholders, particularly those most impacted by the Project's construction and operations.

Also of significance in meeting the challenge was the Project Team's approach to schedule management, which included the following steps:

- the establishment of the master project schedule, which was the primary planning and coordination tool for schedule management;
- the development and maintenance of a permit register to identify and monitor the status of permits, approvals, authorizations, licences and agreements that may be required for the Project.
- the inclusion of relevant milestones, schedule incentives and acceleration clauses in each construction contract;
- the maintenance of the master project schedule through the review and incorporation of contractors' baseline and monthly updated schedules; and
- monitoring progress and taking action as required to manage the interfaces between the different Project contracts and meet the Project's key performance indicators.

6.3 Delivering a Major Infrastructure Project in an Urban Setting

The delivery of a major infrastructure project in an urban setting with construction in three different municipalities presented multiple challenges, including: design and construction complexity as a result of congested utility corridors and substantial road use; how to manage stakeholder impacts and build infrastructure to meet different municipal requirements.

The Project met these challenges through the establishment of individual technical working groups with all three host municipalities: this allowed for the collaboration and cooperation of host municipalities as components were designed, procured and constructed.

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Section 5.2.4 outlines the significant efforts made to build and maintain positive relationships with First Nations, local governments, communities, and other stakeholders, and these undoubtedly contributed to addressing the challenges of building such significant infrastructure in an urban environment. A particular example of how the challenges were met is provided by the management of stakeholder impacts during the staging of the cross-harbour pipe.

For six weeks, Niagara Street, a small, residential street, was used to assemble a 940-metre pipe above ground before it was pulled into a cross-harbour undersea tunnel from Ogden Point to McLoughlin Point.

Beginning the first week of March 2018, 78 pipe sections were welded together and the pipe was moved into place on rollers on Niagara Street across eight city blocks from South Turner Street to St. Lawrence Street. Over three days, cranes and sidebooms lifted the pipe in the 100 block of Niagara Street where the pipe was threaded into the tunnel at Ogden Point and pulled from the McLoughlin Point side.

Managing the significant impacts that this work had on the neighbourhood involved comprehensive planning to coordinate with the contractor, local authorities and service providers; and extensive communications and engagement with local residents. Some of the community outreach included:

- A door-to-door survey which was conducted with Niagara Street residents to provide updated information and a resident needs assessment in December 2017;
- Two community meetings with residents to answer questions which were held on February 21 and February 24, 2018;
- A Help Tent that was located in the 200 block of Niagara Street and staffed by a Project representative to provide information and answer questions about the Project;
- The 24/7 phone line and project email address were provided to residents so that they could request information or report a concern; and
- A community BBQ was held on May 1, 2018 as a thank you to the residents for their patience.

As a result of the community outreach undertaken, and the patience and understanding of the community, the Project Team and Project contractor (Harbour Resource Partners) built positive relationships within the community, many of whom expressed an interest in witnessing a remarkable engineering feat.

6.4 Cost

The Project faced significant cost pressures as a result of several factors including inflation, greater than anticipated contamination, and the global health pandemic, as outlined in Section 5.2.6 of this report.

Key to meeting this challenge was:

- The ability to manage risk: risk management on the Project involved the identification, analysis, oversight, treatment and monitoring of the Project risks. The Project Leadership Team promoted a risk-aware culture whereby any person was encouraged to raise potential risks for consideration. The success of this approach was supported by the findings of Ernst and Young when they conducted an

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independent project execution review part-way through Project delivery (in April 2019), and reported:

- A strong risk-aware culture that was supported by well-defined processes and risk registers;
 - The Project Team had put careful consideration into risk transfer when structuring contracts. Notable and leading industry practices around controlling mechanisms are in place, including incentive and penalty clauses; and
 - Project reporting to be comprehensive and forward-looking, with commentary to provide the necessary context around key items.
- Lower than forecast financing costs: due to the Project's funding sources and related conditions, there were differences in timing between incurring and recovering Project-related costs. As a result of these differences, the CRD's Finance Department needed to develop and implement a financing strategy to manage cashflow to meet the Project's financial commitments. The financing strategy implemented, combined with low interest rates and early payment of a significant proportion of the Province's funding resulted in significant cost savings in the Project's forecast financing costs, which helped to offset the budget pressures described in section 5.2.6 of this report.

6.5 Interfaces between Project Components

Managing the physical and schedule interfaces between the different components required to deliver the overall Wastewater Treatment Project was a challenge.

Key to meeting this challenge was:

- The inclusion of elements with critical interfaces into a single contract – where the resulting risk profile, type of work and size of the package, would still allow for sufficient market interest in the package such that competitive pricing would be received - for example:
 - the Macaulay Point Pump Station and Forcemain were procured together in a single contract; and
 - three elements (the McLoughlin Point Wastewater Treatment Plant, marine outfall and harbour crossing) were included in a contract to allow a single contractor to manage the physical and schedule interfaces between these components with critical interfaces
- The use of a single owner's engineer to develop the indicative design for all critical Project components with significant interfaces;
- The use of a single systems integrator to develop standards and implement an approach for computerised controls and communication; and
- Developing of a master project schedule that allowed for a logical sequence of commissioning activities, considering that construction of the Project would be achieved through multiple contracts and that each required the delivery of waste streams to achieve completion.

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6.6 Construction Challenges

Construction challenges included: geotechnical considerations (especially protecting the integrity of the Dallas Road bluffs during the construction of the Clover Forcemain component of the Project); working in proximity to water; managing contaminated soils and utility conflicts; constructing on constrained sites (especially at McLoughlin Point); and building in areas with archaeological sites and the potential for archaeological finds.

Key to meeting these challenges were:

- Hiring experienced design consultants and construction contractors;
- Developing plans and procedures, both Project-wide and component-specific that mitigated potential adverse environmental impacts;
- Technical peer review of alternative solutions to complex challenges;
- Specific to the site constraints: developing indicative designs sufficiently during procurement processes to ensure designs were selected that were technically-feasible and could be constructed within the site constraints;
- Collaborating with First Nation partners; and
- Hiring archaeological advisors to provide advice and assistance with respect to archaeological management, including by:
 - preparing Archaeological Overview Assessments and Archaeological Impact Assessments;
 - planning for archaeological mitigation and data recovery;
 - preparing archaeological protocols and specifications for inclusion in construction contracts;
 - conducting archaeological awareness training for construction crews; and
 - undertaking archaeological monitoring with the support of First Nation partners.

6.7 Integration of the Project Components into the Existing Core Area Wastewater System

The integration of new Project components into an existing operating system presented several challenges.

These challenges were managed through the:

- Engagement of representatives from CRD's Integrated Water Services department in the review of design and construction submittals;
- Commitment and support of CRD operating staff, especially through the commissioning period;
- Inclusion in the construction contracts of requirements regarding the training that contractors had to provide to CRD operating staff;
- Project funding of the following initiatives as the CRD planned to integrate the Project components into the core area system:
 - Operational Readiness Review: a performance-based examination of facilities, equipment, personnel, procedures and management control systems for ensuring the Project assets can be operated safely and securely

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- in compliance with the applicable legislative and regulatory frameworks and in accordance with the policies and delegated responsibilities of the CRD.
- SCADA IT Network Design – Phase 1: starting with the existing network topologies and IP addresses, this study provided a high level design that accounted for the future mapping that would be required for the most intense deployment, in order to provide input on the Project sites now that considers the future goal of the CRD IT/SCADA Network, thereby reducing the need for modifications in the future.
- Asset Management Study: a study to develop a master list of assets with associated attributes that will be stored in Asset Accounting to meet financial processes and long-term capital planning needs for all the infrastructure related to the Core Area Wastewater Treatment Project and Service.

6.8 Establishment of Project Office

The establishment of a Project Team with the relevant expertise required to deliver the Project was key to meeting all of the Project goals, but it presented a potentially-significant challenge to find individuals with appropriate Project delivery experience that were both available and interested in committing to a Project in Victoria for a relatively short-term position.

The Project managed this challenge by recruiting key Project team members, and supplementing them with consultant support as required. For financial, engineering and administrative resources, the Project was aided in meeting this challenge by the ability to second some resources from the CRD, and also the potential for Project resources to apply for and transition to employment opportunities at the CRD.

The Project Board and Director were successful in attracting and retaining the core competencies required throughout delivery of the Project, and this strategy allowed for continuity through dedicated Project team members, while also providing a means to manage the natural variation in resource needs as the Project progressed, and gain access to specialist skill sets as required.

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7 Project Handover

The Project Board have fulfilled their role and function as defined in the Terms of Reference, and the term of the Project Board concludes on May 24, 2021. This report section outlines the Project-related commitments and activities that extend beyond May 2021, and is organised in three categories:

- i) Activities related to closing-out the Project's construction contracts;
- ii) Obligations remaining to be fulfilled in the Project's funding, First Nation and land access agreements; and
- iii) Operating and maintenance obligations related to the infrastructure built by the Project.

This report section outlines Project-related commitments and activities that extend beyond May 2021 and that are transitioning from the Project to the CRD. In addition there are organizational/corporate leadership, administrative and support function responsibilities that the CRD will need to fulfill as a result of the addition of the Project components to the core area wastewater system.

7.1 Close-out of the Project's Construction Contracts

As of May 2021, the vast majority of construction has been completed (the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining). The works remaining under each construction contract are summarised in Table 10, and the Project budget includes committed funds to complete the remaining works and close-out the construction contracts.

Table 10 – Summary of Works Remaining on the Project's Construction Contracts at May 2021

Project Component	Contract Type	Summary of Works Remaining at May 2021
McLoughlin Point Wastewater Treatment Plant	DBF	Providing advice and guidance to optimize plant performance over the remainder of the two-year performance period (to January 12, 2023) and complete warm weather odour test.
Residuals Treatment Facility	DBFOM	Complete activities required to achieve Completion; minor deficiency items and record drawing submission.
Macaulay Point Pump Station and Forcemain	DB	Landscaping, minor deficiency items and record drawing submission
Clover Point Pump Station	DB	Generator ventilation rectification; inlet channel debris removal; final acceptance testing; minor deficiency items and record drawing submission
Clover Forcemain	DBB	Quarterly post-construction stability surveys over the warranty period
Residual Solids Pump Stations	DBB	Removal of low floats and upgrade programming; landscaping, minor deficiency items and record drawing submission
Trent Forcemain	DBB	Restoration, minor deficiency items and record drawing submission
Arbutus Attenuation Tank	DBB	Final commissioning activities, site grading and landscaping, minor deficiency items and record drawing submission

The Project budget also includes committed funds for the resources required to oversee the completion of the remaining works and close-out the construction contracts. Specifically, the

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Project budget includes committed funds for the following resources to support close-out post May 2021:

- Project staff transitioning to the CRD, including project management, document control and finance staff resources that the Project budget will fund post May 2021;
- Project consultants: funds have been committed for design consultants (KWL and Parsons) and the Project's owner's engineer (Stantec), to support Project close-out activities; and
- The remainder of the CRD finance department allocation for 2021.

7.2 Obligations Remaining to be Fulfilled in the Project's Funding, First Nation and Land Access Agreements

In addition to the Project's nine construction contracts, approximately 20 funding, First Nation and land access agreements were entered into in order to deliver the Project (refer to Appendix C for a list of the agreements). There are a relatively small number of obligations remaining to be fulfilled in the Project's funding, First Nation and land access agreements. The Project budget includes committed funds to fulfil the outstanding obligations, and the Governance Transition Report details both the fulfilled and the outstanding commitments.

7.3 Operation and Maintenance of Infrastructure Built by the Project

7.3.1 Responsibility for Operations and Maintenance of Project Components

The CRD's Integrated Water Services department are responsible for operating and maintaining all of the Project components other than the Residuals Treatment Facility (see section 7.3.3) upon the relevant Project contractor completing their commissioning requirements. This transfer has occurred for all components other than the Arbutus Attenuation Tank, for which the transfer is forecast to occur in June 2021.

This responsibility includes:

- managing the optimisation of the operation and maintenance of each Project component upon handover, and any resultant impacts on the operation of the other components of the core area wastewater system;
- managing the contractual warranties for each of the Project components;
- administering the two-year performance period for the McLoughlin Point Wastewater Treatment Plant, as outlined below.

The McLoughlin Point Wastewater Treatment Plant contract includes a two-year performance period, from the acceptance date (January 2021). Over the performance period the CRD will operate and maintain the McLoughlin Point Wastewater Treatment Plant, and Harbour Resource Partners are responsible for:

- monitoring operations;
- consulting with and providing advice to the CRD and the CRD's plant manager with respect to the operation of the Facility;
- assisting with environmental and regulatory compliance;
- preparing and updating the operations manual and operations and maintenance plans;
- assisting with the evaluation of the performance of the Project and the implementation of plans to achieve continued compliance with the process performance guarantees;

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- assisting with the development and implementation of plans that will minimize use of power, chemicals, water and labour; and
- responding to warranty claims.

There are physically interfacing works and screened, dewatered wastewater is required to be delivered in order for the performance period to operate as intended. Responsibility for these interfaces is retained by the CRD: it was the Project Team's responsibility to manage the interfaces during construction and commissioning, and upon the acceptance date (January 2021), the CRD's Integrated Water Services department assumed responsibility for the operation of the McLoughlin Point Wastewater Treatment Plant and the management of the interfaces.

As noted earlier in this report, the Project met its regulatory requirements key performance indicator (to deliver the Project such that the Core Area complies with provincial and federal wastewater regulations). Specifically, the McLoughlin Point Wastewater Treatment Plant operated in compliance with the provincial and federal wastewater regulations over the three month period from the start of November 2020 to the end of January, 2021, and since April 18, 2021. In the interim period (between the start of February and mid-April, 2021), a number of operating challenges arose, resulting in the discharged effluent exceeding the permitted quality limits. The Plant has continuously treated wastewater since being commissioned, but over the interim period, the discharged effluent was closer in quality to that which would be produced from a secondary treatment plant than a tertiary.

Operating and equipment challenges of the nature experienced at the McLoughlin Point Wastewater Treatment Plant are not uncommon in the period of time immediately after handover of an operating facility from a contractor to an operator, as a period of fine-tuning and optimising operations is to be expected. The Plant is now in compliance with the regulations, and treating wastewater to a tertiary level.

7.3.1.1 Operational Readiness Review

The Project funded the engagement of independent experts to conduct an Operational Readiness Review. This review commenced prior to the transition of Project components from the commissioning phase to the operating phase, with the objective of seeking an independent review of the transition planning conducted and ensure:

- equipment, facilities, and systems were in a state of readiness to safely and securely conduct operations in accordance with the operating plans and performance objectives;
- management control programs were in place to ensure safe and secure operations could be sustained; and
- user/operating organization personnel were trained and qualified.

7.3.2 Contract Administration of Residuals Treatment Facility Project Agreement

The Residuals Treatment Facility was procured through a design-build-finance-operate-maintain contract under which Hartland Resource Management Group have the responsibility to design, build, partially-finance, operate and maintain the facility to meet the performance specification and contract requirements over the term of the contract.

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The Residuals Treatment Facility has been constructed and is close to completing commissioning, and the Hartland Resource Management Group will be responsible for operating and maintaining the facility over the next 20 years. The Project's committed budget includes the net present value of the capital cost of the Residuals Treatment Facility: the CRD's operating budget will need to fund the amount by which the operating period payments for the Residuals Treatment Facility exceed the net present value of the capital cost.

There are physically-interfacing works and residual solids required to be delivered and biosolids required to be transported in order for the contract to operate as intended. The CRD's Parks and Environmental Services Department are responsible for managing these interfaces and administering the contract over the 20 year operating and maintenance period.

7.3.3 Permits

The CRD's Parks and Environmental Services Department and/or Integrated Water Services department (as applicable) are responsible for environmental monitoring and/or mitigation activities related to the operation and maintenance of Project components, and maintaining and complying with the terms of operating permits and the limited number of construction-related permits that have obligations that extend beyond the commissioning period.

7.3.4 Responsibility for Operations and Maintenance of Project Amenities

In furtherance of the Project's goal to deliver a solution that adds value to the surrounding community and enhances the liveability of neighbourhoods, the Project either funded or funded and delivered a number of amenities and/or infrastructure improvements (as outlined in Section 5.1.4). These amenities and infrastructure improvements have been transferred to the benefitting municipality to operate and maintain.

7.4 Knowledge Transfer

Project knowledge transfer has been achieved through:

- The support and integration of the CRD throughout the planning, design, procurement and construction of the Project – including through the secondment of CRD resources, and CRD resource review of Project submittals;
- The continuity of personnel through the transfer of resources from the Project Team to CRD positions; and
- The retention of Project records.

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Appendix A – Guiding and Key Supporting Documents

CRD Core Area Wastewater Treatment Project Board Bylaw No. 1, 2016

The CRD Core Area Wastewater Treatment Board Bylaw No. 1, 2016 established the Project Board for the purposes of administering the Project. Attached to the bylaw are the Project Board's Terms of Reference, which set out the role, responsibilities and function of the Project Board. The Terms of Reference also provide a framework that includes the Project vision and goals, guiding principles and values, Project Board meeting protocols, confidentiality considerations and identifies those matters that must be referred to the CRD Board for approval. The bylaw was adopted by the CRD Board on May 25, 2016.

Business Case

The Business Case defined the scope of the Project and established the control budget of \$765 million (the "Control Budget"). The CRD Board approved the Business Case on September 14, 2016.

Core Area Liquid Waste Management Plan

The Core Area Liquid Waste Management Plan ("CALWMP") outlines CRD's wastewater management strategies, including wastewater treatment under the Environmental Management Act.

Amendment 11 of the Core Area Liquid Waste Management Plan defines how the CRD will treat wastewater in the Core Area. The CRD has received approval from the Ministry of Environment for Amendment 11 on the condition that a definitive plan for the beneficial use of biosolids be submitted to the Minister by June 30, 2019.

The CALWMP also includes seven liquid waste management initiatives designed to protect the core area's water quality: monitoring and sampling; harbour stewardship; watershed protection; trucked liquid waste management; inflow and infiltration; onsite septic maintenance; and source control.

Project Charter

The Project Charter was developed to define the parameters and establish the mandate for the Project Team to execute and deliver the Project. The Project Charter included the Project goals from the Project Board's Terms of Reference and established key performance indicators for the Project. The Project Charter also includes a description of roles and responsibilities, and presents a high-level description of the Project budget, schedule, scope, risks, and stakeholders. The Project Charter was first approved by the Project Board on April 4, 2017, and was subsequently updated twice to account for progress made on delivering the Project, with each update approved by the Project Board (on April 27, 2018 and September 30, 2019).

Project Management Plan

The Project Management Plan specified the project management objectives and approaches intended to be used to achieve the key performance indicators (as established in the Project Charter); and stated the key organizational roles and responsibilities anticipated to be required

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to provide effective management, administration and control of the Project. The Project Management Plan was approved by the Project Board on September 26, 2018.

Risk Management Plan

The Project's Risk Management Plan included the risk management process, roles and responsibilities, management escalation hierarchy and requirements for risk meetings and reporting cycles, in order to direct and empower the Project Team to: develop and maintain a 'risk aware' culture; provide a comprehensive risk identification and control process; and to proactively forecast and report on risks. The Project Risk Management Plan was approved by the Project Board on March 29, 2018.

Communications and Engagement Plan

The Project's Communications and Engagement Plan defined the Project's communications and engagement goals, described the communications and engagement activities during the construction period; and described the roles and responsibilities of the Wastewater Treatment Project's Communications and Engagement Team, which included CRD staff, consultants and representatives from the contractors for each component of the Project. The Project's Communications and Engagement Plan was first approved by the Project Board on April 4, 2017, and was subsequently updated twice to account for progress made on delivering the Project, with each update approved by the Project Board (on July 26, 2018 and July 25, 2019).

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Appendix B – Project Cost Report at April 30, 2021

Appendix B: Project Cost Report at April 30, 2021

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Description	BUDGET		COST EXPENDED		FORECAST	
	Control Budget	Allocated Budget	Expended to April 30, 2021	Expended to April 30, 2021 as a % of Allocated Budget	Forecast to Complete	Forecast at Completion
McLoughlin Point Wastewater Treatment Plant	331.4	336.3	329.5	98%	6.8	336.3
Construction	306.7	334.4	329.3	98%	5.1	334.4
Contingency	14.9	1.0	-	0%	1.0	1.0
Financing	9.8	0.9	0.2	26%	0.7	0.9
Residuals Treatment Facility	159.4	140.2	12.7	9%	127.5	140.2
Construction	145.4	139.8	12.7	9%	127.1	139.8
Contingency	12.3	-	-	0%	-	-
Financing	1.7	0.4	-	0%	0.4	0.4
Conveyance System	158.0	206.5	198.9	96%	7.6	206.5
Macaulay Point Pump Station	25.4	32.4	32.1	99%	0.3	32.4
Macaulay Forcemain	5.6	7.4	7.4	100%	-	7.4
Craigflower Pump Station	12.5	12.4	12.4	100%	-	12.4
Clover Point Pump Station	23.7	28.7	27.4	96%	1.3	28.7
Currie Pump Station ^A	2.8	0.1	0.1	100%	-	0.1
Arbutus Attenuation Tank	14.2	24.6	22.9	93%	1.7	24.6
Clover Forcemain	14.6	31.8	31.7	99%	0.2	31.8
Currie Forcemain ^A	3.3	0.2	0.2	100%	-	0.2
Trent Forcemain	9.5	11.0	9.5	86%	1.6	11.0
Residual Solids Conveyance Line	19.1	37.0	37.0	100%	0.0	37.0
Residual Solids Pump Stations & Bridge Crossings	4.6	18.1	17.8	98%	0.4	18.1
Residual Solids Conveyance Line – Highway Crossing	-	0.3	0.3	100%	-	0.3
Contingency	16.8	1.7	-	0%	1.7	1.7
Financing	5.8	0.6	0.1	24%	0.4	0.6
Project Management Office ("PMO")	75.8	72.5	68.8	95%	3.6	72.5
Project costs Aug 2016-Dec 2016	2.2	2.2	2.2	100%	-	2.2
Owner's Engineering	17.2	18.4	17.7	96%	0.7	18.4
Conveyance Design	5.0	11.0	9.9	90%	1.1	11.0
Advisors & Professional Support	7.0	11.6	11.4	98%	0.3	11.6
Project Board	2.0	1.1	1.1	96%	0.0	1.1
Project Board Expenses	0.3	0.1	0.1	100%	-	0.1
Project Team	29.1	21.9	20.4	93%	1.6	21.9
Project Leadership Team Expenses	0.7	0.3	0.3	100%	-	0.3
Project Support Team Expenses	0.5	0.1	0.1	100%	0.0	0.1
CRD Financial Services	1.5	1.4	1.4	100%	-	1.4
CRD Human Resources	0.3	0.3	0.3	100%	-	0.3
CRD Corporate Communications	0.2	0.2	0.2	100%	-	0.2
CRD Real Estate	0.3	0.3	0.3	100%	-	0.3
CRD Information Technology	0.4	0.3	0.3	100%	-	0.3
CRD Insurance	0.1	0.0	0.0	100%	-	0.0
CRD Operations	0.6	0.6	0.6	100%	-	0.6
CRD Legislative Services	0.1	0.1	0.1	100%	-	0.1
CRD Corporate Safety	0.2	0.2	0.2	100%	-	0.2
CRD Executive Services	-	0.1	0.1	100%	-	0.1
Office Lease	1.9	1.1	1.1	96%	0.0	1.1
Office Supplies	0.1	0.2	0.2	96%	-	0.2
Vehicles	0.2	0.2	0.2	100%	-	0.2
Connections Call Center	-	0.0	0.0	100%	-	0.0
Communication support materials	0.5	0.2	0.2	100%	-	0.2
Computer Hardware, Software & Training	1.0	0.7	0.7	99%	-	0.7
Contingency	4.8	-	-	0%	-	-
BC Hydro	12.9	2.7	2.7	100%	-	2.7
Third Party Commitments	8.1	8.5	4.6	54%	3.9	8.5
Subtotal^{AA}	745.7	766.6	617.2	81%	149.4	766.6
Program Reserves^{AAA}	19.2	8.3	-	0%	8.3	8.3
Core Area Wastewater Treatment Project	765.0	775.0	617.2	80%	157.8	775.0

* Values presented in \$millions, results in minor rounding differences

** Costs expended to April 30, 2021 includes invoices received and processed before the cut-off for the April 2021 cost period

^A In 2019, the Wastewater Treatment Project's scope was refined to remove three components of the conveyance system (expanding the capacity of the Currie Pump Station, twinning the Currie Forcemain and twinning the East Coast Interceptor), as it was determined that they would provide no benefit to the CRD's residents and businesses: see section 4.3.7.1 for further information. The expended costs on these removed components comprise costs incurred before 2016 on planning and design.

^{AA} While the total Project cost will not be known until total completion of all contracts, which is anticipated to occur in Q4 2021, it is forecast that the total Project cost will be approximately \$766.7 M, which is within the approved budget of \$775M.

^{AAA} A program reserve of \$19.2 million was included in the Control Budget to manage risks impacting the entirety of the Project, or the interface between any of the Project components. At April 30, 2021, \$8.3 million remains in program reserve; this is in addition to \$2.74M of contingency that is included within the total forecast cost of \$766.7M, to manage the risks associated with completing the Project-related commitments and activities that extend beyond May 2021.

Appendix C – Funding, First Nation and Land Access Agreements

Funding Agreements:

- Infrastructure Canada:
 - Building Canada Fund;
 - Green Infrastructure Fund; and
 - PPP Canada Fund;
- Province of BC; and
- Federation of Canadian Municipalities (FCM): three funding agreements (for three grants and one loan).

First Nation Agreements:

- Songhees First Nation Support Agreement;
- Esquimalt First Nation Support Agreement; and
- WSANEC Leadership Council Memorandum of Understanding.

Land Access Agreements:

- Transport Canada Licences:
 - McLoughlin Point Harbour Crossing;
 - McLoughlin Point Outfall;
- Township of Esquimalt Amenity Agreements:
 - Host Community Impact 5-Year Agreement;
 - Community Impact Mitigation and Operating Agreement; and
 - Amenity Reserve Fund Administration Agreement.
- City of Victoria Licences of Occupation:
 - Dallas Road; and
 - Clover Point Pump Station.
- Greater Victoria Harbour Authority (GVHA) Agreements:
 - Compensation Agreement; and
 - Right to Enter Agreement.
- DND Licence Agreements:
 - Access to Federal Real Property; and
 - Relocation Expenses
- Minister of Transportation and Infrastructure RSCL Highway Crossing Agreement;
- District of Saanich RSCL Infrastructure Access Agreement; and
- Rock Bay Lease Agreement.



Wastewater Treatment Project

Treated for a cleaner future

CRD Wastewater Treatment Project

Governance Transition Report

Report Date: May 17, 2021

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1 Executive Summary

1.1 Wastewater Treatment Project

The Capital Regional District planned, procured and constructed the Wastewater Treatment Project (the “Project”) in order to meet the provincial and federal regulations for the core area’s wastewater by December 31, 2020.

On May 25, 2016 the Regional Board of the CRD (the “CRD Board”) established the Wastewater Treatment Project Board (the “Project Board”) under Bylaw 4109 (the “CRD Core Area Wastewater Treatment Board Bylaw No. 1, 2016”) for the purposes of administering the Project. The CRD Board adopted by resolution terms of reference (“Terms of Reference”) for the Project Board for the purposes of establishing principles governing the WTP. The Terms of Reference are attached as Schedule “A” to the CRD Core Area Wastewater Treatment Board Bylaw No. 1, 2016.

On May 25, 2016 the CRD Board also delegated certain of its powers, duties and functions to the Project Board under Bylaw 4110 (the “CRD Core Area Wastewater Treatment Project Board Delegation Bylaw No. 1, 2016”).

In accordance with the CRD Core Area Wastewater Treatment Project Board Delegation Bylaw No. 1, 2016 the Project Board appointed a Project Director to oversee all aspects of the Project. In accordance with the Terms of Reference, the Project Director was responsible for leading a Project team to plan, procure, and implement the WTP.

The Project Board also appointed a Deputy Project Director. The Project Director and Deputy Project Director were delegated authority in accordance with Bylaw 4186 (the “CRD Delegation Bylaw No. 1, 2017”), which delegates to the CRD’s officers and employees the authority to acquire and purchase goods and services on behalf of the CRD, subject to the CRD’s purchasing policies and procedures, and signing authority limitations.

Under these two delegations of authority, the Project Board and Project Team entered into agreements and made commitments in order to achieve the purposes for which the Project Board was established.

The Project Board have fulfilled their role and function as defined in the Terms of Reference, and the term of the Project Board and Project Team concludes on May 24, 2021. The Project Team have fulfilled the vast majority of the commitments, but some remain to be fulfilled after the Project Board’s term, in many cases as a result of the commitments’ recurring or deferred nature (for example administering construction contracts warranty periods that extend beyond the Project Board’s term, or receipt of close-out documentation).

1.2 Objective of this Governance Transition Report

The objective of this Governance Transition Report is to facilitate a comprehensive Project close-out and successful transition by providing a summary of the following:

- Identifying the source of the various commitments made, and for each outlining the commitments that remain to be fulfilled beyond the Project Board’s term;

- Summarising the funds committed in the Project's budget to complete the activities remaining to close-out the construction contracts and the obligations remaining to be fulfilled in the Project's funding, First Nation and land access agreements; and
- Outlining the location and organisation of Project documentation.

More detailed supporting documentation is available in the Project files, and in every case the source agreement should always be referred to for the definitive obligation: this report summarises the status of Project commitments and activities as of May 2021, for convenience as a reference only.

Note that another document (the Project Completion Report) has been written to mark the completion of the Wastewater Treatment Project, and includes:

- an assessment of the Project's performance against the goals established by the CRD Board and the key performance indicators approved by the Project Board;
- the identification of variances from the baseline plans prepared by the Project Board and/or Project Team, in terms of the Project's scope, schedule and cost;
- the identification of Project successes and challenges; and
- an outline of the Project-related commitments and activities that extend beyond May 2021.

2 Project Commitments: Source and Summary Status

This report section outlines the Project-related commitments and activities that extend beyond May 2021, and is organised in the following five categories:

- i) Activities related to closing-out the Project's construction contracts;
- ii) Obligations remaining to be fulfilled in the Project's funding, First Nation and land access agreements;
- iii) Committed funds for the resources required to oversee the completion of the remaining obligations and close-out the construction contracts; and
- iv) Operating and maintenance obligations related to the infrastructure built by the Project; and
- v) A summary of the status of First Nations artwork and signage that either has or is to be installed.

Appendix A summarises the sources of the Project commitments, which can be categorised as:

- Construction contracts;
- Funding agreements;
- First Nation agreements; and
- Land access agreements.

The Project budget includes committed funds (as outlined in this report) to complete the activities remaining to close-out the construction contracts and the obligations remaining to be fulfilled in the Project's funding, First Nation and land access agreements.

In addition, the Project budget includes an appropriate amount of contingency, based on the Project Team's assessment of the: status of each component; the risks associated with the remaining work and the outstanding obligations; and the funds and resources committed to complete these. In summary, the Project budget includes contingency as follows:

- \$1 million for the McLoughlin Point Wastewater Treatment Plant, to cover the potential incentive payment to HRP, that is payable after the completion of the performance period (which concludes on January 12, 2023), and will be payable at an amount (of up to \$1 million) to be determined based on performance against milestones over the two year performance period; and
- no contingency is anticipated to be required for the Residuals Treatment Facility component, as the remaining construction-period risks are allocated to HRMG in the Project Agreement, as amended by the Service Commencement Agreement;
- \$1.74M for the conveyance component, which is anticipated to be more than sufficient given the nature of the remaining commitments and activities; and
- no contingency is anticipated to be required for the Project Management Office as the resource commitments to support close-out activities allow for the conveyance contractors' schedules to slip, and should be sufficient provided all contracts achieve total completion by year end.

2.1 Construction Contracts

The Project Team entered into a number of design and construction contracts in order to build the Project, as summarized in Table 1.

Table 1 – Contracting Strategy, Design Consultant and Construction Contractor

Project Component	Contract	Contracting Strategy	Design Consultant	Construction Contractor
McLoughlin Point WWTP	McLoughlin Point Wastewater Treatment Plant	Design Build Finance	Harbour Resource Partners (Graham Infrastructure and AECOM Canada)	
Residuals Treatment Facility	Residuals Treatment Facility	Design Build Finance Operate Maintain	Hartland Resource Management Group (Synagro Capital, Maple Reinders PPP Ltd., Bird Construction Inc.)	
Conveyance System	Clover Point Pump Station	Design Build	Kenaidan Contracting Ltd.	
	Macaulay Point Pump Station & Forcemain	Design Build	Kenaidan Contracting Ltd.	
	Clover Forcemain	Design Bid Build	Kerr Wood Leidal	Windley Contracting Ltd.
	Residual Solids Conveyance Line	Design Bid Build	Parsons	Don Mann Excavating Ltd.
	Residual Solids Pump Stations	Design Bid Build	Parsons	Knappett Projects Inc.
	Arbutus Attenuation Tank	Design Bid Build	Kerr Wood Leidal	NAC Constructors Ltd.
	Trent Forcemain	Design Bid Build	Stantec	Jacob Bros Construction

As of May 2021, the vast majority of construction has been completed: the Arbutus Attenuation Tank and Clover Point Pump Station are the only Project sites with some minor construction activities remaining. The works remaining under each construction contract are summarised in Table 2, and the Project budget includes committed funds (as outlined in Table 2) to complete the remaining works and close-out the construction contracts.

The CRD are now operating the infrastructure built under each contract, with the exception of:

- the Arbutus Attenuation Tank, which is expected to be operational in June 2021; and
- the Residuals Treatment Facility, which has been delivered through a design-build-finance-operate maintain contract, pursuant to which the Hartland Resource Management Group are responsible for operating and maintaining the facility until the end of 2040.

Table 2 – Summary of Works Remaining on the Project's Construction Contracts at May 2021

Project Component	Summary of Works Remaining at May 2021	Project Personnel Available after May 2021 to Provide Continuity	Last Monthly Invoice processed and included in Expended Project Budget (see note 1)	Amount included within Project Budget Forecast to Complete: Covers Completed (but not yet invoiced) and Remaining Works (see note 2)
McLoughlin Point Wastewater Treatment Plant	- Providing advice and guidance to optimize plant performance over the remainder of the two-year performance period (to January 12, 2023); - Complete warm weather odour test; and - DFO authorization reporting.	- Project Manager, Wastewater Treatment Plant; - Owner's engineer: Stantec	April 2021	\$2.22M (to cover performance period commitments)
Residuals Treatment Facility	- Complete activities required to achieve Completion, primarily being: - Residual effluent line modifications; and - Address residual effluent quality (including demonstrating compliance to the CRD's satisfaction for the purposes of the second 15-day acceptance test); - Complete change orders related to: - Modifications at ring road connector; - Changes to biosolids loadout chute; - Down payment of sprung structure lease; - Minor deficiency items; and - Record drawing submission.	- Project Manager, Residuals Treatment Facility; - Owner's engineer: Stantec	March 2021	\$127M (to cover capital cost) \$0.25M (to cover completion of change orders)
Macaulay Point Pump Station and Forcemain	- Landscaping; - Minor deficiency items; and - Record drawing submission.	- Project Manager, Clover & Macaulay Point Pump Stations; - Owner's engineer: Stantec	March 2021	\$0.34M
Clover Point Pump Station	- Generator ventilation rectification; - Inlet channel debris removal (see note 3); - Final acceptance testing (note that final acceptance testing has had to be deferred until after the inlet channel debris removal is completed);	- Project Manager, Clover & Macaulay Point Pump Stations; - Owner's engineer: Stantec	March 2021	\$1.19M

Project Component	Summary of Works Remaining at May 2021	Project Personnel Available after May 2021 to Provide Continuity	Last Monthly Invoice processed and included in Expended Project Budget (see note 1)	Amount included within Project Budget Forecast to Complete: Covers Completed (but not yet invoiced) and Remaining Works (see note 2)
	- Completion of landscaping (this will complete the public realm improvements and is expected to be complete at the end of Q2, 2021) - Minor deficiency items; and - Record drawing submission.			
Clover Forcemain	- Landscaping; and - Quarterly post-construction stability surveys over the warranty period	- Project Manager, Clover & Macaulay Point Pump Stations; - Project Manager, Deputy Conveyance Manager - Design consultant: KWL	November 2020	\$0.16M
Residual Solids Conveyance Line	- Minor restoration on the BC Hydro access road to be completed once BC Hydro has completed the pole relocation (gate, tree replacement, final road surface); and - Peers Creek survey; and - DND roadway tie-in	- Project Manager, Clover & Macaulay Point Pump Stations; - Project Manager, Deputy Conveyance Manager - Design consultant: Parsons - Owner's engineer: Stantec	March 2021	\$0.03M
Residual Solids Pump Stations	- Removal of low floats and upgrade programming; - Supply and installation of automated valve actuators; - Landscaping; - Minor deficiency items; and - Record drawing submission	- Project Manager, Clover & Macaulay Point Pump Stations; - Project Manager, Deputy Conveyance Manager - Design consultant: Parsons	March 2021	\$0.43M
Trent Forcemain	- Restoration; - Minor deficiency items; and - Record drawing submission	Project Manager, Clover & Macaulay Point Pump Stations;	March 2021	\$1.58M

Project Component	Summary of Works Remaining at May 2021	Project Personnel Available after May 2021 to Provide Continuity	Last Monthly Invoice processed and included in Expended Project Budget (see note 1)	Amount included within Project Budget Forecast to Complete: Covers Completed (but not yet invoiced) and Remaining Works (see note 2)
		- Project Manager, Deputy Conveyance Manager - Owner's engineer: Stantec		
Arbutus Attenuation Tank	- Final commissioning activities; - Site grading and landscaping; - Minor deficiency items; and - Record drawing submission	- Project Manager, Clover & Macaulay Point Pump Stations; - Project Manager, Deputy Conveyance Manager - Design consultant: KWL	April 2021	\$1.71M
Conveyance Subtotal				\$5.44M
Total				\$134.91M

Notes to Table 2:

1. This is the last monthly invoice that was received and processed before the cut-off for the April 2021 cost period: invoices received to this date are captured in the Project budget in the column 'Expended to April 30, 2021'.
2. This is within the amount included in the Project budget in the column 'Forecast to Complete': it covers work completed but not yet invoiced (i.e. work conducted after the last monthly invoice shown in the previous column) as well as the forecast cost of the work remaining.
Note that for some Project components the amount in the 'Forecast to Complete' column in the Project budget differs from that shown in the table above, as it also includes committed funds to fulfil the outstanding obligations in the Project's First Nation and land access agreements.
3. This activity was not part of the original scope of the Project, and is required as a result of the pre-existing condition of the inlet channel (resulting from the build-up of debris over decades of use), and can only be completed in low flow conditions. The need to complete inlet channel debris removal has pushed out the schedule for the completion of some other scope elements of the contract.

2.1.1 Construction Contract Claims

The Project Team has negotiated and either rejected or settled construction claims as they have arisen, and none are outstanding as of May 2021. Table 3 summarises information regarding Project contractors that have formally released the CRD from claims for any events or circumstances up to the date shown.

Table 3 – Contractors Releasing CRD from Claims up to the Date Shown

Contract	Contracting Strategy	Date of Release
McLoughlin Point Wastewater Treatment Plant	Design Build Finance	January 12, 2021 (Acceptance Date: date responsibility for operating transitioned to CRD)
Residuals Treatment Facility	Design Build Finance Operate Maintain	March 29, 2021
Clover Point Pump Station	Design Build	March 31, 2021
Macaulay Point Pump Station & Forcemain	Design Build	March 31, 2021
Clover Forcemain	Design Bid Build	N/A (not required, all claims were settled or rejected over the course of construction)
Residual Solids Conveyance Line	Design Bid Build	N/A (not required, all claims were settled or rejected over the course of construction)
Residual Solids Pump Stations	Design Bid Build	N/A (not required, all claims were settled or rejected over the course of construction)
Arbutus Attenuation Tank	Design Bid Build	April 30, 2021
Trent Forcemain	Design Bid Build	May 6, 2021

2.1.1 Third-Party Insurance Claims

The Project has dealt with a number of third party claims over the course of construction. Third party claims are generally submitted through the wastewater e-mail address or come to the Project Team's attention through a municipality, and all claims that are submitted are reviewed by the Project Team to determine who is the appropriate Project contractor to forward the claim to. The Project contractor coordinates with their insurance company to evaluate the claim and determine the next steps. In many cases an adjuster will visit the third party claimant and inspect the areas of concern, following which they provide a response to the claimant. In some cases the claimant is directed to make a claim under their own insurance policy.

The CRD's only obligation with respect to any third-party insurance claims (whether they are yet to be resolved or yet to be submitted) is to direct them to the relevant Project contractor. The Project Team have endeavoured to ensure appropriate follow-up and communication.

2.1.2 BC Hydro

The Project required a number of BC Hydro infrastructure adjustments and improvements to be made, some of which were organised and paid for directly by the Project Team, with the remainder included within the scope of the relevant Project contractor's construction contract.

All BC Hydro infrastructure adjustment and improvements required for the Project (whether arranged directly by the Project Team or through the Project's contractors) have been completed, with the only exception being the relocation of one hydro pole within DND property at Work Point which is anticipated to be completed by BC Hydro before the end of Q3 2021. BC

Hydro are coordinating this work with DND, and the CRD has no further obligations related to BC Hydro's work.

BC Hydro have been fully-paid for the infrastructure adjustment and improvements arranged directly by the Project Team. The spreadsheet at the following link provides references to documents that outline the scopes of work and invoices for that work:

[BC Hydro Final Cost Report](#)

2.2 Obligations Remaining to be Fulfilled in the Project's Funding, First Nation and Land Access Agreements

In addition to the Project's nine construction contracts, approximately 20 funding, First Nation and land access agreements were entered into in order to deliver the Project (refer to Appendix A for a list of the agreements). There are a relatively small number of obligations remaining to be fulfilled in the Project's funding, First Nation and land access agreements, as summarised in the following subsections.

The Project budget includes committed funds to fulfil the outstanding obligations, as summarised in Table 4.

Note that many of the agreements contain:

- 'passive' obligations – for example the funding agreements include the requirement to maintain records for a certain number of years, and make them available upon request; and/or
- 'funding' obligations – for example the Esquimalt agreements include commitments for the CRD to fund amenity improvements subject to the Township advancing planning and approvals by certain dates, and the Project has committed funds to cover these obligations, as summarised in Table 4.

Table 4: Committed Project Funding for Obligations Remaining to be fulfilled in the Project's First Nation and Land Access Agreements

Agreement	Project Funding Covers	Project Funding	Location of Committed Funding
Transport Canada Licence: McLoughlin Point Harbour Crossing (see note 1)	Anticipated annual fee for 20 year term	\$0.02M	CP.100.751.100.155
Transport Canada Licence: McLoughlin Point Outfall (see note 1)	Anticipated annual fee for 20 year term	\$0.12M	CP.100.751.100.156
Township of Esquimalt Host Community Impact 5-Year Agreement	Lyall Street Enhancements	\$0.95M	CP.100.831.100.130
Township of Esquimalt Host Community Impact 5-Year Agreement	Remaining payments to fulfil public art and historical interpretive signage commitments	\$0.02M	CP.100.831.100.136
Township of Esquimalt Community Impact Mitigation Operating Agreement	Community Impact Fee (\$55k + CPI est. 2%) 25 years	\$1.73M	CP.100.831.600.605
Fisheries Act Authorization for the McLoughlin Point Outfall	Fulfillment of the remaining obligations	\$0.06M	CP.100.881.100.115
City of Victoria Licence of Occupation: Clover Point Pump Station	Commitment: one-time payment of \$75,000 for the maintenance of the public washrooms	\$0.08M	CP.330.805.100.150
Business Case commitment to Colwood Reserves	Fund reserve	\$2.00M	CP.800.000.600.606
WSANEC Leadership Council Memorandum of Understanding	Commitment - \$16k per month for 2021- Fund operating reserve Dec 2020	\$0.13M	CP.800.000.600.609
District of Saanich RSCL Infrastructure Access Agreement	Fulfilment of outstanding obligations	\$1.76M	CP.800.000.830.010
TOTAL		\$6.79M	

Notes to Table 4:

1. *These licences are in the process of being finalised by CRD's Corporate Services (real estate) Department: they could not have been entered into sooner as they require as-built information in order to be finalised. The licences will be required for the operating period of the assets: the Project is funding the annual fee for the first term (of 20 years), and upon expiry the CRD will need to renew both licences.*

2.2.1 Funding Agreements

The federal and provincial governments assisted the Capital Regional District in funding the Project. Project documentation regarding funding agreements can be found here:

[Funding Agreements](#)

Table 5 summarises the status of the funding agreements related to the Project, and detailed supporting documentation is available in the Project files. In addition, CRD finance staff seconded to the Project Team are familiar with the status of the funding agreements.

The Project's budget includes \$1.5M for the financing costs estimated to be incurred after May 2021. This estimate of financing costs was provided by the CRD's finance department, and covers differences in the timing between the receipt of funds (from senior governments and requisitions from the core area municipalities) and the Project's expenditures.

Table 5 – Summary of Status of Project's Funding Agreements at May 2021

Funding Partner	Agreement	Funds Outstanding	Status
Infrastructure Canada	Building Canada Fund	-	All funding received
Infrastructure Canada	Green Infrastructure Fund	\$5M	All documentation submitted and under Infrastructure Canada's review; awaiting release of \$5M holdback
Infrastructure Canada	P3 Canada Fund	\$41M	Discussions ongoing with Infrastructure Canada to ensure eligibility for maximum amount
Province of BC	Contribution Agreement	\$62M	All documentation submitted and under the Province's review; awaiting payment of final tranche of funding (\$62M)
Federation of Canadian Municipalities	GMF 16576	\$3M	Documentation compiled for signature and then to be sent to MFA once the grant audit is completed and submitted to CRD by KPMG.
Federation of Canadian Municipalities	GMF 15822	\$0.2M	All documentation submitted; awaiting payment
Federation of Canadian Municipalities	GMF 16342	\$0.2M	All documentation submitted; awaiting payment

2.2.2 First Nation Agreements

The CRD entered into three agreements with First Nations related to the Project, as follows:

- Esquimalt First Nation Support Agreement;
- Songhees First Nation Support Agreement; and
- WSANEC Leadership Council Memorandum of Understanding;

In summary:

- All of the CRD's obligations under the Esquimalt and Songhees First Nation Support Agreements have been fulfilled, and close-out letters from the Esquimalt and Songhees First Nations confirming this have been received.
- The only First Nation agreement with outstanding obligations is the WSANEC Leadership Council Memorandum of Understanding: the Project budget has committed funding to cover the remaining capacity funding, and the remainder of the outstanding obligations are not specific to the Project (they are broader to the CRD).

The CRD's First Nations Relations Department have supported and coordinated with the Project Team throughout Project delivery, and the fulfilled and outstanding obligations in the First Nation agreements were reviewed and transferred to the CRD's First Nations Relations Department in a meeting on March 12, 2021.

2.2.3 Land Access Agreements

The CRD entered into multiple land access agreements related to the Project. The following sub-sections summarise the status of the land access agreements as at May 2021.

2.2.3.1 Township of Esquimalt

The CRD entered into three agreements with the Township of Esquimalt related to the Project, as follows:

- Host Community Impact 5-Year Agreement;
- Community Impact Mitigation and Operating Agreement; and
- Amenity Reserve Fund Administration Agreement.

The Project Team are of the opinion that all of the commitments under the three agreements have been met, and the CAO of the Township of Esquimalt is preparing to take a close-out letter to Council confirming this.

Some of the obligations have been fulfilled by the Project committing funds, which are to be drawn upon subject to the passing of time (e.g. the community impact fee defined in the Community Impact Mitigation Operating Agreement) or the Township advancing planning and approvals (e.g. the Lyall Street Enhancements in the Host Community Impact 5-Year Agreement).

Documentation regarding the fulfilled and outstanding obligations can be found in the relevant governance transition summary, and in addition the CAO of the CRD and/or finance staff seconded to the Team have been included in correspondence regarding the funded obligations.

There is also an ongoing obligation to participate in the Esquimalt Liaison Committee: see section 3.3.1 of this report.

See also section 3.4 of this report for information regarding the Technical Working Group the Project Team established with the Township of Esquimalt.

2.2.3.2 City of Victoria

The City of Victoria granted two licences to the CRD related to the Project, as follows:

- Dallas Road Licence of Occupation; and
- Clover Point Pump Station Licence of Occupation.

The majority of obligations within both licences have been fulfilled, with a limited number of CRD responsibilities remaining, primarily related to the submission of documentation and the City's sign-off on landscaping.

Documentation regarding the fulfilled and outstanding obligations can be found in the relevant governance transition summary, and in addition Project Team members remaining with the CRD past May 2021 (being: the Project Manager, Clover & Macaulay Point Pump Stations; and the Project Manager, Deputy Conveyance Manager) are familiar with the status of the Licences of Occupation.

See also section 3.4 of this report for information regarding the Technical Working Group the Project Team established with the City of Victoria.

2.2.3.3 District of Saanich

The CRD entered into an agreement with the District of Saanich related to the Project, as follows: District of Saanich RSCL Infrastructure Access Agreement.

A number of obligations within the agreement have been fulfilled. The Project Team have committed funds for a financial proposal that is currently under the District of Saanich's review: the Project Team have proposed this as an alternative means to fulfil the majority of the outstanding obligations. If the District of Saanich agree to this approach the majority of obligations within the agreement will have been fulfilled, and a limited number of CRD responsibilities will remain, primarily related to the Peers Creek culvert replacement.

Documentation regarding the fulfilled and outstanding obligations can be found in the relevant governance transition summary, and in addition the CAO of the CRD is familiar with the rationale behind the financial proposal offered to the District of Saanich to fulfil the outstanding obligations.

One of the CRD's infrastructure improvements obligations under the Agreement was to replace culverts at Peers Creek. Parsons (under a contract with the CRD) designed two replacement (larger diameter) culverts and new headwalls, and Don Mann (under a contract with the CRD) constructed the improvements under the supervision of Stantec (under a contract with the CRD). Current Environmental were engaged by Parsons during the design, and the Project Team have subsequently engaged them directly to review concerns raised by nearby residents. Stantec are currently in the process of finalizing the completion report related to this improvement, for submission to the District of Saanich.

See also section 3.4 of this report for information regarding the Technical Working Group the Project Team established with the District of Saanich.

2.2.3.4 Greater Victoria Harbour Authority

The CRD entered into two agreements with the Greater Victoria Harbour Authority related to the Project, as follows:

- Compensation Agreement; and
- Right to Enter Agreement.

All of the CRD's obligations under the Greater Victoria Harbour Authority Agreements have been fulfilled, and close-out documentation from the Authority confirming this has been received.

2.2.3.5 Other Land Access Agreements

The CRD entered into three other land access agreements with third parties related to the Project, as follows:

- DND Licence Agreement for Access to Federal Real Property;
- Rock Bay Lease Agreement; and
- MOTI

All of the CRD's obligations under these agreements have been fulfilled, and close-out documentation from the relevant counterpart confirming this has been received.

2.3 Committed Funds for the Resources Required to Oversee the Completion of the Remaining Obligations and Close-Out the Construction Contracts

The Project Team have identified the resources (both Project Team staff and Project consultants) with the knowledge and expertise required to support the delivery of the remaining works, and the outstanding commitments, and the Project budget includes committed funds for the required resources, as follows:

- Project staff transitioning to CRD: see Table 6, which outlines project management, document control and finance staff resources that the Project budget will fund post May 2021;
- Project consultants: see Table 7, which outlines \$1.96M of funds that will be committed, primarily for design consultants (KWL and Parsons) and the Project's owner's engineer (Stantec), to support Project close-out activities; and
- The remainder of the CRD finance department allocation for the current year (approximately \$91k).

These resource commitments are based on the close-out activities forecast to be required post May 2021, and a conservative forecast of when those activities will be complete: Table 8 includes the actual or forecast dates for substantial and total completion for each of the Project's construction contracts, but the resource commitments in Tables 6 and 7 (and the Project's budget) allow for these schedules to slip, and should be sufficient provided that all contracts achieve total completion by year end.

Table 6: Committed Project Funding for Project Staff Transitioning to CRD to Support Project Close-Out Activities Post May 2021

Project Role	CRD Role	Transition	Project Funding Role Until
Project Manager, Wastewater Treatment Plant	Manager, Core Area Wastewater Treatment and Conveyance Operations	Phased over 2019-2020	July 4, 2021
Project Manager, Clover Point Pump Station and Macaulay Point Pump Station and Forcemain	Engineer, Integrated Water Services	May 25, 2021	December 31, 2021
Project Controls Manager	Continuation of Project Role	May 25, 2021	August 30, 2021
Project Manager, Residuals Treatment Facility	Continuation of Project Role	May 25, 2021	July 31, 2021
Project Manager, Deputy Conveyance Manager	Continuation of Project Role	May 25, 2021	July 31, 2021
Financial Analyst	Continuation of Project Role	May 25, 2021	August 1, 2021
Document Controller	Document Controller	June 1, 2021	December 31, 2021

Table 7: Committed Project Funding for Project Consultants to Support Project Close-Out Activities Post April 2021

Consultant	Scope Post April 2021	Scope Anticipated to Conclude	Last Monthly Invoice processed and included in Expended Project Budget (see note 1)	Amount included in Project Budget Forecast to Complete: Covers Completed (but not yet invoiced) and Remaining Works (see note 2)
Stantec	Owner's engineer, supporting the close-out of the following contracts: • McLoughlin Point Wastewater Treatment Plant; • Residuals Treatment Facility; • Macaulay Point Pump Station and Forcemain; • Clover Point Pump Station; and • Trent Forcemain	October 31, 2021	April 2021	\$646k
KWL	Design consultant, supporting the close-out of the following contract: Clover Forcemain	October 31, 2021	March 2021	\$67k
KWL	Design consultant, supporting the close-out of the following contract: Arbutus Attenuation Tank.	October 31, 2021	March 2021	\$490k
Parsons	Design consultant, supporting the close-out of the following contracts: • Residual Solids Conveyance Line; and • Residual Solids Pump Stations.	October 31, 2021	January 2021	\$504k
Mike McCoy	Operations expert, supporting primarily the operations team at the Wastewater Treatment Plant, but also available to assist with the operation of the conveyance components	August 30, 2021	April 2021	\$168k
Stantec	Conclusion of Asset Management Consulting Services for CRD's Integrated Water Services Department	CRD's Finance Department are managing the scope	Dec 2020	\$41k
EMA	Conclusion of Operational Readiness Review	CRD's Integrated Water Services Department are managing the scope	April 2021	\$46k
TOTAL FORECAST COMMITTED PROJECT FUNDING FOR PROJECT CONSULTANTS TO SUPPORT PROJECT CLOSE-OUT ACTIVITIES POST APRIL 2021				\$1.96M

Notes to Table 7:

1. This is the last monthly invoice that was received and processed before the cut-off for the April 2021 cost period: invoices received to this date are captured in the Project budget in the column 'Expended to April 30, 2021'.
2. This is the amount included in the Project budget in the column 'Forecast to Complete': it covers work completed but not yet invoiced (i.e. work conducted after the last monthly invoice shown in the previous column) as well as the forecast cost of the work remaining

Table 8 – Project Construction Contracts: Actual or Forecast Substantial and Total Completion

Project Component	Substantial Completion	Total Completion
McLoughlin Point Wastewater Treatment Plant (see note 1)	October 2020	January 12, 2021
Residuals Treatment Facility (see note 1)	March 4, 2021	June 30, 2021
Macaulay Point Pump Station and Forcemain	June 24, 2021	July 26, 2021
Clover Point Pump Station (see note 2)	October 26, 2021	November 19, 2021
Clover Forcemain	August 27, 2020	May 31, 2021
Residual Solids Conveyance Line	April 30, 2021	May 31, 2021
Residual Solids Pump Stations	May 15, 2021	July 15, 2021
Trent Forcemain	July 09, 2021	July 30, 2021
Arbutus Attenuation Tank	July 30, 2021	September 3, 2021

Notes to Table 8:

1. *This table includes the actual or forecast dates for substantial and total completion for each of the Project's construction contracts, but the resource commitments in Tables 6 and 7 (and the Project's budget) allow for these schedules to slip, and should be sufficient provided that all contracts achieve total completion by year end.*
2. *The concepts of substantial and total completion don't strictly apply to these contracts, instead the dates included are proxies, based on:*
 - a. *substantial completion: ready for intended use; and*
 - b. *total completion: Independent Certifier confirms acceptance testing complete*
3. *The requirement to complete inlet channel debris removal at Clover Point Pump Station was not part of the original scope of the contract: it is required as a result of the pre-existing condition of the inlet channel (resulting from the build-up of debris over decades of use), and can only be completed in low flow conditions. The need to complete inlet channel debris removal has pushed out the schedule for the completion of some other scope elements of the contract.*

2.4 Operation and Maintenance of Infrastructure Built by the Project

2.4.1 Responsibility for Operations and Maintenance of Project Components

The CRD's Integrated Water Services department are responsible for operating and maintaining all of the Project components other than the Residuals Treatment Facility (see section 7.3.3) upon completion of their commissioning period, and this transfer has occurred for all components other than the Arbutus Attenuation Tank, for which the transfer is forecast to occur in June 2021.

This responsibility includes:

- managing the contractual warranties for each of the Project components;
- administering the two-year performance period for the McLoughlin Point Wastewater Treatment Plant, as outlined below.

The McLoughlin Point Wastewater Treatment Plant contract includes a two-year performance period, from the acceptance date (January 2021). Over the performance period the CRD will

operate and maintain the McLoughlin Point Wastewater Treatment Plant, and Harbour Resource Partners are responsible for:

- monitoring operations;
- consulting with and providing advice to the CRD and the CRD's plant manager with respect to the operation of the Facility;
- assisting with environmental and regulatory compliance;
- preparing and updating the operations manual and operations and maintenance plans;
- assisting with the evaluation of the performance of the Project and the implementation of plans to achieve continued compliance with the process performance guarantees;
- assisting with the development and implementation of plans that will minimize use of power, chemicals, water and labour; and
- responding to warranty claims.

There are physically interfacing works and screened, dewatered wastewater is required to be delivered in order for the performance period to operate as intended. Responsibility for these interfaces is retained by the CRD: it was the Project Team's responsibility to manage the interfaces during construction and commissioning, and upon the acceptance date (January 2021), the CRD's Integrated Water Services department assumed responsibility for the operation of the McLoughlin Point Wastewater Treatment Plant and the management of the interfaces.

2.4.2 Contract Administration of Residuals Treatment Facility Project Agreement

The Residuals Treatment Facility was procured through a design-build-finance-operate-maintain contract under which Hartland Resource Management Group have the responsibility to design, build, partially-finance, operate and maintain the facility to meet the performance specification and contract requirements over the term of the contract.

The Residuals Treatment Facility has been constructed and is close to completing commissioning, and the Hartland Resource Management Group will be responsible for operating and maintaining the facility over the next 20 years. The Project's committed budget includes the net present value of the capital cost of the Residuals Treatment Facility.

There are physically-interfacing works and residual solids required to be delivered and biosolids required to be transported in order for the contract to operate as intended. The CRD's Parks and Environmental Services Department are responsible for managing these interfaces and administering the contract over the 20 year operating and maintenance period.

2.4.3 Environmental Management and Permits

To the extent allowed by the Project schedule, the Project Team assigned responsibility for obtaining permits to the relevant Project contractor, in order to avoid the Project Team inadvertently constraining the relevant contractor's execution flexibility. The contractor's knowledge of construction means, methods and schedule also put them in the best position to assess which of their activities required a permit and what the permit application should contain.

The notable exception to the above approach was registration under the Municipal Wastewater Regulation, which the Project Team coordinated with the support of: members of the CRD's Parks and Environmental Services and Integrated Water Services Departments; Project consultants (predominantly Stantec and KWL) and Project contractors (predominantly HRP and Kenaidan).

The CRD's Parks and Environmental Services Department and/or Integrated Water Services department (as applicable) are responsible for:

- environmental monitoring and/or mitigation activities related to the operation and maintenance of Project components, and
- compliance and reporting pursuant to the:
 - Municipal Wastewater Regulation registration;
 - Federal Wastewater System Effluent Regulations, including the transitional authorizations; and
 - Fisheries Act Authorization for the McLoughlin Point Outfall: HRP obtained this Authorization and were responsible for fulfilling the planning, construction and year 1 monitoring obligations of this Authorization; the CRD's Integrated Water Services Department are responsible for fulfilling the remaining obligations.

Other than the obligations outlined above, the CRD do not have any obligations related to permits obtained during the planning, construction or commissioning phase of the Project.

Note the Operational Certificate for the Residuals Treatment Facility is in CRD's name, but HRMG are responsible for maintaining and complying with it, including fulfilling all ongoing monitoring and reporting obligations.

Project documentation regarding regulatory approvals and permits can be found here: [Regulatory approvals, licenses and permits](#)

2.4.4 Responsibility for Operations and Maintenance of Project Amenities

In furtherance of the Project's goal to deliver a solution that adds value to the surrounding community and enhances the liveability of neighborhoods, the Project either funded or funded and delivered a number of amenities and/or infrastructure improvements. These amenities and infrastructure improvements have been transferred to the benefitting municipality to operate and maintain, as outlined in Table 9 below, with the exception of the public realm improvements at Clover Point (which are covered in section 2.1 and are anticipated to be completed and handed over at the end of Q2, 2021). With the exception of the completion of the public realm improvements at Clover Point, the CRD's outstanding responsibilities are limited to coordinating the relevant contractor's response to any warranty claims.

Table 9 – Summary of Project Amenities Constructed by Project Contractors for which Operating and Maintenance Responsibility have been Transferred to a Third Party

Party Responsible for Operating and Maintaining Asset	Asset	Project Contractor Responsible for Construction and Warranty
City of Victoria	Cycle Path along Dallas Road	Windley
City of Victoria	Public Realm Improvements at Clover Point	Kenaidan
District of Saanich	Hartland Water System Improvements	Knappett

2.5 Signage and First Nations Artwork

In furtherance of the Project's goal to 'deliver a solution that adds value to the surrounding community and enhances the liveability of neighborhoods', and in some cases in fulfilment of commitments in the Host Community Impact 5-Year Agreement with the Township of Esquimalt (regarding public art and historical interpretive signage), the Project has arranged for the production of signage and First Nations Artwork as outlined in Table 10. Installation has either occurred or is scheduled to occur in the near future.

Project documentation regarding First Nations artwork and signage can be found here:

[Project Signage and First Nations Artwork](#)

Table 10 – Summary of Status of First Nations Artwork and Signage at May 2021

Artwork	Intended Installation Location	Status of Artwork	Artist	Status of contract with Artist/Signmaker	Installation to be Completed by	Anticipated Date of Installation
Peace Pole	Macaulay Point	Stored in Songhees Carving Shed	Ake Lianga and Bradley Dick	N/A (artwork organized through and paid for by the Pacific Peoples' Partnership: contact April Ingham, Executive Director)	Kenaidan	By end of May, 2021
Salish Art Metal Sculpture	Macaulay Point	Installed	Darlene Gait	Fully paid	Kenaidan	Already installed
Chief's Chair	Macaulay Point	Installed	Dylan Thomas	Final payment to be made upon delivery	Kenaidan	Already installed
Interpretive Signs (two)	Clover Point and Macaulay Point	Under fabrication	Urban Sign	Final payment to be made upon delivery	Kenaidan	By end of June, 2021
Interpretive Signs (five)	McLoughlin Point	Under fabrication	Urban Sign	Final payment to be made upon delivery	CRD's Integrated Water Services Department	By end of June, 2021
Seawolf shroud	Clover Point	Installed at Clover Point	Clarence Dick	Fully paid	Kenaidan	Already installed

3 Project Communications and Engagement

The Project Team, with the input and review of the CRD's Senior Manager of Corporate Communications, developed the Wastewater Treatment Project's Communications and Engagement 2020 Outlook (the 2020 Outlook). This document was developed to supplement the Project's Communications and Engagement Plan by highlighting communications and engagement opportunities and context specific to the final year of construction, and the transition of the Project from construction through commissioning and into the operating phase. The Communications and Engagement 2020 Outlook was approved by the Project Board in May 2020, and implemented by the Project Team.

In accordance with the 2020 Outlook, over the course of the final year of construction on the Project, the responsibility for communications and engagement transitioned from the Project Team to relevant CRD Departments, generally upon the Project entering the operating phase. This responsibility included: responding to public questions; providing stakeholder information; participating in the Esquimalt Liaison Committee; and responding to media enquiries.

3.1 Project Telephone Line and E-mail Address

The Project's dedicated 24/7 telephone line was closed in March 2021 (when the majority of the remaining construction was constrained to contained sites), and responsibility for monitoring the wastewater e-mail address was transferred to communications staff in the CRD's Integrated Water Services Department at the end of March 2021.

A tracking log of all public correspondence received through the below two channels can be found at the following link [Public correspondence log](#)

- E-mails received through the Project Board (cawtpb@crd.bc.ca) and Project e-mail address (wastewater@crd.bc.ca), up to March 2021; and
- Calls received through the Project's dedicated 24/7 telephone line.

3.2 Media Inquiries

The CRD's Senior Manager of Corporate Communications was the point of contact for media throughout Project delivery, with responsibility for coordinating with the Project Team to manage media inquiries related to the Project. After May 2021 it is anticipated that the CRD's Senior Manager of Corporate Communications will continue to be responsible for managing media inquiries with the support of the CRD's Parks and Environmental Services and/or Integrated Water Services Department representatives, as applicable to the inquiry.

3.3 Community Committees

The Project Team met and communicated with various community associations either regularly and/or when requested to update residents in areas where construction was taking place. None of these updates were intended to continue past the commissioning phase, with the exception of the Esquimalt Liaison Committee for which responsibility was transferred to the CRD's Integrated Water Services Department upon the McLoughlin Point Wastewater Treatment Plant becoming operational, as outlined below.

3.3.1 Esquimalt Liaison Committee

In accordance with the Community Impact Mitigation and Operating Agreement with the Township of Esquimalt, the Esquimalt Liaison Committee was established in May 2017 to provide a forum for the discussion of issues related to the construction and operation of the Wastewater Treatment Plant and the Macaulay Point Pump Station and Forcemain, including traffic management plans.

The committee includes representatives from the Township of Esquimalt, West Bay Residents Association, Lyall Street Action Committee, Macaulay Elementary School Parent Advisory Committee, Department of National Defence, and the CRD.

During Project construction, representatives from the McLoughlin Point Wastewater Treatment Plant contractor Harbour Resource Partners, the Macaulay Point Pump Station and Forcemain contractor Kenaidan Contracting Ltd. and the Residual Solids Conveyance Line contractor Don Mann Excavating also attended as appropriate.

The Esquimalt Liaison Committee met monthly during the construction phase and the agreement requires meetings continue at least twice annually while the McLoughlin Point Wastewater Treatment Plant is in operation. The Committee discussed an intent to review the meeting schedule once the McLoughlin Point Wastewater Treatment Plant was operational.

The Project Team attended the Esquimalt Liaison Committee meetings until the plant become operational, and responsibility for attending the meetings and representing the CRD has transitioned to the CRD's Integrated Water Services Department.

The Terms of Reference for the Esquimalt Liaison Committee can be found here: [Esquimalt Liaison Committee Terms of Reference](#)

Information related to the Esquimalt Liaison Committee meetings attended by Project Team members can be found here: [Esquimalt Liaison Committee Documents](#)

3.3.2 City of Victoria Neighbourhood / Community Associations

There are three neighbourhoods in close proximity to Project construction in Victoria. The Project Team communicated and met with the James Bay Neighbourhood Association, the Fairfield Gonzales Community Association and Victoria West Community Association as needed. Engagement with these neighbourhood and community associations was focused on construction progress and mitigation measures.

The Project Team established a committee with representatives of the James Bay Neighbourhood Association (JBNA) to provide a forum for the discussion of issues relating to

mitigation of construction impacts of the Wastewater Treatment Project on the community. Monthly updates were provided to the committee by email and meetings were held approximately quarterly. With the vast majority of construction along Dallas Road complete (and only some restoration and landscaping remaining) the Project Team has concluded the JBNA-specific meetings and updates.

Information related to the JBNA meetings attended by Project Team members can be found here: [JBNA documents](#)

3.3.3 Saanich / Electoral District A / Willis Point

The Project Team met with the Saanich Community Association Network (SCAN) and engaged with SCAN and other community or neighbourhood associations in close proximity to Project construction in Saanich, including the Willis Point Community Association and Mount Work Coalition.

Early in Project planning the Project Team discussed establishing a Saanich community liaison committee but Saanich community representatives stated their preference was to receive Project updates through email for distribution to their members.

Parks and Environmental Services representatives have generally been included in recent e-mail correspondence with Saanich community association representatives, in order to enable a continuity as the Residuals Treatment Facility transitions from the commissioning to operating phase.

3.4 Local Government Technical Engagement: Staff Working Groups

Complementing the ongoing engagement with elected officials, local government technical engagement was established with the three primary core area municipalities most directly affected by construction: Victoria, Esquimalt, and Saanich. The Technical Engagement Program with each primary municipality ensured there was regular contact with the Wastewater Treatment Project Team and key municipal staff. It provided a forum to ensure accurate technical information was available to municipal staff as Project planning and construction proceeded, and to ensure technical issues were raised, discussed and addressed and, where possible, to coordinate municipal works with Project construction.

The technical engagement process was managed by the Project Team. The Wastewater Treatment Project provided information to local government staff, and received input and feedback from staff. In some cases, the Project Team sought specific input about technical issues to further Project design and development, or to inform construction.

Terms of Reference were developed for each committee, and included:

- Local government staff participants – these generally included a senior engineer, senior planner, and other staff recommended by each municipality;
- The Project Team appointed a representative for each municipality and contractor representatives also attended meetings where appropriate; and
- Meeting frequency varied but was generally a minimum of quarterly during construction, with the option for either party to request additional meetings.

Documentation relevant to each technical working group, including meeting minutes, can be found here:

- [Township of Esquimalt Technical Working Group;](#)
- [City of Victoria Technical Working Group;](#) and
- [District of Saanich Technical Working Group.](#)

4 Project Documentation

All documents and records related to the Wastewater Treatment Project have been organized in accordance with the CRD Records Classification System (RCS). All Project records fall under the 5220 index, for which the CRD's retention policy is as follows:

- Time in office is SO "Superseded or Obsolete" when the project is completed;
- Time in Storage is 7 years; and
- Final State is SR "Selective Retention" as all minor or trivial projects will be destroyed and all other projects will be permanently retained.

4.1 Software Packages

Two software packages have been used for the Project's document management: SharePoint and Prolog Enterprise. These are both document management and collaboration software packages used to assist in the management of the documents. SharePoint has been used mainly for sharing Project documents between Project Team members, while Prolog has been used by Project Team members, Project consultants and Project contractors for Project collaboration.

4.1.1 SharePoint

The SharePoint database has been structured with folders for each of the project components (for files specific to that Project component), and for the project management office (for files applicable to more than one Project component).

The main folders are:

- CP100 Wastewater Treatment Plant;
- CP210 Residuals Treatment Facility;
- CP300 Conveyance System:
 - CP310 Macaulay Point Pump Station and Forcemain;
 - CP320 Craigflower Pump Station;
 - CP330 Clover Point Pump Station;
 - CP350 Arbutus Attenuation Tank;
 - CP360 Clover Forcemain;
 - CP370 Trent Forcemain;
 - CP380 Residual Solids Conveyance Line;
 - CP385 Residual Solids Pump Stations & Bridge Crossings & Hartland Water System Improvement – Design;
- CP400 BC Hydro; and
- CP900 Project Management Office (PMO).

Within each main folder, libraries have been created as required for different categories of project documentation, in accordance with the CRD's Records Classification System.

- CP100 Wastewater Treatment Plant;
 - 0110 Administration;

- 0220 General Correspondence;
- 0640 Reports, Studies & Statistics;
- 3000 Land Administration;
- 3060 Development Permits;
- 4500 Licenses & Permits;
- 5220 Contracts;
- 5220 Correspondence;
- 5220 Procurement.

- CP210 Residuals Treatment Facility;
 - 0110 Administration;
 - 0400 Cooperation & Liaison;
 - 0640 Reports, Studies & Statistics;
 - 4500 Licenses & Permits;
 - 5220 Contracts;
 - 5220 Correspondence;
 - 5220 Procurement.

- CP300 Conveyance System;
 - CP310 Macaulay Point Pump Station and Forcemain;
 - 0110 Administration;
 - 0400 Cooperation & Liaison;
 - 0640 Reports, Studies & Statistics;
 - 3060 Development Permits;
 - 4500 Licenses & Permits;
 - 5220 Contracts;
 - 5220 Correspondence;
 - 5220 Procurement.

 - CP320 Craigflower Pump Station;
 - 5220 Contracts;

 - CP330 Clover Point Pump Station;
 - 0110 Administration;
 - 0400 Cooperation & Liaison;
 - 0640 Reports, Studies & Statistics;
 - 4500 Licenses & Permits;
 - 5220 Contracts;
 - 5220 Correspondence;
 - 5220 Procurement;
 - 5220 Zoning.

- CP350 Arbutus Attenuation Tank;
 - 0110 Administration;
 - 0400 Cooperation & Liaison;
 - 0640 Reports, Studies & Statistics;
 - 4500 Licenses & Permits;
 - 5220 Contracts;
 - 5220 Correspondence;
 - 5220 Procurement.

- CP360 Clover Forcemain;
 - 0110 Administration;
 - 0400 Cooperation & Liaison;
 - 0640 Reports, Studies & Statistics;
 - 4500 Licenses & Permits;
 - 5220 Contracts;
 - 5220 Correspondence;
 - 5220 Procurement.

- CP370 Trent Forcemain;
 - 0110 Administration;
 - 0640 Reports, Studies & Statistics;
 - 4500 Licenses & Permits;
 - 5220 Contracts;
 - 5220 Correspondence;
 - 5220 Procurement.

- CP380 Residual Solids Conveyance Line;
 - 0110 Administration;
 - 0400 Cooperation & Liaison;
 - 0640 Reports, Studies & Statistics;
 - 4500 Licenses & Permits;
 - 5220 Contracts;
 - 5220 Correspondence;
 - 5220 Procurement.

- CP385 Residual Solids Pump Stations & Bridge Crossings & Hartland Water System Improvement – Design;
 - 0110 Administration;
 - 0400 Cooperation & Liaison;
 - 0640 Reports, Studies & Statistics;
 - 4500 Licenses & Permits;

- 5220 Contracts;
 - 5220 Correspondence;
 - 5220 Procurement.
- CP400 BC Hydro;
 - 5220 Contracts;
 - 5220 Correspondence.
- CP900 Project Management Office (PMO)
 - 0110 Administration; (Doc Control documentation, Governance Transition Plan Files, Templates)
 - 0220 General Correspondence; (Correspondence with Local/Provincial/Federal Government and Stakeholders)
 - 0340 Policies, Procedures & Manuals; (User guide for Prolog, SharePoint, CAD Standards)
 - 0360 Committees & Commissions OPEN; (Agenda's, Minutes from Open Project Board Meetings)
 - 0360 Committees & Commissions CLOSED; (Agenda's, Minutes from Closed Project Board Meetings)
 - 0400 Cooperation & Liaison; (Working group and liaison committee documents)
 - 0550 CRD Board; (Info sent to CRD Board in 2016: pre Project Team)
 - 0550 CRD Board CLOSED; (Info sent to Closed CRD Board in 2016: pre Project Team)
 - 0640 Reports, Studies & Statistics;
 - 1475 Communications; (Communications Team files)
 - 1615 Accounting General (EX. RPT); (Expense Claims- Employees and Board Members)
 - 1880 Finance (Open);
 - 1880 Finance (Secure); (Finance Documents)
 - 2320 Contracts and Agreements; (Funding, Commitment, Art and Signage, Data use agreements and documentation)
 - 2360 Easements & Rights of Way; (McCloughlin Point SRW)
 - 2640 Health and Safety; (Health and Safety Manager Documentation)
 - 3000 Land Administration;
 - 4500 Licenses & Permits;
 - 4500 E.F.R; (Environmental and First Nations Relation Documentation)
 - 5220 Contracts;
 - 5220 Procurement;
 - 5220 Project Charter;
 - 5220 Project Controls;
 - 5220 PMP- Including subsidiary Plans;
 - 5220 Projects; (WTP Project Monthly/Quarterly Reports);
 - 5220 Quality Management; (Quality Manager Documentation).

Project files have been stored within these libraries.

4.1.2 Prolog

Prolog has been structured with modules for each of the Project's major design and construction Project contracts (for files specific to a Project contract), and for the project management office (for files applicable to more than one Project contract).

The main modules are:

- CP100 Wastewater Treatment Plant;
- CP210 Residuals Treatment Facility;
- CP.230D Hartland Water System Improvement – Design;
- CP310 Macaulay Pump Station and Forcemain;
- CP320 Craigflower Pump Station;
- CP330 Clover Point Pump Station;
- CP350 Arbutus Attenuation Tank;
- CP350D Arbutus Attenuation Tank – Design;
- CP360 Clover Forcemain;
- CP360D Clover Forcemain – Design;
- CP370 Trent Forcemain;
- CP370D Trent Forcemain – Design;
- CP380 Residual Solids Conveyance Line;
- CP380D Residual Solids Conveyance Line, Pump Stations & Bridge Crossings- Design;
- CP385 Residual Solids Pump Stations & Bridge Crossings / Hartland Water System Improvement;
- CP400 BC Hydro; and
- CP900 Project Management Office.

Sub-sections include but are not limited to:

- Cost Control:
 - Contract Management;
 - Budget Management;
 - Contracts;
 - Potential Change Orders;
 - Change Orders;
 - Contract Invoices.
- Document Control:
 - Correspondence;
 - Drawings and Specs;
 - Submittal Packages;
 - Submittal Registers;
 - Requests For Information;

- Meeting Minutes;
- Project Files.
- Field Administration:
 - Daily Reports;
 - Inspections & Tests.

Project files and/or data have been stored within these sub-sections.

4.2 Project Hardcopies

Through a series of meetings held over the course of Project delivery with representatives from the CRD's Integrated Water Services Department and CRD's Information Services Manager, it was decided that hard copies of key Project deliverables will be located as summarised in Table 11. At May 2021, the majority of these hard copies are still to be finalised by Project contractors and submitted to the CRD.

Table 11 – Hard Copy Locations of key Project Deliverables

Component/Asset	Storage Location	Hard Copies		
		O&M Manual	Record Drawings	Project Binder
CP100 Wastewater Treatment Plant	WasteWater Treatment Plant library	1	1	
	CRD Storage Facility (Access Storage)	1	1	
CP210 Residuals Treatment Facility (RTF)	WasteWater Treatment Plant library	1	1	
	CRD Storage Facility (Access Storage)	1	1	
CP310 Macaulay Pump Station and Forcemain	WasteWater Treatment Plant library	1	1	1
	CRD Storage Facility (Access Storage)	1	1	1
	Macaulay Pump Station	1	1	
CP330 Clover Point Pump Station	WasteWater Treatment Plant library	1	1	1
	CRD Storage Facility (Access Storage)	1	1	1
	Clover Point Pump Station	1	1	
CP385 Residual Solids Pump Stations & Bridge Crossings CP385 Hartland Water System Improvement (HWSI)	WasteWater Treatment Plant library	1	1	1
	CRD Storage Facility (Access Storage)	1	1	1
	Pump Station #2	1	1	
	Pump Station #3	1	1	
	Pump Station #4	1	1	
	Hartland Water Booster Station	1	1	
CP360 Clover Forcemain	WasteWater Treatment Plant library	1	1	1
CP370 Trent Forcemain				
CP380 Residual Solids Conveyance Line	CRD Storage Facility (Access Storage)	1	1	1
CP350 Arbutus Attenuation Tank	WasteWater Treatment Plant library	1	1	1
	CRD Storage Facility (Access Storage)	1	1	1
	Arbutus Attenuation Tank	1	1	

4.2.1 Infolinx

Infolinx is a web-based software system that the CRD uses to track the location of all CRD corporate records and print labels for filing folders. All physical copies of Project records stored in Access Storage (the CRD's storage facility for physical copies of documentation) will have Infolinx labels for ease of tracking the location of the documentation.

4.3 Project Risk Registers

Project and Project component risk registers for the Project were used to aid in the identification and management of Project-phase risks (i.e. those related to planning, construction or commissioning). The risk registers also captured a small number of operating period risks, but were not intended to be comprehensive with respect to operating period risks.

The following four risk registers were updated over the course of the Project:

- Project (to capture risks that impacted more than one Project component);
- McLoughlin Point Wastewater Treatment Plant;
- Residuals Treatment Facility; and
- Conveyance System.

All four risk registers were updated monthly, and changes were reported to the Project Board.

The status of the risk registers as at April 20, 2021 are as follows:

- In the Project risk register: the only Project-phase (as opposed to operating period) risk remaining open is: senior government funds issue delayed. The Project Team are currently completing the documentation required to apply for the remaining government funding;
- In the McLoughlin Point Wastewater Treatment Plant risk register: no Project-phase risks remained open (the only risks remaining open are operating period risks);
- In the Residuals Treatment Facility risk register: no Project-phase risks remained open (the only risks remaining open are operating period risks);
- In the conveyance risk register: a small number of Project-phase risks remain open, and contingency (of \$1.74 million) has been included in the Project budget to cover:
 - the inlet channel debris removal at Clover Point Pump Station; and
 - the risks associated with the work remaining on the conveyance component, which is anticipated to be more than sufficient given the nature of the remaining works.

5 Knowledge Transfer

Project knowledge transfer has been achieved through:

- The support and integration of the CRD throughout the planning, design, procurement and construction of the Project – including through the secondment of CRD resources, and CRD resource review of Project submittals;
- Handover meetings between Project Team members and CRD staff;
- The use of a common SCADA system integrator (QCA), who is now familiar with all of the pre-existing and new components of the core area's SCADA system;
- The commitment of Project funds to allow for the continued involvement of the Project's owner's engineer (Stantec);
- The continuity of personnel through the transfer of resources from the Project Team to CRD positions; and
- The retention of Project records.

Appendix A - Source of Project Commitments

Construction Contracts:

- Arbutus Attenuation Tank;
- Clover Forcemain;
- Clover Point Pump Station;
- Macaulay Point Pump Station and Forcemain;
- McLoughlin Point Wastewater Treatment Plant;
- Residual Solids Forcemain and Centrate Return Line;
- Residual Solids Pump Stations and Bridge Crossings;
- Residuals Treatment Facility; and
- Trent Forcemain.

Funding Agreements:

- Infrastructure Canada:
 - Building Canada Fund;
 - Green Infrastructure Fund; and
 - P3 Canada Fund;
- Province of BC; and
- Federation of Canadian Municipalities:
 - GMF 16576;
 - GMF 15822; and
 - GMF 16342.

First Nation Agreements:

- Esquimalt First Nation Support Agreement;
- Songhees First Nation Support Agreement; and
- WSANEC Leadership Council Memorandum of Understanding.

Land Access Agreements:

- Transport Canada Licences:
 - McLoughlin Point Harbour Crossing;
 - McLoughlin Point Outfall;
- Township of Esquimalt Amenity Agreements:
 - Host Community Impact 5-Year Agreement;
 - Community Impact Mitigation and Operating Agreement; and
 - Amenity Reserve Fund Administration Agreement;
- City of Victoria Licences of Occupation:
 - Dallas Road; and
 - Clover Point Pump Station;
- Greater Victoria Harbour Authority (GVHA) Agreements:

- Compensation Agreement; and
 - Right to Enter Agreement.
- DND Licence Agreement for Access to Federal Real Property;
- Minister of Transportation and Infrastructure RSCL Highway Crossing Agreement;
- District of Saanich Residuals Conveyance System and Infrastructure Improvements Design, Construction, Access Agreement; and
- Rock Bay Lease Agreement.

PROJECT COST REPORT as at September 30, 2021						
Description	BUDGET		COST EXPENDED		FORECAST	
	Control Budget	Allocated Budget	Expended to September 30, 2021	Expended to September 30, 2021 as a % of Allocated Budget	Forecast to Complete	Forecast at Completion
McLoughlin Point Wastewater Treatment Plant	331.40	336.3	329.9	98%	6.4	336.3
Construction	306.7	334.4	329.7	99%	4.7	334.4
Contingency	14.9	1.0	-	0%	1.0	1.0
Financing	9.8	0.9	0.2	26%	0.7	0.9
Residuals Treatment Facility	159.4	140.2	139.8	100%	0.4	140.2
Construction	145.4	139.8	139.8	100%	0.0	139.8
Contingency	12.3	-	-	0%	-	-
Financing	1.7	0.4	-	0%	0.4	0.4
Conveyance System	158.0	206.4	203.8	99%	2.5	206.3
Macaulay Point Pump Station	25.4	32.4	32.3	100%	0.2	32.4
Macaulay Forcemain	5.6	7.4	7.4	100%	-	7.4
Craigflower Pump Station	12.5	12.4	12.4	100%	-	12.4
Clover Point Pump Station	23.7	29.4	28.9	98%	0.5	29.4
Currie Pump Station^	2.8	0.1	0.1	100%	-	0.1
Arbutus Attenuation Tank	14.2	24.6	24.0	97%	0.7	24.6
Clover Forcemain	14.6	31.8	31.7	100%	0.2	31.8
Currie Forcemain^	3.3	0.2	0.2	100%	-	0.2
Trent Forcemain	9.5	11.1	11.1	100%	0.0	11.1
Residual Solids Conveyance Line	19.1	37.2	37.2	100%	-	37.2
Residual Solids Pump Stations & Bridge Crossings	4.6	18.2	18.1	99%	0.2	18.2
Residual Solids Conveyance Line – Highway Crossing	-	0.3	0.3	100%	-	0.3
Contingency	16.8	0.4	-	0%	0.4	0.4
Financing	5.8	0.6	0.1	24%	0.4	0.6
Project Management Office ("PMO")	75.8	72.5	71.4	99%	1.1	72.5
Project costs Aug 2016-Dec 2016	2.2	2.2	2.2	100%	-	2.2
Owner's Engineering	17.2	18.3	18.2	99%	0.2	18.3
Conveyance Design	5.0	11.0	10.6	96%	0.4	11.0
Advisors & Professional Support	7.0	11.8	11.5	98%	0.3	11.9
Project Board	2.0	1.1	1.1	100%	-	1.1
Project Board Expenses	0.3	0.1	0.1	100%	-	0.1
Project Team	29.1	21.9	21.7	99%	0.2	21.9
Project Leadership Team Expenses	0.7	0.3	0.3	100%	-	0.3
Project Support Team Expenses	0.5	0.1	0.1	100%	-	0.1
CRD Financial Services	1.5	1.4	1.4	100%	-	1.4
CRD Human Resources	0.3	0.3	0.3	100%	-	0.3
CRD Corporate Communications	0.2	0.2	0.2	100%	-	0.2
CRD Real Estate	0.3	0.3	0.3	100%	-	0.3
CRD Information Technology	0.4	0.3	0.3	100%	-	0.3
CRD Insurance	0.1	0.0	0.0	100%	-	0.0
CRD Operations	0.6	0.6	0.6	100%	-	0.6
CRD Legislative Services	0.1	0.1	0.1	100%	-	0.1
CRD Corporate Safety	0.2	0.2	0.2	100%	-	0.2
CRD Executive Services	-	0.1	0.1	100%	-	0.1
Office Lease	1.9	1.1	1.1	100%	-	1.1
Office Supplies	0.1	0.2	0.2	100%	-	0.2
Vehicles	0.2	0.1	0.1	100%	-	0.1
Connections Call Center	-	0.0	0.0	100%	-	0.0
Communication support materials	0.5	0.2	0.2	100%	-	0.2
Computer Hardware, Software & Training	1.0	0.7	0.7	100%	-	0.7
Contingency	4.8	-	-	0%	-	-
BC Hydro	12.9	2.7	2.7	100%	-	2.7
Third Party Commitments	8.1	10.5	4.7	45%	5.8	10.5
Program Reserves	19.2	6.3	-	0%	6.3	6.3
Core Area Wastewater Treatment Project	765.0	774.9	752.4	97%	22.5	775.0

* Values presented in \$millions, results in minor rounding differences
** Cost report presents approved expenditures
^ Component no longer required, and would not provide any value therefore removed from Project Scope; Costs include Seaterra initiation, planning and design