REGIONAL DISTRICT OF NANAIMO

STAFF REPORT

TO:	Committee of the Whole	**MEETING:**	September 8, 2020
FROM:	Duncan Taylor Manager – Engineering Services	**FILE:**	5330-20-FCPCC EXPAN

SUBJECT: French Creek Pollution Control Centre Expansion and Odour Control Upgrade Project Update

RECOMMENDATIONS

1. The Board approve a $100,000 change order for AECOM to complete additional engineering services required to address the interface between the existing and new facilities for the French Creek Pollution Control Centre Expansion and Odour Control Upgrade Project (FCPCC Project).
2. The Board approve a $150,000 change order for AECOM to include Greenhouse Gas Reduction engineering services in the FCPCC Project.
3. The Board receive information on a preliminary budget update for the FCPCC Project.
4. The Board endorse the FCPCC Project, currently estimated at $48.5 million, for future eligible grant programs.
5. The Board receive information on the Contaminants of Emerging Concern Planning Study.

SUMMARY

The French Creek Pollution Control Centre (FCPCC) provides Parksville, Qualicum Beach and Electoral Area G, with wastewater treatment fundamental to the wellbeing and quality of life of residents, and the planned growth of the community. The Expansion and Odour Control Upgrade Project (FCPCC Project) will provide incremental secondary treatment capacity (30% increase) required for planned growth through 2040, significantly reduce odours, contribute to carbon neutrality, and manage our assets sustainably by replacing failing facilities that are at end of life. The Project has also been purposefully designed to be compatible with tertiatry-type upgrades in the future.

In July 2018, the Board awarded the detailed design of the FCPCC Project to AECOM. In March 2019, the Board approved a $222,000 change order for the thickener facility and landscape architecture design. Two additional change orders are presented for Board Approval.

1. $100,000 to address interface interconnection issues identified through the detailed design process.
2. $150,000 for the detailed design of greenhouse gas reduction options including: recovering heat from effluent; solar power system; and wood cladding for the building

The project consists of three main components: capacity expansion; odour reduction; replacing failing infrastructure. In addition, this report seeks approval to undertake the design of additional

componets identified to support sustainability and carbon neutrality. In 2018, an initial construction cost estimate of $32 million was budgeted for the capacity expansion component of the project. A consolidated cost estimate has been prepared as part of the detailed design process, (which now also includes odour reduction, replacing failing infrastructure, sustainability components, and escalation) of $48.5 million. The incremental project costs identified will be primarily funded through existing capital reserves. A revised construction cost estimate will be presented to the Board in the Fall, after completion of the 90% design milestone, for budget approval.

Provincial and Federal governments have announced that stimulus funding will be available for selected infrastructure projects. Grant funding for the project will significantly reduce the financial burden on the taxpayer. Board endorsement of the FCPCC Project for future funding opportunities will expedite the application process and position the project to respond to short application timelines. Potential project phasing and schedule adjustment may be required to align with grant funding criteria and opportunities.

In April 2020, the RDN was awarded a $10,000 Infrastructure Planning Grant towards a Contaminants of Emerging Concern Planning Study. Results of the study will provide information to support future decisions on how to improve the quality of treated wastewater. Staff will present results and recommendations of the Contaminants of Emerging Concern Planning Study to the LWMP Monitoring Committee and the Board following its completion in spring 2021.

BACKGROUND

The French Creek Pollution Control Centre (FCPCC) treats wastewater for approximately 27,000 people and businesses in Qualicum Beach, Parksville, and the service areas of French Creek, Pacific Shores, Surfside, and Barclay Crescent. The FCPCC also treats trucked waste from homes with septic systems and holding tanks.

The FCPCC was constructed in 1978 with secondary treatment and currently meets or exceeds Provincial and Federal regulatory requirements for municipal wastewater treatment. The facility is reaching capacity and requires many upgrades to accommodate growth, improve efficiency, replace ageing infrastructure, and reduce odours.

Treatment Levels

The RDN's 2014 LWMP identified the FCPCC expansion as one of the major upcoming capital projects. The LWMP process considered appropriate treatment levels.

- Secondary treatment is a biological process that uses beneficial micro-organisms to consume organic matter in the wastewater as their food supply. The micro-organisms are then separated from the liquid. The liquid is a clean clear effluent that is discharged through the outfall. The separated micro-organisms are thickened into a solid and pumped to digesters where they are treated further until they become reusable biosolids. Secondary treatment meets Provincial and Federal regulatory requirements and the FCPCC expansion is designed to provide secondary treatment for the community.
- Tertiary treatment can use chemical, physical or biological processes to remove additional substances in the wastewater. Tertiary treatment is typically used when there is discharge to lakes or rivers and the phosphorus levels need to be very low. While regulations do not require tertiary treatment, the FCPCC Project has been purposefully designed to be compatible with tertiary upgrades in case there is a desire or regulatory

requirement to add additional levels of treatment in the future. This consideration aligns with the LWMP and Strategic Plan goals of continuing to improve the quality of wastewater in the region.

FCPCC Project Scope

There are three major components of the FCPCC Project:

1. ***Increase secondary treatment capacity.*** Treatment capacity will increase by 30% to accommodate the service area requirements until 2040. The secondary treatment technology selected is a proven and state of the art combined treatment unit, with activated sludge treatment and will meet Provincial and Federal regulatory requirements. It features a compact design suitable for the limited land available at the site.
2. ***Replace equipment at end of life.*** Most of the existing FCPCC infrastructure is 20 to 40 years old.. AECOM has confirmed components within the existing facility that must be repaired, renovated or replaced during the FCPCC Project. The required components include: upgrades to the reclaimed water system; change room and shower facilities; laboratory, office and first aid upgrades; new power generator; electrical and computer control systems; building and structural repairs; tank replacements; building envelope renovation; and piping replacements.
3. ***Reduce Odours***. The RDN partnered with the Vancouver Island University (VIU) Applied Environmental Research Laboratories to fingerprint odour emissions. This information is being used to design the appropriate control measures that will improve air quality, reduce odour complaints, and enhance the overall quality of life for neighbouring residents and visitors. The scope and cost of the odour control upgrades is based on the results of the VIU odour monitoring program, condition assessments of the odour control systems, and feedback received through public engagement.

Engineering Change Orders

In March 2019, the Board approved a $222,000 change order for the thickener facility and landscape architecture design. Two additional change orders are presented for Board Approval.

1. Additional Engineering Services – Interface Between Existing and New Facilities

It is common for renovation projects to identify interface issues when connecting existing infrastructure to new infrastructure. The FCPCC detailed design process has identified interface issues in the old facility, primarily relating to electrical, HVAC and building infrastructure, that require additional engineering to address. An additional $100,000 for AECOM's engineering services contract is required to address recently identified interface issues.

2. Greenhouse Gas Reduction Options

In the 2019-2020 Board Strategic Plan, the RDN introduced a commitment to achieve carbon neutrality by 2032. As a proactive measure, the RDN completed a Sustainability Design Feasibility Study February 2020, to investigate the addition of greenhouse gas reduction components to the FCPCC Project.

The Sustainability Design Feasibility Study recommended:

- Heat recovery from effluent,
- Solar photovoltaic power system, and
- Exterior wood cladding.

The cost of engineering design for recovering heat from effluent, solar photovoltaic power, and wood cladding is $150,000. The icremental construction cost associated with these components is estimated at approximately $850,000.

Heat Recovery From Effluent

Recovering heat from treated effluent would offset all natural gas heating for the new Expansion Process Building and reduce the equivalent greenhouse gas emissions by 11.24 tonnes a year. This is a 91% improvement over natural gas. This heat recovery option has an estimated incremental cost of $650,000. AECOM estimates a simple payback of 143 years.

Solar Photovoltaic Power System

The solar photovoltaic power system would include approximately 144 solar panels on the roof of the new Expansion Process Building to produce an estimated 44.7kW of electrical power and offset the purchase of power from BC Hydro. This system would reduce the equivalent greenhouse gas emissions by 2 tonnes a year. The initial system cost is estimated at approximately $150,000. AECOM estimates a simple payback of 12 years.

Exterior Wood Cladding

The Sustainability Design Feasibility Study considered “green walls” and wood structural elements for the Expansion Process Building. However, these elements were not recommended because there is limited sunlight exposure to support the green walls and the moisture associated with the wastewater treatment process is too high for structural wood. The study recommended wood cladding for the building with a steel frame which aligns with the Wood First for RDN Facilities Policy (B1.20) and the Green Building Policy for RDN Facilities (B1.16). The wood cladding option adds apprximately $50,000 to the cost of the building.

Preliminary Project Budget Update

In 2018, an initial construction cost estimate of $32 million was budgeted for the capacity expansion component of the project. As part of the current design process, a consolidated cost estimate has been prepared (which now also includes odour reduction, replacing failing infrastructure, sustainability components, and escalation) of $48.5 million. The incremental project costs identified will be primarily funded through existing capital reserves. A revised construction cost estimate will be presented to the Board in the Fall, after completion of the 90% design milestone, for budget approval.The costs are summarized in Table 1 and explained in the bullets below.

Table 1. Cost Summary

2018 Estimate (Capacity Expansion)	$32 million
Increase in Construction Management	$0.5 million
Increase in Odour Control Scope	$3.5 million
Improvements to Ageing Infrastructure	$3 million
Additional Scope	$2 million
Greenhouse Gas Reduction Options	$1 million
Other owner's costs	$1 million
Cost Escalation	$4 million
Construction Efficiency Loss for Construction in an Operating Environment	$1.5 million
TOTAL	$48.5 million

- **Increase in Construction Management**: The FCPCC Project is benefitting from experience on the GNPCC Secondary Treatment Upgrade Project. In particular, additional resources are required for on-site management and inspection to ensure quality control during construction.
- **Odour Control Scope (Asset Management/Capital Reinvestment)**: The scope of the Odour Control System Upgrade for the project includes the addition of a new Biofilter on the Biosolids Dewatering System and increase in the size of the Trickling Filter Odour Control System.
- **Improvements to Ageing Infrastructure (Asset Management/Capital Reinvestment):** The existing plant requires tank replacements, building envelope renovation, slide gate, and piping replacements.
- **Additional Scope:** The FCPCC Project now includes cable routing gallery for the new process building and additional cost for paving and the crossing over Morningstar Creek.
- **Greenhouse Gas Reduction Options:** Engineering design and construction of the Greenhouse Gas Reduction Options described in this report.
- **Other Owner's Costs:** Additional cost for permitting, control system computers, other supporting consultants, and utility connections are included in the updated cost estimate.
- **Cost Escalation:** Construction cost escalation since 2018 is estimated to be 12% to 17%, depending on the construction component, and is reflected in the current budget estimate. AECOM report they have observed recent significant construction cost escalation in Western Canada, especially BC, which have followed previous years of relatively low escalation. AECOM maintain an up to date index of inflation expectations to more accurately estimate project costs based on the anticipated timing of construction.
- **Construction Efficiency Loss:** The existing facility will remain operational through the construction of this project, which will result in construction inefficiency. The estimated cost of this inefficiency and phasing of work is 5% of the direct project cost.

AECOM will provide an updated construction cost estimate at the 90% design milestone following the completion of the additional engineering noted in this report. The revised project budget will be presented to the Board in the Fall for approval and included in the 2021 Capital Budget. Based on the current estimated costs at 60% design, it is anticipated the financial plan requisitions will be adjusted as shown in Table 2.

Table 2. FCPCC Draft Requisition Adjustment for 2021-2025

	2020	2021	2022	2023	2024	2025
Approved 2020–2024 Financial Plan	1%	2%	2%	2%	2%	2%
Draft 2021-2025 Financial Plan	1%	4%	4%	4%	3%	3%

The incremental budget will be primarily funded from existing capital reserves, which will increase from $8,000,000 to $19,500,000. Should the full amount be required, the reserve will have a projected balance of $1.6 million at the end of 2023. Capital reserve funds are established for this purpose as an asset management best practice, both to replace aging infrastructure and plan for funding of new infrastructure. Annual debt payments are projected to be $900,000 assuming a 1.5% interest rate and 20-year term, which will equate to approximately $9.50/$100,000 assessed. The proposed funding sources for the construction cost are:

	2020 Approved Budget	Updated Estimated Budget
Borrowing and/or Grants	$12,500,000	$16,000,000
General Reserves	$8,000,000	$19,500,000
DCC Reserves	$12,100,000	$12,665,000
Grants	$335,000	$ 335,000
Total	**$32,935,000**	**$48,500,000**

Project Endorsement for Future Grant Funding Opportunities

In February 2020, the RDN applied for funding for the FCPCC Project under the Investing in Canada Infrastructure Program. A decision on this application is expected in Spring 2021.

Provincial and Federal governments have announced that stimulus funding will be available for selected “shovel-worthy” infrastructure projects. The FCPCC Project is an excellent candidate for funding given: the essential nature of this project; the “shovel-worthy” design; and the inclusion of innovative greenhouse gas-reducing technologies. The project team is developing opportunities to phase project components and adjust schedules to optimize alignment of the project with future funding opportunities. Grant funding for the project will significantly reduce the financial burden on the taxpayer. Board endorsement of the FCPCC Project for future funding opportunities will expedite the application process and position the project to respond to short application timelines.

The British Columbia government and CleanBC also recently announced grant funding for community infrastructure projects focusing on renewable energy and energy efficiency. Staff consider the FCPCC Greenhouse Gas Reduction Options to be a good fit. Board endorsement of this project would facilitate submission of a grant application by November 2020.

Contaminants of Emerging Concern Planning Study

The RDN is among the pioneering regions investigating the non-regulated contaminants of emerging concern. In April 2020, the RDN was awarded a $10,000 Infrastructure Planning Grant towards a $37,726 Contaminants of Emerging Concern Planning Study.

With provision of secondary treatment, both Greater Nanaimo Pollution Control Centre (GNPCC) and FCPCC are meeting regulatory requirements. Secondary treatment does a good job of removing regulated substances. It can also remove some non-regulated substances.

Some of the non-regulated contaminants, termed “contaminants of emerging concern”, are of interest to wastewater treatment providers, the public, and the media.

“Contaminants of emerging concern” refer generally to several non-regulated substances that are associated with human activity and may be detected in low levels in some environments. The list is not definitive and can include pharmaceuticals, pesticides, personal care products, microplastics, and commercial or industrial products. Methods to reduce contaminants of emerging concern in wastewater are:

a) Source control (preventing pollution at the source before it contacts wastewater),
b) Secondary treatment, and
c) Additional treatment.

Decisions on how to reduce contaminants of emerging concern in wastewater and improve the quality of wastewater require a robust understanding of which contaminants enter the system, which ones pass through the system, and in what amount they are present.

The Contaminants of Emerging Concern Planning Study will:

- provide knowledge of unregulated substances entering and exiting the FCPCC and the GNPCC;
- provide insight into the ability of different treatment technologies to remove contaminants of emerging concern; and
- support future decision making regarding future treatment levels.

Staff will present results and recommendations of the Contaminants of Emerging Concern Planning Study to the LWMP Monitoring Committee and the Board following its completion in spring 2021.

Both the GNPCC Secondary Treatment Upgrade project and the FCPCC Project have been purposefully designed to be compatible with tertiatry-type upgrades in case there is a desire or regulatory requirement to add additional levels of treatment in the future.

ALTERNATIVES

1. The Board approve a $100,000 change order for AECOM to complete additional engineering services required to address the interface between the existing and new facilities for the French Creek Pollution Control Centre Expansion and Odour Control Upgrade Project (FCPCC Project).
2. The Board approve a $150,000 change order for AECOM to include Greenhouse Gas Reduction engineering services in the FCPCC Project.
3. The Board receive information on a preliminary budget update for the FCPCC Project.
4. The Board endorse the FCPCC Project, currently estimated at $48.5 million, for all future eligible grant programs.
5. The Board receive information on the Contaminants of Emerging Concern Planning Study.
6. Provide alternate direction.

FINANCIAL IMPLICATIONS

Change Orders, FCPCC Project Budget, and Grant Endorsement

In July 2018, the Board awarded the detailed design of the FCPCC Project to AECOM for $2,506,980. In March 2019, the Board approved a $222,000 change order to add the thickener facility and landscape architecture design. Two additional change orders are proposed which, if approved, would be added to AECOM's contract.

1. The additional cost for AECOM to address the interface between the existing and new facilities is $100,000.
2. The additional cost to include Greenhouse Gas Reduction in AECOM's engineering services contract is $150,000.

Table 2 below summarizes AECOM's approved and proposed scope of work for the FCPCC Project.

Table 2. AECOM's Approved and Proposed Scope of Work for the FCPCC Project

Description	Status	Date	Scope Change	Total Cost	Scope Change (from original)
Detailed Design, Original Scope	Approved	July 2018	n/a	$2,506,980	n/a
Thickener/Landscape Architecture	Approved	March 2019	$222,000	$2,728,980	8.9 %
Additional Interface Engineering Services	Proposed	Pending	$100,000	$2,828,980	4.0 %
Greenhouse Gas Reduction Options	Proposed	Pending	$150,000	$2,978,980	6.0 %
Total Budget Change			**$472,000**		**18.9%**

The 2020 approved budget has funds available to cover these costs. A revised project budget for the construction of the FCPCC Project will be presented to the Board in the Fall for approval and inclusion into the 2021 Capital Budget.

There are no financial implications to endorse the FCPCC Project for future eligible grant programs. Obtaining grant funding will have a considerable benefit in reducing the financial burden of this project for the taxpayer. The project is currently under consideration for a grant under the Investing in Canada Infrastructure Program, and additional infrastructure grant programs are expected to be announced soon.

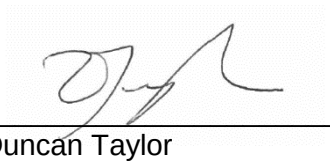
STRATEGIC PLAN IMPLICATIONS

1. Climate Change - Be leaders in climate change adaptation and mitigation, and become net zero by 2032.

Including the Greenhouse Gas Reduction Options in the FCPCC Project will support the strategic plan initiatives to be leaders in climate change and mitigation and become net zero by 2032.

2. Environmental Stewardship - Continue to improve the quality of treated wastewater in the Region.

Results of the Contaminants of Emerging Concern Planning study will inform future decisions to improve the quality of treated wastewater.



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