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REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE MEETING OF WEDNESDAY, JULY 28, 2021

SUBJECT **Core Area Wastewater System Commissioning and Operations Update and Construction Completion Status Report**

ISSUE SUMMARY

To provide the Committee a Core Area Wastewater System commissioning and operations update and a construction completion status report.

BACKGROUND

On January 13, 2021, the Capital Regional District (CRD) accepted operational responsibility for the McLoughlin Point Wastewater Treatment Plant (MPWWTP). The CRD accepted operational responsibility for the other conveyance system components, including pump stations and pipelines, between September 2020 and May 2021. The CRD has not accepted operational responsibility for the Arbutus Attenuation Tank yet. Although the new conveyance and treatment infrastructure constructed under the project was tested and deemed ready for service commencement as it was handed over to the CRD for operation, the commissioning period of the MPWWTP and the system as a whole is anticipated to extend well into the two year performance period for the MPWWTP (ending December 2022). During this time, the commissioning activities at the MPWWTP and conveyance infrastructure facilities are expected to periodically impact plant performance and effluent quality, and some plant and conveyance facility systems, including odour management. In general, the commissioning activities can be summarized as follows:

1. Operations personnel training – During the first six months of operation, CRD staff have been continuously gaining familiarity and operating experience with the new infrastructure. Even experienced operations staff that have gained previous experience at other plants need time to learn and gain confidence in the MPWWTP operation. Supplementary training on specific pieces of equipment or procedures has been provided as necessary.
2. Operational documentation – Documentation provided by the contractors including, standard operating procedures, safety procedures, and preventative maintenance routines, are being continually updated to reflect changes resulting from actual operating experience. Many procedures developed at the design and start-up phases of the project, such as 3-month and 6-month major maintenance routines or complex lock-out/tag-out procedures to take equipment/processes out of service, had not been carried-out in the field, so various documents have required revisions and the time to complete the maintenance tasks has been longer than it will be once staff are familiar with the work.
3. Equipment adjustments/failures – The MPWWTP and the Conveyance Pump Stations contain many components, including process mechanical equipment (treatment process equipment, screens, pumps, motors, valves, chemical feed systems), electrical, instrumentation and control equipment (motor controls, switchgear, generators, SCADA controls), that can require adjustment or fail once under normal operating conditions. Resolution of these equipment issues has had some impact on plant performance.
4. MPWWTP optimization – CRD staff have been working closely with the Harbour Resource Partners' (HRP) commissioning and performance period representatives (one representative is stationed at MPWWTP until December 2022), the Owner's engineer, Stantec, as well as a plant optimization engineer (who was previously under contract with

HRP and has since been retained by the CRD) to monitor plant process performance and make on-going recommendations to CRD regarding plant operations.

ALTERNATIVES

Alternative 1

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

That this report be received for information.

Alternative 2

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

That staff provide additional information.

IMPLICATIONS

Effluent Compliance and Reporting

The CRD manages its Core Area liquid waste in accordance with the Core Area Liquid Waste Management Plan (up to and including Amendment 12), and the Municipal Wastewater Regulation Registration (Registration) for the MPWWTP, issued on June 9, 2020 and revised on February 22, 2021 by the BC Ministry of Environment and Climate Change Strategy (ENV) under the *Environmental Management Act*. The Registration sets out the wastewater treatment and performance criteria for the MPWWTP and authorizes the CRD to discharge treated effluent to the receiving waters.

The Federal Wastewater Systems Effluent Regulations (WSER), which fall under the *Fisheries Act*, require the Core Area's wastewater to be treated such that the effluent discharged from the MPWWTP not exceed a monthly average of 25 mg/litre for total suspended solids (TSS) and 25 mg/litre for carbonaceous five-day biochemical oxygen demand (cBOD₅). The provincial Registration is the more stringent regulatory requirement.

For context, the MPWWTP treatment system consists of primary treatment using Lamella Plate Settlers and Densadeg high rate clarifiers, a three step secondary treatment process using 2mm fine screens, moving bed biofilm reactors (MBBR) and biological aerated filters (BAF), and mechanical tertiary treatment using five micron disk filters. The MPWWTP is designed to achieve the criteria set out in the Registration as follows:

1. The MPWWTP will provide tertiary treatment to flows up to 216 megalitres /day (MLD) (or 2X the Average Dry Weather Flow (ADWF)) and primary treatment for flows up to 432 MLD (or 4X the ADWF) and meet the following effluent quality requirements:
2. When Daily Flow <2X ADWF, the single day cBOD₅ & TSS must be ≤25 mg/L
3. When Daily Flows <2X ADWF, the monthly mean cBOD₅ & TSS must be ≤10 mg/L
4. When Daily Flows <2X ADWF, pH must be in the 6-9 range
5. When Daily Flows ≥2X ADWF, cBOD₅ & TSS must be ≤130 mg/L (discharge of blended tertiary and primary treated effluent)
6. The number of days per calendar year where flow exceeds 2X ADWF causing a discharge of blended tertiary and primary treated effluent must not exceed 70

Regular compliance reporting under federal and provincial legislation is carried out in accordance with requirements. The Province is notified immediately when effluent quality criteria are not met (e.g. exceedance of maximum suspended solids limits), and compliance reports for all seven of the CRD's wastewater facilities are submitted on a monthly basis. Reporting to the Federal government is completed via online submission on a quarterly basis. Staff have submitted the required regulatory reporting, and meet with representatives of ENV regularly to discuss compliance related issues.

In summary, although the Federal WSER effluent quality criteria have been met, with the exception of TSS in April (26.5 mg/L (actual) vs. 25 mg/L (limit)), the provincial Registration requirements for cBOD₅ and TSS (monthly averages and some single day exceedances) have not been consistently met during the first six of the commissioning period. In addition, as per the Registration and WSER requirements, the CRD reports all treatment process interruptions or bypasses to ENV and/or Fisheries and Oceans Canada (DFO). Between January and June there have been 14 reports to the regulators, including 7 related to plant bypasses or other unauthorized discharges resulting from commissioning, and 7 related to TSS or cBOD₅ discharge loadings above the maximum effluent quality limits. It is important to note that despite the observed instances of non-compliance with the Registration, there are no anticipated adverse impacts to health or the environment. These events have no significant environmental impact due to the generally low level of exceedances and discharge location. However, the goal is to operate MPWWTP consistently in full compliance as soon as possible, so each event that potentially contributes to non-compliance is carefully reviewed and an incident summary/probable cause and mitigation measures/corrective actions are documented.

The critical issues contributing to plant performance and reduced effluent quality are summarized as follows:

1. Tertiary Disk Filters – the cloth media on the filters was clogging as a result of higher than expected organic loading, reducing the effectiveness of the tertiary treatment process for periods between February – July. In addition, the filter backwash valves and actuators have not operated properly, impacting the tertiary treatment process performance. All of the valves and actuators within the disk filter system are being replaced mid-August.
2. Organic and fibrous material screening – At the Clover and Macaulay Pump Stations and MPWWTP, fine screening equipment continue to be adjusted and optimized to maximize material capture and improve automated washing processes in order to maintain operational effectiveness and reduce solids entering the treatment processes.
3. BAF and MBBR media volumes in treatment process vessels – reduced media volumes in the vessels due to attrition resulting from backwashing and media loss has reduced the secondary treatment capacity. With the replacement media expected to arrive imminently, the MBBR media will be added by the end of July followed by the BAF media addition in August. The BAF backwash operation has also been a focus of the process optimization

Residuals Treatment Facility

In recent months, the Residuals Treatment Facility (RTF) has experienced a number of challenges regarding production of Class A Biosolids and achieving completion in accordance with the Service Commencement Agreement executed March 29, 2021. In early April, Digester #2 biological processes became upset, necessitating storage of wastewater residuals in digester

#3. Due to the dryer's inability to process undigested residuals, the digester upset resulted in de-watering and landfill disposal of the undigested residuals between late April and early July.

In addition to working to resolve the upset in digester #2, repairs to digester #1 were completed and "Certified" as of May 6, and HRMG immediately began seeding and preparing the digester for operations. As of mid-July, operation of digesters #1 and 2 has stabilized and the facility is able to process 100% of the influent from MPWWTP into dried Class A biosolids.

HRMG and the CRD are currently working to resolve service failures related to the quality of effluent discharged from the RTF into the centrate return line. HRMG is currently developing and considering options for reducing the daily loading of biological oxygen demand in the effluent.

Staff are also testing options for ensuring particle size of the Class A biosolids are suitable for disposal at the Lafarge cement plant. Currently, staff anticipate implementation of an engineered screening option this summer, which will allow for regular trucking and disposal of biosolids to commence this summer under the CRD's approved short term biosolids management plan.

Operating Budget

The Committee will recall that the total 2021 operating expenditures are budgeted at \$28.2 million, of which \$8.1 million is associated with conveyance system operations and \$20.1 million is associated with liquid and solids treatment operations. At the end of the second quarter, the budget remains on track and underspent in two areas.

First, due to the commissioning challenges at the RTF, the facility did not achieve Service Commencement until March and there have been performance adjustments to the HRMG operating payments since April, resulting in a budget variance. Second, the MPWWTP electricity consumption/costs are tracking lower than anticipated, also resulting in a budget variance. Staff will continue to monitor the budget closely in preparation of the 2022 operating budget.

CRD staff continue to negotiate the Core Area Wastewater Service Agreements with the Songhees and Esquimalt First Nations, which set out treatment capacity allocations as well as the operating and capital cost apportionments.

Communications and Community Engagement

CRD staff continue to communicate and engage regularly with various stakeholders typically on commissioning and construction related matters. Questions or concerns are received via email (wastewater@crd.bc.ca) or phone (250-940-7400). In addition, commissioning and maintenance activity information is posted bi-weekly on the CRD website and public advisories are issued for specific activities that are likely to cause odour or noise impacts in localized areas.

The majority of the concerns received have been related to odour from the MPWWTP. CRD staff continue to respond to every complaint and are logging and mapping every complaint in order to try to correlate the occurrence with operational activities and other potential contributing factors. There has been significant effort over the past few months to identify the potential sources of odour at the MPWWTP. As noted, staff are still refining the plant operation and working through the three month and six month major plant maintenance cycles which staff are discovering generate some odour depending on the type of maintenance activity, due to open tank hatches

and exhaust fans not maintaining negative air pressure. In addition, through neighborhood odour surveys conducted over the last several weeks, staff have identified other sources of odour in some areas. We are working closely with the City of Victoria to identify potential sources along the City sewer system and Esquimalt sewer system. We are also conducting work to ensure the underground chambers and odour control systems along the residuals conveyance pipeline are functioning properly and that other manholes along the gravity pipeline heading to the Macaulay Point Pump Station are sealed.

However, as per the Core Area Wastewater Project Agreement between the CRD and HRP, the plant is to have been designed such that odour laden air at the plant will be captured and treated prior to discharge such that all air exhausted from the plant will contain a maximum odour concentration at and beyond the plant site boundary of less than five odour units per cubic metre (not perceptible). In addition, the odour treatment systems are designed with sufficient redundancy in place to allow for all normal maintenance activities to occur without interruption or reduction in the level of odour treatment and without exceeding the plant site boundary concentration limit. The CRD remains committed to achieving the requirements of the Project Agreement.

Construction Completion Status Report

In May, the CRD Board received the Wastewater Treatment Project Governance Transition Report, attached as Appendix A, which identified the remaining works and commitments beyond the Project Board's term, as well as the committed funds associated with fulfilling the remaining items. Although the vast majority of construction has been completed as reported in May, there are some remaining deficiencies that staff are working through with the various contractors and final project close-out deliverables have not been received for most of the project components. The table attached as Appendix B summarizes the construction works remaining as of July and the anticipated completion dates. The project budget continues to carry funds to complete the construction, provide for consulting services and to meet other obligations and commitments which need to be finalized. The Governance Transition report summarizes committed project funding as of May 17 for obligations remaining to be fulfilled and of note is the outstanding negotiation and resolution of the work and costs related to the District of Saanich Residuals Conveyance System Infrastructure Access Agreement.

As expected with a newly constructed, large, complex facility, during the initial operating period, some components and equipment will fail or not perform as expected. CRD staff continue to work with HRP at MPWWTP to identify and address these issues through the warranty management process; between January and June there have been 164 warranty items identified, some of which have been resolved.

CONCLUSION

The CRD accepted operational responsibility for the various facilities constructed under the Core Area Wastewater Treatment Project between September 2020 and May 2021. The CRD has not accepted operational responsibility for the Arbutus Attenuation Tank yet. Although the new conveyance and treatment infrastructure constructed under the project was tested and deemed ready for service commencement as it was handed over to the CRD for operation, the commissioning period of the MPWWTP and the system as a whole is anticipated to extend well into the two year performance period for the MPWWTP (ending December 2022). During this time, the commissioning activities at the MPWWTP and conveyance infrastructure facilities are expected to periodically impact plant performance and effluent quality, and some plant and conveyance facility systems, including odour management. Regular compliance reporting under federal and provincial legislation has been carried out in accordance with requirements.

With regards to the operating budget, at the end of the second quarter, the budget remains on track and underspent in two areas. Although the vast majority of construction associated with the project has been completed as reported in May, there are some remaining deficiencies that staff are working through with the various contractors and final project close-out deliverables have not been received for most of the project components. There are funds committed under the approved project budget to fulfill the remaining items, all of which are expected to be concluded by year end.

RECOMMENDATION

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

Submitted by:	Ted Robbins, B.Sc., C.Tech., General Manager, Integrated Water Services
Concurrence:	Russ Smith, Acting General Manager, Parks & Environmental Services
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

Appendix A: Wastewater Treatment Project Governance Transition Report (May 17, 2021)
Appendix B: Wastewater Treatment Project Remaining Works Status Report (July 2021)