APPENDIX A

Memorandum

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TO: File

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DATE: December 11, 2025 **FILE:** 0110-01

SUBJECT: **Saanich Peninsula Wastewater Treatment Plant Upgrades – Priority Sequencing of Identified Works**

ISSUE SUMMARY

To identify the priority sequence for the upcoming planned capital projects at the Saanich Peninsula Wastewater Treatment Plant.

BACKGROUND

As result of previous and current consulting engineer efforts, the CRD has been made aware of the necessity for several upgrade and remediation projects to the existing Saanich Peninsula Wastewater Treatment Plant. Specifically, the identified upgrade projects are listed below, including the identifying consultant group and year.

- Process Building HVAC Upgrades (KWL, 2021)
- Primary Clarifier and Sludge Tank Headspace Odour Control Upgrades (KWL, 2021)
- Primary Clarifier 2, Sludge Tank and Process Sump Rehabilitation (Stantec, 2025)
- Primary Clarifier Cover Replacement (Stantec, 2025)

While funding for each project had previously been carried for in the CRD's Capital Plan, the results of the most recent engineer's estimates and tender pricing exercises have identified that the combined budgets allocated for all the above noted work is insufficient. As such, CRD staff have determined the need to investigate project prioritization and value engineering options for the above noted items.

FINANCIALS

The current funding for the identified upgrade and remediation projects are via a collection of 2025 Capital Plan line items, as listed in the table below.

Capital Plan No.	WBS Item	Total Budget	Available Funds[1]
19-06	CE.682 – SPWWTP Odour Control Upgrades	$ 575,000	$ 45,754
23-03	CE.835 - Odour Control Upgrade Construction[2]	$ 4,500,000	$ 4,500,000
24-01	CE.897 – Sludge Tanks and Process Sump Repair[3]	$ 950,000	$ 816,143

24-04	CE.905 – SPWWTP OCU PLC Replacement[4]	$ 85,000	$ 60,000
26-01	TBD – Primary Clarifier Cover Replacement	$ 200,000	$ 200,000
Total		**$ 6,260,000**	**$ 5,621,897**

[1] Available funds have been determined by subtracting actual and committed costs from the current WBS budgets.
[2] Early approvals has been granted for the 2026 budget to increase funding for Capital Plan No. 23-03 – Odour Control Upgrade Construction to $4,500,000.
[3] Early approvals has been granted for the 2026 budget to increase funding for Capital Plan No. 24-01 – Sludge Tanks and Process Sump Repairs to $950,000.
[4] Total budget for WBS Item CE.905 is $500,000, however only $85,000 has been allocated to Odour Control PLC Replacement via WBS leg CE.905.7502.

The estimated construction costs for each of the identified project scopes were obtained through a combination of engineer's estimates and formal procurement processes. These costs have been summarized below for reference. For full project costing, estimates of staff and consultant efforts have also been listed.

Scope Description	Basis of Estimates	Estimated Construction Costs	Estimated Duration (Weeks)	Estimated Consultant & Staff[2] Costs	Total Estimated Costs
Process Building HVAC Upgrades	ITT IWS 2025-026 RFP 2023-853	$ 1,980,000	32 Weeks	$ 140,000	$ 2,120,000
Primary Clarifier and Sludge Tank Headspace Odour Control Upgrades	ITT IWS 2025-026 HDR COR #6	$ 2,350,000	32 Weeks	$ 205,000	$ 2,555,000
Primary Clarifier 2, Sludge Tank and Process Sump Rehabilitation	2025 Condition Assessment of Tank Structures (Stantec) SPWWTP Phase 2 Proposal (Stantec)	$ 2,360,000	12 Weeks	$ 70,000	$ 2,430,000
Primary Clarifier 2 Cover Replacement	2025 Condition Assessment of Tank Structures (Stantec) SPWWTP Phase 2 Proposal (Stantec)***	$ 240,000	3 Weeks	$ 20,000	$ 260,000
Totals		**$ 6,930,000**	**N/A**	**$ 435,000**	**$ 7,365,000**

[1] Stantec estimate assumed that Primary Clarifier 2 Cover Replacement would occur as part of tank repair project. Pricing has been updated to assume works would be separated; however potential savings exist if completed under the same contract.
[2] Staff costs for Project Management have been estimated at 40% (14 hours) per week for the duration of construction.
[3] Stantec proposal for SPWWTP Phase 2 Condition Assessments included a 12-week construction period. A 3-week period has been assumed if the Primary Clarifier 2 Cover Replacement is performed as a stand-alone scope, with Stantec's rates applied for this duration.

As is evident in the above tables, there is an approximate $1.7 million shortfall in funding relative to the total costs of the four identified scopes of work. While some optimization potentials exist, it is unlikely that these will be able to overcome the current gap in funding. Funding for projects in the Saanich Peninsula Wastewater Capital Plan is primarily provided through debt via a loan authorization bylaw. While it is noted that there are additional line items on the Saanich Peninsula Wastewater Capital Plan utilizing debt funding, for the nature of this exercise, staff-maintained focus on prioritizing between these key initiatives at the wastewater treatment plant.

TECHNICAL FINDINGS & EVALUATION

Due to the level of cost escalations noted during both the engineer's estimates and competitive pricing exercises, a prioritization of the identified project is required in order to determine a sequence for works to proceed while budgeting concerns and value engineering efforts are undertaken. Priority is measured by first determining the Project Driver, being the category of the highest criticality, and then performing a comparison of both Probability (PoF) and Consequence of Failure (CoF). Ratings are applied independently for both PoF and CoF on a 1 to 5 scale, as detailed in the attached Appendix F. An overall rating is then determined by multiplying PoF by CoF to provide a value between 1 to 25. Ranking of the overall values from highest to lowest will provide a priority sequence for the works.

Process Building HVAC Upgrades:
Following the 2021 consultant (KWL) assessment of the existing Odour Control systems at the Saanich Peninsula Wastewater Treatment Plant, it was identified that the existing air extraction and treatment systems within the Process Building areas are under capacity. As result, the space is not able to achieve requirements as per BC Building Code (BCBC), Canadian Electrical Code (CEC) and/or National Fire Protection Association (NFPA) and upgrades are required. Both Preliminary (KWL) and Detailed Designs (HDR) have also been completed for these works, in conjunction with the Headspace Odour Control Upgrades, and the full consultant assessment, preliminary and detailed design reports are available in the attached Appendices A, B and C.

As per the 2021 assessment finding, the existing system is insufficient to achieve compliance as per BCBC, CEC and NFPA requirements within the occupied buildings. As result, CoF and PoF ratings of 4 and 3, respectively, have been assigned as per the table below due to the known potential implications on occupant health and safety.

Project Driver	Worker / Public Safety
Consequence of Failure	4
Probability of Failure	3
Overall (CoF x PoF)	12

Primary Clarifier and Sludge Tank Headspace Odour Control Upgrades:
Following the 2021 consultant assessment (KWL) of the existing Odour Control systems at the Saanich Peninsula Wastewater Treatment Plant, it was identified that the existing air extraction from the headspaces within the "wet areas" are insufficient to achieve corrosion control from H2S attack. This assessment included each of the Primary Clarifiers, Sludge Tanks and Process Sump areas. A dedicated "wet area" air extraction and treatment system was recommended, however was noted as not a mandatory item to achieve regulatory compliance. Following this assessment, 2022 Preliminary Design (KWL) identified a high cost for the adoption of the dedicated odour control system and instead recommended several minor short-term upgrades to prolong the need for the new system. A Detailed Design (HDR) was completed in 2025, in conjunction with the Process Building HVAC Upgrades, to provide sufficient air extraction for long-term corrosion prevention within the process tank headspaces. The full consultant assessment, preliminary and detailed design reports are available in the attached Appendices A, B and C.

As per the 2021, 2022 and 2025 report findings, system upgrades are required to prevent long-term corrosion due to H2S attack, however, is not a regulatory requirement and does not improve the immediate plant operations or worker health and safety. As result, CoF and PoF ratings of 4 and 3, respectively, have been assigned as per the table below due to there being no known potential implications on occupant health and safety.

Project Driver	Process / System / Equipment Criticality
Consequence of Failure	4
Probability of Failure	3
Overall (CoF x PoF)	12

Primary Clarifier 2, Sludge Tanks and Process Sump Rehabilitation:
Following the summer 2023 repairs to the adjacent Primary Clarifier 1, visual and tactile condition assessments of Primary Clarifier 2, the Sludge Tanks and Process Sump were undertaken by structural consultant (Stantec) in Spring 2025. The assessment findings noted concrete deterioration up to 15mm in depth to the upper walls and suspended roof slab of the Primary Clarifier 2. Assessment of the Sludge Tanks and Process Sump also identified concrete deterioration within a range of 10mm to 20mm. Further laboratory testing confirmed the deterioration to be due to H2S attack and that the layers of deteriorated concrete currently do not provide structural support. Structural analysis was then completed for each of the assessed locations, and it was noted that Primary Clarifier 2's suspended slab has experienced a 31% reduction in live load capacity. If placed in continuous operation, deterioration of Primary Clarifier 2 will likely reach an extreme level within 2-3 years and result in destabilization of the suspended slab. It is also expected that continued operation of the sludge tanks and process sump will cause deterioration to reach the reinforcement steel zone, thus leading to reduced structural capacities, within a similar timeframe. The full consultant assessment report and findings are available in the attached Appendix D.

As per the 2025 condition assessment findings, significant concrete deterioration has been noted in each of assessed locations, with structural analysis identifying reduced live load capacity on the suspended slab of Primary Clarifier 2. With these findings, as well as the expectation for deterioration to reach extreme levels within 3-5 years, CoF and PoF ratings of 4 and 5, respectively, have been assigned as per the table below due to the known reduced structural capacity and anticipated timeline for failure.

Project Driver	Process / System / Equipment Criticality
Consequence of Failure	4
Probability of Failure	5
Overall (CoF x PoF)	20

Primary Clarifier 2 Cover Replacement:
Corrosion was noted on the structural supports to the Primary Clarifier 2 tank covers during annual inspection by staff in Spring 2025. A structural consultant (Stantec) was then engaged to preform a detailed condition assessment of the structural members. The findings of this assessment noted significant corrosion resulting in an approximate 80% reduction in structural capacity. With corrosion expected to further progress under normal operating conditions, the structures were recommended to be replaced by Spring 2026. The full assessment report and findings are available via the attached Appendix E.

As per the 2025 condition assessment findings, the extreme reduction in structural capacity already experienced identifies an imminent likelihood of failure. A rating of 5 for both CoF and PoF have been applied due to the operation impacts, hazard to personal and likelihood of failure as per Stantec's assessment.

Project Driver	Worker / Public Safety
Consequence of Failure	5
Probability of Failure	5
Overall (CoF x PoF)	25

Summary:
The Consequence and Probability of Failure ratings for each of the noted projects are summarized and ranked in the summary table on the following page. The listed rankings illustrate the priority sequence for which construction works on the basis of Consequence and Probability of Failure.

Description	Consequence of Failure (CoF)	Probability of Failure (PoF)	Overall Rating	Priority Ranking
Primary Clarifier 2 Cover Replacement	5	5	25	1
Primary Clarifier 2, Sludge Tanks and Process Sump Rehabilitations	5	4	20	2
Process Building HVAC Upgrades	4	3	12	3
Primary Clarifier and Sludge Tank Headspace Odour Control Upgrades	4	3	12	4[1]

[1] As both the Process Building HVAC and Primary Clarifier and Sludge Tank Headspace Odour Control Upgrades tied in their overall rating scores, and evaluation of secondary project drivers was required to confirm prioritization between these works. When considering that the Process Building HVAC works were initialized due to deficiencies relating to worker safety, then it becomes clear that the HVAC upgrades take the higher level of precedence. By comparison, the Headspace Odour Control works were initialized for long-term improvements to plant operations.

CONCLUSION

Previous consultant assessment and design efforts have identified four unique scopes for upgrades to the existing Saanich Peninsula Wastewater Treatment Plant. However, comparison of recent engineers estimates and procurement activities against the existing budget as per the 2025 Capital Plan has identified a significant shortfall in funding. As result, a priority sequence was required to be determined prior to proceeding with project construction works. By applying ratings of 1 to 5 on the basis of both the Consequence and Probability of Failure, an overall rating for each project could be obtained, thus allowing for a ranking of highest to lowest priority to be determined.

Based on this ranking, replacement of the Primary Clarifier 2 covers is the work of highest priority due to its likelihood for imminent failure, impacts to operations and hazard to operations staff. As per Stantec's cost estimate, there exists a potential for cost savings if these works are performed in conjunction with the second highest priority works, being the rehabilitation of the Primary Clarifier 2, Sludge Tanks and Process sumps. In comparison of the estimated costs to the available budget, there is sufficient funding available to proceed with these both of these works immediately.

Furthermore, Process Building HVAC and the Primary Clarifier and Sludge Tank Headspace Odour Control both tied for third priority works. Further consideration of the project initiations identified that a high precedence should be applied to the Process Building HVAC Upgrades due

to its impacts on worker safety. As identified above, there is not currently sufficient budget to perform these works in additional to the Priority 1 and 2 items. Once a more accurate estimation of costs for the Priority 1 and 2 works are known, additional value-engineering efforts should be undertaken for Priority 3 & 4, as per pervious approvals, with additional funding requests potentially being required following the outcome of these efforts.

This memo outlines the prioritization review completed by a cross section of key CRD staff, as documented hereunder. As the priority sequence of works does not reflect the existing allocation of funds as per the Capital Plan, CRD staff will proceed with progressing a Capital Plan Amendment to reflect the new prioritization, for authorization by the Saanich Peninsula Wastewater Commission.

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ATTACHMENT(S)

Appendix A: SPWWTP – Odour Control Assessment Report – KWL 2021
Appendix B: SPWWTP – Odour Control Upgrades Preliminary Design – KWL 2021
Appendix C: SPWWTP – Basis of Design – HDR 2025
Appendix D: SPWWTP – Condition Assessment of Tank Structures
Appendix E: SPWWTP – Primary Clarifier 2 Access Hatch Review
Appendix F: Consequence and Probability of Failure Rating Tables

Attachments Omitted