Capital Regional District

625 Fisgard St.,
Victoria, BC V8W 1R7

Notice of Meeting and Meeting Agenda
Surfside Park Estates Water Service Committee

Thursday, June 26, 2025 | **2:00 PM** | **Goldstream Conference Room, 479 Island Hwy, Victoria BC V9B 1H7**

Members of the public can view the live meeting via MS Teams link: **Click here**
Alternatively, to hear the meeting via telephone:
Call: 1-877-567-6843 and enter the Participant Code 533 290 715#

L. Vallee (Chair), K. Wall (Vice Chair), P. Brent (EA Director), W. Mulvin

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. Adoption of Minutes

3.1. 25-0725 Minutes of the Surfside Park Estates Water Service Committee meeting of March 6, 2025

Recommendation: That the minutes of the Surfside Park Estates Water Service Committee meeting of March 6, 2025 be adopted as circulated.

Attachments: Minutes - March 6, 2025

4. Chair's Remarks

5. Presentations/Delegations

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

Delegations will have the option to participate electronically. Please complete the online application at www.crd.ca/address no later than 4:30 pm two days before the meeting and staff will respond with details.

Alternatively, you may email your comments on an agenda item to the Committee at legserv@crd.bc.ca.

6. Commission Business

6.1. 25-0650 Senior Manager's Verbal Update

Recommendation: There is no recommendation. This verbal update is for information only.

6.2. 25-0679 Capital Projects Requiring Funding - Potential Funding Options and Cost Implications

Recommendation: 1. That the petition process be initiated to borrow up to $2,000,000 over 25 years debt term to complete the capital improvement projects.
2. If the petition process is successful, that a loan authorization bylaw be advanced to the Electoral Areas Committee and Capital Regional District Board for readings and adoption; and
3. That staff complete the remaining steps required to secure the funds and begin the projects.

Attachments: Staff Report: Capital Projects Requiring Funding – Options & Cost Implications
Appendix A: Surfside Water System Tank Replacement Options Analysis
Appendix B: Matrix of Elector Approval Processes
Appendix C: Draft Letter & Petition for Surfside Water System Borrowing

6.3. 25-0718 Surfside Park Estates Water Service 2025-2029 Capital Plan Amendment

Recommendation: That the Surfside Park Estates Water Service Committee recommends that the Electoral Areas Committee recommends to the Capital Regional District Board:
That the Surfside Park Estates Water 2025 - 2029 Capital Plan be amended to:
1. Increase the 2025 project budget for the Replacement of Ultraviolet (UV) Equipment at the Surfside Water Treatment Plant (WTP) (25-02) by $7,500 from $7,500 to $15,000, funded from Capital Reserve Fund.
2. Defer $7,500 of project budget for the Source Water Surveillance project (24-02), funded from Capital Reserve Fund, from 2025 to 2026.

Attachments: Staff Report: SPEWS 2025-2029 Capital Plan Amendment
Appendix A: Revised 2025 Capital Plan

6.4. 25-0676 2024 Annual Report

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

Attachments: Staff Report: 2024 Annual Report - Cover Report
Appendix A: 2024 Annual Report
Appendix B: 2024 Statement of Operations and Reserve Balances

6.5. 25-0672 Capital Projects and Operational Update - June 2025

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

Attachments: Staff Report: Capital Projects and Operational Update - June 2025

6.6. 25-0713 Arsenic Health Guidelines

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

Attachments: Staff Report: Arsenic Health Guidelines

7. Notice(s) of Motion

8. New Business

9. Adjournment

The next meeting is Thursday October 23, 2025 at 2:00 pm.

To ensure quorum, please advise Megan MacDonald (mmmacdonald@crd.bc.ca) if you or your alternate cannot attend.

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Capital Regional District

625 Fisgard St.,
Victoria, BC V8W 1R7

Meeting Minutes

Surfside Park Estates Water Service Committee

Thursday, March 6, 2025 | **9:30 AM** | **Goldstream Conference Room, 479 Island Hwy, Victoria BC V9B 1H7**

PRESENT:
R. Fenton (on behalf of P. Brent, EA Director) (EP), L. Vallee, K. Wall

Staff: C. Moch, Manager, Water Quality; D. Robson, Manager, Saanich Peninsula Gulf Island Operations; N. Tokgoz, Manager, Water Distribution Engineering and Planning; M. Risvold, Administrative Secretary 3; M. MacDonald, Legislative Services Coordinator (Recorder)

EP - Electronic Participation

Regrets: P. Brent (EA Director), W. Mulvin

The meeting was called to order at 9:37 am.

1. Territorial Acknowledgement

D. Robson provided a Territorial Acknowledgement.

2. Election of Chair

D. Robson called for nominations for the position of Chair of the Surfside Park Estates Water Service Committee for 2025.

K. Wall nominated L. Vallee. L. Vallee accepted the nomination.

D. Robson called for nominations a second and third time.

Hearing no further nominations, D. Robson declared Louis Vallee the Chair of the Surfside Park Estates Water Service Committee for 2025 by acclamation.

3. Election of Vice Chair

Chair Vallee called for nominations for the position of Vice Chair of the Surfside Park Estates Water Service Committee for 2025.

Chair Vallee nominated K. Wall. K. Wall accepted the nomination.

Chair Vallee called for nominations a second and third time.

Hearing no further nominations, Chair Vallee declared Ken Wall the Vice Chair of the Surfside Park Estates Water Service Committee for 2025 by acclamation.

4. Approval of Agenda

MOVED by K. Wall, SECONDED by R. Fenton
That the agenda of the Surfside Park Estates Water Service Committee meeting of March 6, 2025 be approved as amended with the addition of the following items:
- 10.1. Clarification of Capital Project Funding Mechanism
- 10.2. Project Priorities
- 10.3 Flagging Water Meters
- 10.4 Filter Replacements
- 10.5 Leaks
CARRIED

5. Adoption of Minutes

5.1. 25-0227 Minutes of the Surfside Park Estates Water Service Committee of October 31, 2024

MOVED by K. Wall, SECONDED by L. Vallee,
That the minutes of Surfside Park Estates Water Service Committee meeting of October 31, 2024 be adopted as circulated.
CARRIED

6. Chair's Remarks

The Chair thanked Alternate Director Fenton for attending the meeting.

7. Presentations/Delegations

There were no presentations or delegations.

8. Commission Business

8.1. 25-0229 Senior Manager's Verbal Update

D. Robson presented Item 8.1. for information and provided the following updates:
- CRD Evolves and related staff support changes for the committee
- implementation of a new stage four water restriction
- installation of water conservation signage

Discussion ensued regarding:
- determination of water conservation level and related communication

8.2. 25-0216 Capital Projects and Operational Update - March 2025

D. Robson and N. Tokgoz presented Item 8.2. for information.

Discussion ensued regarding:
- funding mechanism for required water system improvements
- community awareness and engagement
- ongoing water leaks and leak detection efforts

MOVED by L. Vallee, SECONDED by K. Wall,
"That the Surfside Park Estates Water Service Committee request staff present a report at the next meeting that outlines the following:
- the proposed path forward to carry out water system improvements in future years;
- the amount of borrowing required through a loan authorization bylaw; and
- options for obtaining elector approval for the loan (petition or alternative approval process)."
CARRIED

9. Notice(s) of Motion

There were no notice(s) of motion.

10. New Business

10.1. Clarification of Capital Project Funding Mechanism

Chair Vallee noted that this topic was discussed under Item 8.2.

10.2. Project Priorities

Chair Vallee noted that this topic was discussed under Item 8.2.

10.3. Flagging Water Meters

Chair Vallee noted that recent snowfall and cold weather led to leaks. Locating water meters in the snow was a challenge as the markings on the pavement were covered. A request was made for a small flag for each meter.

C. Moch stated that staff have field descriptors and GPS to help locate the meters. A flag for each meter would be expensive and difficult to maintain. Staff typically only flag the meters which are difficult to locate.

10.4. Filter Replacements

Chair Vallee requested information on the water system filter replacements.

C. Moch provided a description of filter types and replacement schedules.

10.5. Leaks

Chair Vallee noted that recent leaks have impacted the water system.

C. Moch noted that staff were recently deployed for emergency repairs. There are a number of additional locations which have been identified for ongoing repairs and maintenance.

11. Adjournment

MOVED by L. Vallee, SECONDED by K. Wall,
That the Surfside Park Estates Water Service Committee meeting of March 6, 2025 be adjourned at 10:53 am.
CARRIED

_____
Chair

_____
Recorder

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REPORT TO SURFSIDE PARK ESTATES WATER SERVICE COMMITTEE
MEETING OF THURSDAY, JUNE 26, 2025

SUBJECT **Capital Projects Requiring Funding – Potential Funding Options and Cost Implications**

ISSUE SUMMARY

The Surfside Park Estates Water Service Committee has requested that staff prepare a report outlining the proposed path forward to carry out water system improvements in future years, the amount of borrowing required through a loan authorization bylaw and options for obtaining elector approval for the loan (petition or alternative approval process).

BACKGROUND

The Surfside Park Estates (Surfside) Water System is located on the southwest side of Mayne Island in the Southern Gulf Islands Electoral Area and provides drinking water to approximately 70 customers. There are 105 parcels within the Surfside System that can be inhabited. Capital Regional District (CRD) Infrastructure and Water Services is responsible for the system's overall operation, maintenance, design, and construction.

There are currently two major capital improvement projects on the Surfside Water System Capital Plan that reserve funds are insufficient to carry out within the next two years. The two projects are the Wood Dale Drive Water Main Replacement and the Water Storage Tank Replacement. The project budgets and scopes are noted in Table 1.

Table 1: Capital Projects requiring Debt Funding

Project #	Capital Project Title	Budget	Scope
24-01	Wood Dale Drive Water Main Replacement	$300,000	Replacement of approximately 200 meters (m) of 150 millimeters (mm) diameter polyvinyl chloride (PVC) watermain that is leaking along Wood Dale Dr.
25-01	Water Storage Tank Replacement	$1,700,000	Design and construction of new water storage tanks and piping following the completed system review and options analysis.

The Wood Dale Drive watermain and the section of watermain from Wood Dale Drive to the existing water storage tanks are known major sources of leakage. Over the past five years, data shows that water production has increased at a rate that is six times higher than measured water use. This data indicates that system leaks or water losses are growing disproportionately to water use, posing a high risk to the service. Additionally, the rising water production is approaching the water treatment capacity, putting extra stress on the groundwater resource. The costs associated with water treatment are also escalating, particularly due to the increased frequency of arsenic media replacement.

The existing two water storage tanks, integral to supplying water to the Surfside system, have been confirmed as having corrosion, poor access and safety concerns in addition to being non-seismically resilient and connected to the known leaky piping off Wood Dale Drive.

In 2024, CRD worked with a consulting engineer to complete a water system review and tank replacement options analysis and received the recommendation that the tanks be replaced within Mount Parke Regional Park. Further details, including the reports, are included in Appendix A.

These capital improvement projects are required to support future years of water service. The budget requested to complete these projects is $2,000,000. In the absence of grant funding, debt funding (borrowing) will be required to proceed with the capital improvements. It is expected that authorization would be for total debt funding but specific budget allocation on a project specific basis would be adjustable through the annual capital planning process.

A loan authorization bylaw is required to borrow funds to complete the works. Under the *Local Government Act*, participating area approval is required prior to adopting a loan authorization. Approval may be obtained for a service in an electoral area in one of three methods: by petition, by alternative approval process (AAP), or assent voting (referendum). A matrix outlining these three unique processes and the benefits and challenges of each is attached as Appendix B.

ALTERNATIVES

Alternative 1

1. That the petition process be initiated to borrow up to $2,000,000 over 25 years debt term to complete the capital improvement projects.
2. If the petition process is successful, that a loan authorization bylaw be advanced to the Electoral Areas Committee and Capital Regional District Board for readings and adoption; and
3. That staff complete the remaining steps required to secure the funds and begin the projects.

Alternative 2

1. That the alternative approval process (AAP) be selected as the method for obtaining participating area approval to borrow up to $2,000,000 over 25 years debt term to complete the capital improvement projects.
2. That a loan authorization bylaw be advanced to the Electoral Areas Committee and Capital Regional District Board for up to three readings and be referred to the Inspector of Municipalities for approval prior to conducting an AAP process.
3. If the AAP process is successful, that staff complete the remaining steps required to secure the funds and begin the projects.

Alternative 3

1. Defer the capital improvement projects and continue to operate the system as is; and
2. Keep the capital improvement projects within the 5-year capital plan and apply for eligible grants to fund the replacements.

Alternative 4

That this report be referred back to staff for additional information.

IMPLICATIONS

Elector Approval of Loan Authorization Bylaw

Elector approval may be secured through a petition if the owners representing at least 50% of the parcels in the service area, that in total must represent at least 50% of the assessed value of land and improvements, submit signed forms supporting the proposal to borrow funds.

The petition process is the least costly and most efficient approval process and typically takes up to 4 months; however, if less than 50% support it, assent voting (referendum) will be required prior to borrowing the funds.

Elector approval is obtained from an AAP when less than 10% of estimated eligible electors in the participating area oppose the proposed borrowing unless an assent voting (referendum) is held. The estimate of eligible electors will include the count of non-resident property owners and tenants residing in the service area as provided from Elections BC voters list. If less than 10% respond in opposition, then no further assent is required. If 10% or more oppose then an assent vote or referendum is required, which can cost upwards of $70,000 and must be held within 80 days of the AAP deadline date.

Staff recommend proceeding with a petition process to obtain elector approval for borrowing in local water service areas due to following reasons:

1. **Efficiency**: The petition process can be quicker and more straightforward, often taking up to 4 months, compared to the AAP, which can take up to 7 months.
2. **Cost-Effective**: The petition process generally involves fewer administrative costs. It doesn't require public notices or advertising, which can save money.
3. **Clear Support**: The petition process directly measures support from property owners, who are often the most affected by the proposed changes. This can provide a clearer indication of genuine support.
4. **Less Risk of Failure**: The petition process requires a majority of property owners to show support, which can be easier to achieve than avoiding a 10% opposition threshold in the AAP.
5. **Simplicity**: The petition process is simpler, with one vote per property, making it easier to manage and understand.
6. **Direct Engagement**: It allows for direct engagement with property owners, potentially leading to more informed and committed support. As part of this process, the CRD recommends a public open house to educate the property owners about the projects and garner support.

Implementation of Petition Process

The steps required to obtain elector approval via the petition are outlined below:

- Confirm committee approval for a petition process to obtain elector approval.
- Complete and send petition letter addressed to each owner(s) of the parcel/folio within the participating area (draft petition attached as Appendix C)
- Advertise the petition within the Surfside Water System (direct mail, local newspapers, notice boards and website).
- Host a public open house to share information and gather signatures. (not required but recommended)
- Determine results of the petition following the deadline of August 29, 2025 (the petition is at least a 30-day period from date petition letters are sent to each owner).

- If a 50% approval threshold is exceeded, present the loan authorization bylaw to the Electoral Areas Committee and CRD Board with a recommendation to introduce and provide up to three readings.
- Send the loan authorization bylaw to the British Columbia Inspector of Municipalities.
- Following approval by the Inspector, return the loan authorization bylaw to the CRD Board for final approval.
- Following the one-month bylaw challenging period, complete process to draw upon loan and begin projects.

Financial Implications

Long-term debt must be arranged through the Municipal Finance Authority (MFA) which offers a maximum lending term of 30 years. MFA will set a fixed interest rate for an initial term, generally 10 years, and subsequently refinance the loan, typically in five-year increments. The loan authorization bylaw will define the maximum debt term; however, the length of the initial fixed term and the subsequent refinancing terms are at the sole discretion of the MFA.

For analytical purposes only, four different amortization term scenarios are simulated in Table 2. The cost of borrowing is the total of the estimated principal and interest payments over the borrowing term. The information in Table 2 is a high-level estimation only, based on the indicative interest rates published by MFA at the time of this staff report. The actual cost of borrowing will be dependent on the loan amount, actual interest rates at the time of borrowing and refinancing, and the amortization term selected.

Table 2: Surfside Park Estates Water System Debt Servicing Costs - Simulation

Borrowing Amount	**$ 2,000,000**			
Borrowing term (years)	15	20	25	30
Indicative Interest Rate*	4.48%	4.74%	4.74%	4.74%
Cost of Borrowing $	$2,910,262	$3,303,191	$3,645,187	$3,996,748
Annual Debt Payment $	$194,017	$165,160	$145,807	$133,225
Annual Parcel Tax per taxable folio $ **	$1,848	$1,573	$1,389	$1,269

**MFA Indicative Market Rates used for analysis, taken from MFA Website, May 28, 2025.*
*** Calculated parcel tax assuming no change in total folios, set at 2025 level of 105 folios.*

CRD staff consider multiple guidelines with respect to amortization term, including estimated useful life of the infrastructure, the impact of the annual debt payment requirement, the total cost of borrowing over debt term, and the interest rate risk.

A longer amortization term will minimize the annual debt payments, but results in higher total cost of borrowing and higher interest rate risk exposure. Although a debt term of 15 years has the lowest total borrowing costs, a 25-year term is recommended in balancing the annual debt payment requirement for ratepayers, the interest rate risk and the useful life of the capital assets.

Staff will continue pursuing grant opportunities if any become available. An approved loan authorization bylaw will increase the grant success, since grant programs often require cost sharing by demonstrating the local share is committed and secured. The required actual borrowing amount will be reduced if a future grant is awarded.

Service Delivery Implications

Completing the approval process and borrowing funds sooner will minimize service disruptions caused by water quality issues, continued leakage and other issues related to aging infrastructure. The likelihood of disruptions will continue to increase until a solution is implemented.

The sooner the projects are complete, the lower the risk of emergency repairs and additional leakage. If leaks are addressed by the completion of these debt funded capital projects, less water would be produced through the treatment process and fewer costly arsenic media replacements would be needed.

Higher operational costs to maintain the existing infrastructure requiring upgrades will be incurred until funding is attained to complete the projects or failure occurs. If the infrastructure is left to fail, emergency replacement costs will likely be significantly higher than any planned replacement costs.

CONCLUSION

Multiple capital improvements are needed to upgrade the Surfside Park Estates Water System. With insufficient reserve funds, debt funding and a loan authorization bylaw are required to borrow the necessary estimated $2,000,000. Under the *Local Government Act*, participating area approval is required for the loan authorization. A petition process is recommended over an Alternative Approval Process, as it is more efficient, cost-effective, and better represents parcel owners' feedback.

RECOMMENDATION

1. That the petition process be initiated to borrow up to $2,000,000 over 25 years debt term to complete the capital improvement projects.
2. If the petition process is successful, that a loan authorization bylaw be advanced to the Electoral Areas Committee and Capital Regional District Board for readings and adoption; and
3. That staff complete the remaining steps required to secure the funds and begin the projects.

Submitted by:	Joseph Marr, P.Eng., Senior Manager, Infrastructure Planning and Engineering
Concurrence:	Alicia Fraser, P.Eng., General Manager, Infrastructure and Water Services
Concurrence:	Kristen Morley, JD, General Manager, Corporate Services
Concurrence:	Nelson Chan, MBA, FCPA, FCMA, Chief Financial Officer, GM Finance & IT

ATTACHMENT(S)

Appendix A: Surfside Park Estates Water System Tank Replacement Options Analysis
Appendix B: Matrix of Elector Approval Processes
Appendix C: Draft Letter & Petition for the Surfside Park Estates Water System Borrowing

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REPORT TO SURFSIDE PARK ESTATES WATER SERVICE COMMITTEE
MEETING OF TUESDAY, FEBRUARY 13, 2024

SUBJECT **Surfside Park Estates Water System Tank Replacement Options Analysis**

ISSUE SUMMARY

To present options for the replacement of the existing storage tanks within the Surfside Park Estates Water System.

BACKGROUND

The existing two storage tanks, integral to suppling water to the Surfside Park Estates Water System (Surfside System), have been identified as having corrosion, poor access, and safety concerns in addition to being non-seismically resilient and connected to significantly leaky piping.

In August 2023, the Capital Regional District (CRD) completed an in-house review of the existing Surfside System and identified possible options for system upgrades (Appendix A). The review included a Surfside System overview, water demand assessment (used for leak calculation and tank sizing), system condition inspection and identified two new feasible siting locations for replacement tanks. The sites identified for potential tank placement were either in the CRD regional park at Mount Parke at an elevation similar to the existing tanks (Option A); or near the existing water treatment plant (Option B) at a lower elevation. The in-house review resulted in recommendations to engage a consulting engineer to further the options analysis and provide a report complete with a Class D cost estimate for the system upgrade options.

In September 2023, the CRD engaged Associated Engineering Ltd. (AE), to complete an in-depth system review and tank replacement options analysis, complete with cost estimates (Appendix B). AE reviewed CRD's site options and included a third option, refurbishing the existing tanks (Option C). AE's assessment of Option A included Thurber Engineering Ltd.'s geotechnical engineering desktop review of the site area (Appendix C), which suggested that slope stability concerns in the park area can be mitigated but tank site placement should be outside the rockfall area. AE's technical review of the options included tank material selection and tank sizing based on provincial regulations governing drinking water storage including or not including fire protection. Tanks were calculated to be approximately 5.5 times larger in volume if sized to provide fire storage. Options A, B and C were then analyzed in context of all findings and cost estimates for the options were calculated. Appendix D shows the location of each option. Option C was not priced, as AE noted that correcting the issues with the existing tanks is expected to be the most expensive option primarily due to the difficulties in improving access and replacing the existing water main to the tanks. The following table provides a summary of AE's Class D cost estimates for Options A and B.

	Cost without fire storage	**Cost with fire storage**
Option A - Gravity System in Mt Parke	$ 1.5 M	$2.4 M
Option B - Pumped System near existing WTP	$ 2.2 M	$3.2 M

AE confirmed the cost estimates are based on a variety of sources including vendor quotes, recent tender costs, and allowances. They also include costs for typical engineering effort and two separate contingencies, both related to the fact that the project is at an early stage of development. The first, a 40% escalation contingency, accounts for the time-related increases in cost that are likely as the project proceeds through decisions and design towards construction; the second, a 30% construction contingency, accounts for scope-related items that will likely be needed but have not been determined at this point without further detail. The contingencies are based on engineering judgement.

AE has recommended that the CRD pursue Option A, the siting of replacement tanks within Mount Parke Regional Park, at a cost of $1.5 million without fire storage or $2.4 million with fire storage. AE noted that the CRD could consider deferring replacement as the external visual inspection suggested that the existing tanks may have useful life remaining. If replacement is deferred, AE recommended a detailed tank condition assessment be conducted, options to renew tank coatings be evaluated and options for improving capacity and resilience of the existing foundation system be conducted by qualified structural and geotechnical specialists. If tank replacement is deferred, higher operation and maintenance costs will be incurred due to the access constraints and water leakage until such time as the tanks are replaced. The 2023 Surfside System operating budget was $106,835 and annual operations costs, specific to the existing tanks, are noted in the table below.

Year	2019	2020	2021	2022	2023	5-year average
Cost ($)	$2,327	$630	$6,326	$5,906	$376	$3,113

ALTERNATIVES

Alternative 1

That staff be directed to:
1. Defer tank replacement and continue to operate the system as is;
2. Budget for preliminary design of Option A to pursue further details on required assessment, investigations, and engineering to confirm scope and refine the cost estimates; and
3. Keep the tank replacement project within the 5-year capital plan and apply for any eligible grants to fund the Option A system replacement within 5 years.

Alternative 2

That staff be directed to:
1. Defer tank replacement and continue to operate the system as is;
2. Budget for and complete a detailed tank condition assessment, complete with tank coatings renewal options, and options for improving the existing tanks foundation system.
3. Keep the tank replacement project within the 5-year capital plan and apply for any eligible grants to fund the Option A system replacement.

Alternative 3

That staff be directed to undertake an alternative approval process to borrow funds up to $2.4 million to carry out the Option A water system improvements as soon as possible.

Alternative 4

That the report be referred back to staff for additional information.

IMPLICATIONS

Financial Implications

Alternative 1
Funding will be required to facilitate staff to pursue a preliminary design and further details on required assessment, investigations, and engineering to confirm Option A scope and budget. Allowing time for staff to refine design and budget estimates through this work will allow more clarity on the amount the Service needs to borrow to fund the work. Keeping the Option A tank replacement on the five year capital plan allows CRD staff to apply for grants in addition to spreading out potential user rates increase required to fund the project. Higher operational costs to maintain the existing difficult to access and leaking system will be incurred until funding is attained to implement Option A.

Alternative 2
Extending the life of the existing tanks will facilitate spreading out the time that the service requires to fund the recommended tank replacement Option A. Funding will be required to facilitate the assessments and evaluations for repairs to the existing site. Given that the tanks will eventually need to be replaced and it will be cost prohibitive to do so on the existing site, any funds spent on repairing the existing site will be in addition to funds required to implement Option A. Higher operational costs to maintain the existing difficult to access and leaking system will be incurred until funding is attained to implement Option A.

Alternative 3
If the Committee elects to implement this alternative, it will add a significant cost burden to the ratepayers. Borrowing funds to complete the work for Option A as soon as possible would increase users annual parcel taxes from $247 to approximately $1,600 dollars.

Service Delivery Implications

Alternative 1
Analysis has indicated that the tanks will eventually need to be replaced and that Option A is recommended. Risk of tank failure is increased with this alternative until the existing system issues identified are addressed through construction of the new tank (Option A).

Alternative 2
Based on a cursory review, the existing storage tanks appear to have some remaining service life. If a detailed tank condition assessment, complete with tank coatings renewal options, and options for improving the existing tanks foundation system is completed, there will be more clarity on the remaining service life of the existing tanks and any options and costs to extend their service life. Risk of tank failure is increased with this alternative until the life of the existing tanks are renewed or Option A construction is complete.

Alternative 3
The existing system issues identified would be addressed through construction of the new system as soon as possible and risk of tank failure would be reduced.

Alternative 4
If the Committee elects to implement this alternative, risk of leaks and tank failure is increased until a solution is implemented.

CONCLUSION

Completed options analysis of the Surfside water storage tanks indicate the tanks appear to have some remaining useful life. If the tanks replacement is deferred for a significant time, it is recommended that the CRD complete a detailed tank condition assessment, complete with tank coatings renewal options, and options for improving capacity and resilience of the existing tanks foundation system, however there will still be issues related to access and leaking watermain with this option.

The tanks eventually will need to be replaced and it is cost prohibitive to do so at the existing site. The recommended location of future storage tanks is within Mount Parke Regional Park (Option A), at a cost of $1.5 million without fire storage or $2.4 million with fire storage. Further assessment, investigation and engineering should be undertaken to confirm cost estimates including archeological, geotechnical, and environmental constraints in addition to fire storage requirements. Borrowing will be required to fund this work and will increase users' annual parcel taxes significantly if no grants are available.

RECOMMENDATION

That staff be directed to:

1. Defer tank replacement and continue to operate the system as is;
2. Budget for preliminary design of Option A to pursue further details on required assessment, investigations, and engineering to confirm scope and refine the cost estimates; and
3. Keep the tank replacement project within the 5-year capital plan and apply for any eligible grants to fund the Option A system replacement within 5 years.

Submitted by:	Natalie Tokgoz, P.Eng., Manager, Water Distribution Engineering and Planning
Concurrence:	Jason Dales, B.Sc., WD IV., Senior Manager, Infrastructure Wastewater Operations
Concurrence:	Joseph Marr, P.Eng., Acting General Manager, Integrated Water Services

ATTACHMENT(S)

Appendix A: CRD's in-house Memo: "Mayne Island – Surfside Park Estate Water System: System Review and Options Analysis for Tank Replacement and Relocation" - August 2023
Appendix B: AE Options Analysis Technical Memo: "Surfside Park Estate Water System Tank Replacement Options Analysis" November 2023
Appendix C: Thurber Engineering Ltd. Report: "Surfside Park Estate Water System, Mayne Island, B.C. Rockfall Hazard Assessment – Revision 1" – November 2023
Appendix D: Surfside Park Estates: Tank Location Options

Memo

TO: Natalie Tokgoz, P.Eng.

FROM: Katarina Konicek, P.Eng.

DATE: August 21, 2023

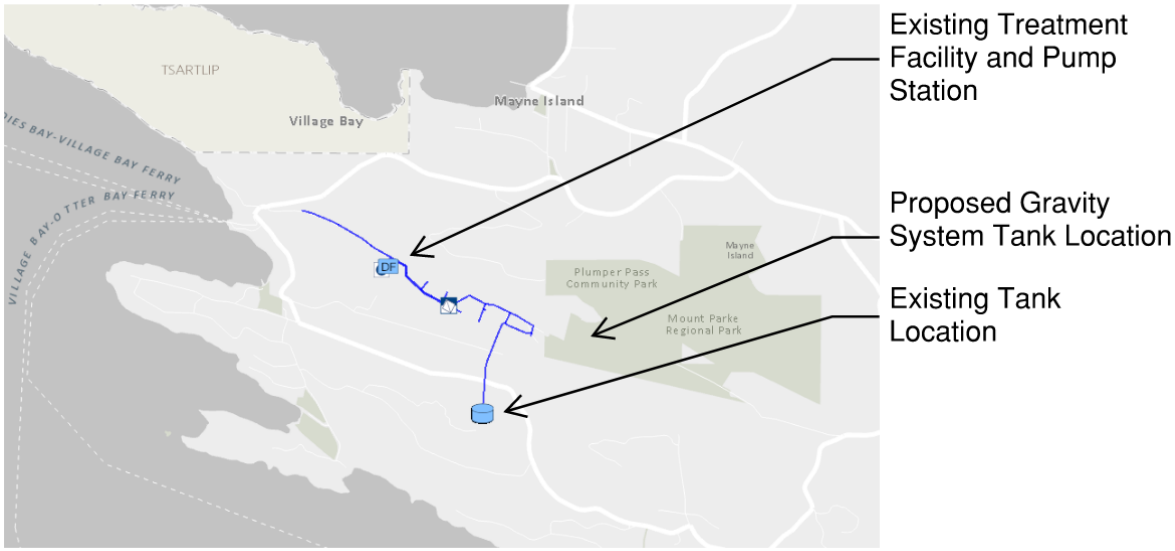
SUBJECT: **Mayne Island – SURFSIDE PARK ESTATE WATER SYSTEM: System Review and Options Analysis for Tank Replacement & Relocation**

CRD IWS staff have completed an in-house review of the existing Surfside System and have identified possible options for system upgrades. The system review and options analysis were triggered by the poor condition of the water storage tanks and the desire to act on the replacement or upgrades to the tanks prior to their failure. This information will be provided to a Consulting Engineer to further review and verify the options analysis and to produce a final report with a Class D cost estimate. The final report, complete with cost estimates for multiple options, will be presented to the Surfside Park Estates Water Service Committee.

System Overview

The Surfside Park Estate Water System (Surfside System) is located on the southwest side of Mayne Island and is part of the Southern Gulf Island Electoral Area. The Surfside System consists of one operating well, a small treatment facility (arsenic removal and mini clearwell), one pump station, one pressure control station (PCS), two storage tanks, and distribution piping. The service area includes approximately 110 lots and there are 70 water customers currently registered with the CRD. The Surfside System is operated by the CRD IWS Saanich Peninsula & Gulf Island Operations (Operations).

Figure 1 - System Overview



The two water storage tanks are located at the southern end of the Surfside System at an approximate elevation of 128m (TWL: 137m, based on record drawings). These tanks provide the community with water via gravity. The existing tanks are cylindrical steel horizontal tanks and each has a capacity of approximately 45m^3 (9,900 Imp.Gal, 11,900 US.Gal). The 150 mm PVC pipe connecting the reservoir tanks to the Surfside System acts as both a fill line and distribution line.

The operating well (Well #5A), water treatment facility, and pump station are all located near the west end of the system and are on the same site at an elevation of 38m. The pump station provides sufficient pressure to fill the reservoir tanks to TWL 137m.

The PCS is located centrally within the Surfside System at an elevation of 68m and provides water to the lower elevation lots (38-68m) at reduced pressures. The reduced pressure zone has an HGL of 100m. The PCS is located below the road grade and includes three pressure reducing valves with the following sizes and set points (based on 2023-06-09 Operational information):

- 1” 45psi (31.7m)
- 2” 42psi (29.6m)
- 3” 38psi (26.8m)

A Strategic Asset Management Plan for the Surfside System was complete December 2011 (attached) and provides supplemental information regarding the water system.

Water Demand

Based on the water production spreadsheet (‘WaterProductionLSAMonthlySpreadsheet’) maintained by the CRD IWS Operations group, the average water production in the service area is 31.7 m^3/day. The actual average metered water demand is 13.7m^3/day and the system requires approximately 1 m^3/day for operational water usage. The remainder of the approximately 17 m^3/d is deemed leakage. This leakage is discussed further in the ‘System Condition’ section below.

Based on a review of the Surfside System water demand data and discussions with CRD IWS Operations staff, the tank sizes are likely sufficient to meet demand and likely do not need to be upsized. That said, the current storage capacity does not accommodate fire flow volume. To accommodate fire storage of 4,000L/min for 1.5hrs, based on FUS (Simplified Method, up to 4560sq.m. and 3-10m separation) the required tank storage would result in a 28 day turn over. The current tanks storage volume allows water to turn over every 7-8 days and water quality does not deteriorate. If the storage volume was larger, the water retention time would be longer and the water quality would likely deteriorate. Additional system maintenance and potentially new infrastructure would be required to maintain water quality if the tanks were upsized. Further investigations into fire flow demands, domestic demands, and tank sizing are required as part of the consultant’s analysis.

System Condition

Based on conversations with CRD IWS Operations in May 2023, the Surfside System storage tanks are in poor condition and their current location is a challenge for maintenance as there is no road access. A site inspection of the tanks was completed by CRD IWS on Oct 15, 2021. Tank deterioration, tank support deterioration and site access were noted as key issues. The inspection report is attached to this memo.

A similar storage tank system, located on Mayne Island as part of the Skana Water system, was reviewed by Stantec Consulting in 2016. Stantec's subsequent assessment report, complete with recommendations for tank upgrades, is attached to this memo for reference as the tanks are very similar to the Surfside tanks.

It is noted above in the 'Water Demand' section that there is a significant water leakage based on well production and water usage data. CRD IWS Operations has attempted to reduce leakage by completing investigations via acoustic leak detection and hand digging without significant success (20230805 SH_to_DR email). Further investigations show that most of the system is in decent condition; however, the section of 150mm PVC pipe that connects to the tanks has been flagged as having multiple leaks and repairs are difficult due to the lack of access to the area.

Options Analysis

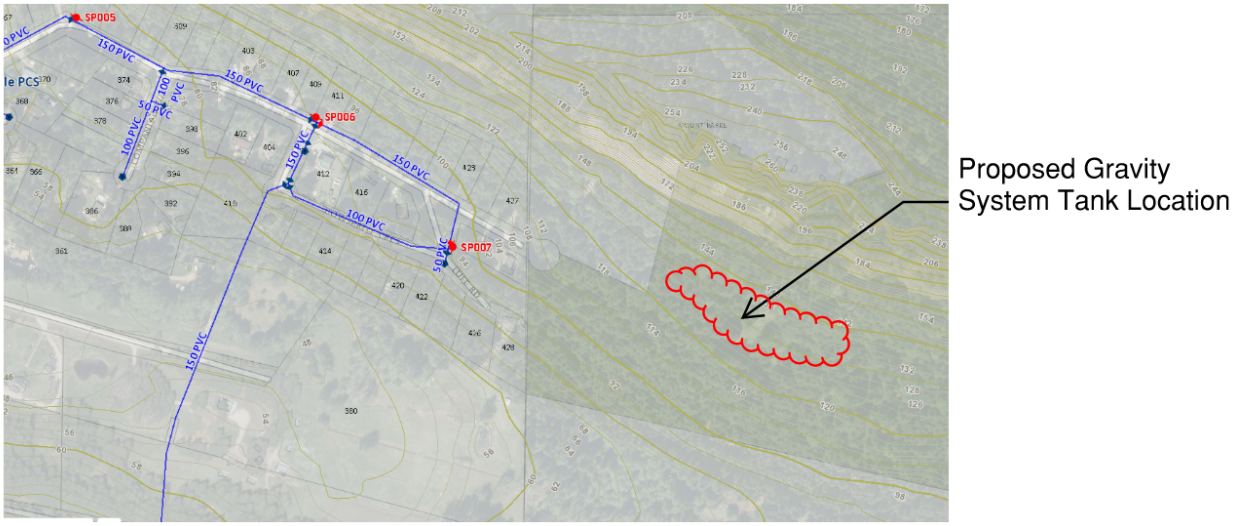
The CRD has reviewed the current system and has selected the following two options for system upgrades. Both options require further review as part of the Consultant's option analysis.

1. Gravity System

   The system would continue to operate by gravity. This would likely require:

   - New tanks (2x45m^3) – possibly proprietary glass fused to steel flat panel tank with reinforced concrete pads and aluminum geodesic dome roof, polyethylene or other suitable recommended tanks.
   - New tank location proposed on Figure 2 (300m east of Wood Dale Drive, within Mount Parke, a CRD Regional Park) at an approximate elevation of 130m.
   - CRD Regional Parks have reviewed the location and confirmed that the tanks can be located in this area, but further review will be required as more detailed information becomes available.
   - Environmental Impact Assessment to be completed and reviewed by CRD Regional Parks.
   - Slope stability assessment for new tank location.
   - Approximately 300m of new watermain to new tank location (one tank fill/discharge line).
   - Decommissioning of existing pipe and tanks.

Figure 2 - Proposed Gravity System Tank Location



Some challenges of this option will include determining a suitable location based on slope stability and will likely require a geotechnical investigation of the potential CRD Park land where the new tanks can be situated.

2. Pumped System

The system would operate as a pumped water distribution system. This would likely require:

- New pump station to service the area (elevation range: 38m to 98m) at HGL 126m.
- Potentially new piping depending on pressures and existing pipe pressure ratings.
- New tanks (2x45m^3), proprietary glass fused to steel flat panel tank with reinforced concrete pads and aluminum geodesic dome roof, polyethylene or other suitable recommended tanks.
- Decommissioning of existing pipe, tanks, and pumpstation.

A challenge of this option include obtaining a new or expanded SRW for the required pump station and storage tanks. See Figure 3 for current well, treatment plant, and pump station location.

Figure 3 - Existing Well, Treatment Building, and Pump Station

Recommendation

The CRD has completed an in-house review of the Surfside System and has provided options for system upgrades. It is recommended to collaborate with a Consulting Engineer to further the options analysis and provide a report complete with a class D cost estimate for the possible system upgrades.

Yours truly,

Katarina Konicek, P.Eng.
Project Engineer, Water Distribution Engineering and Planning
Infrastructure Engineering
CRD Integrated Water Services

KK:nt

Attachments:

- Strategic Asset Management Plan for the Surfside Water System, December 2011
- Site Inspection by Operations, October 15, 2021
- Leak Detection Email August 5, 2022 (20230805 SH_to_DR email)
- Assessment of Skana Water System Tank, Mayne Island, BC, Stantec, February 2, 2016
- Conclusions and Recommendations for Skana Water System Tanks, Stantec, March 16, 2016

Appendix A

Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

TECHNICAL MEMORANDUM

Capital Regional District
Mayne Island

Surfside Park Estate Water System
Tank Replacement Options Analysis

NOVEMBER 2023

Appendix A

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1 ISSUE

The Surfside Park Estates Water System is a small water system located on Mayne Island, operated by the Capital Regional District (CRD). The Surfside Park Estates Water System consists of a groundwater well, a treatment system to remove arsenic, booster pumps, a set of two gravity storage tanks to provide consistent pressure, and distribution pipe.

The existing cylindrical horizontal welded steel tanks have been identified as having significant corrosion and poor access for operation, and consideration of options for their replacement is required.

2 BACKGROUND

2.1 Existing system

The Surfside Park Estates Water System is located on Mayne Island, generally along Wood Dale Drive near the Village Bay Ferry Terminal which is the primary transportation link to the Island. The system serves approximately 70 homes, with an anticipated capacity at build-out of 107 homes.

In order to provide appropriate pressure to customers, the system is split into two pressure zones, operating at nominal hydraulic grade lines of 137 m and 100 m. The upper zone pressure is set by the twin storage tanks while the lower zone is served by a set of three pressure reducing valves. The water treatment plant supplies water to the upper pressure zone through a dedicated supply line tied into distribution mains immediately above the pressure reducing valves. The tanks are connected off of Bowsprite Crescent near the top end of the distribution system, and utilize a common fill/draw pipe with bidirectional flow depending on whether the tanks are filling or draining. Figure 2-2 on the following page provides an overview of the service area and key existing features.

The Surfside water service area does not include land of suitable elevation for gravity storage tanks, so these are located outside of the service area, across the valley to the south in a steeply sloped and heavily wooded area. The tanks were constructed in the 1970s and are constructed as horizontal steel cylinders, each supported on two concrete saddles. One of the tanks is shown in Figure 2-1 with the second tank out of view behind it.

Figure 2-1 Surfside Water Storage Tanks

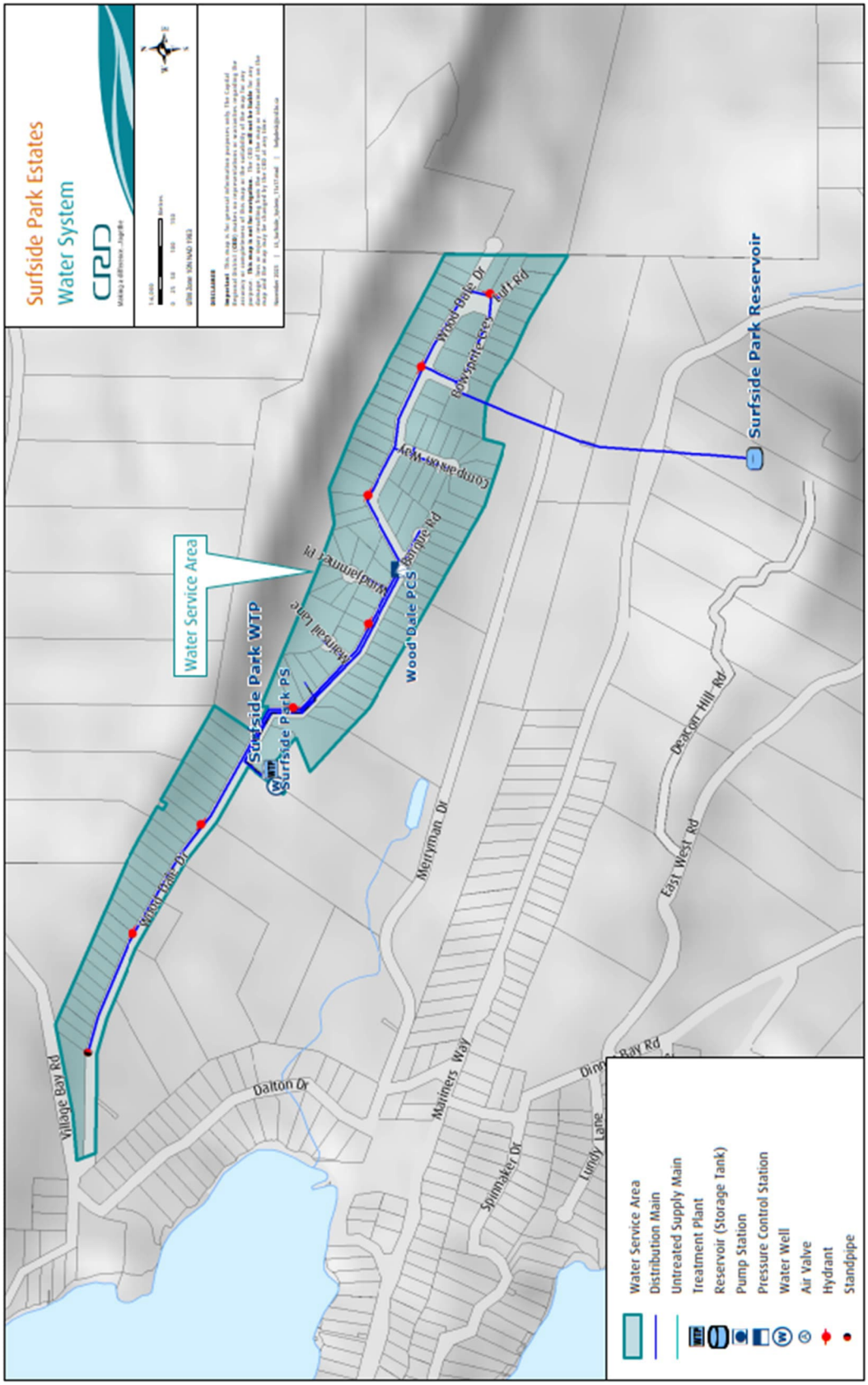


Figure 2-2 Surfside Water Service Area

In general, the available record information for the tanks is poor. The actual volume of the existing tanks is unknown, with recorded capacities between 45 and 57 m^3 per tank, but measurements on site suggesting a nominal capacity slightly over 60 m^3 per tank for a total nominal capacity of more than 120 m^3. Record drawings show a different foundation system to the one installed.

The tanks include a level measurement device mounted on the top of one of the tanks, which utilizes a radio link to convey this information back to the treatment plant and control the production of water. This system is powered by a solar panel. This equipment is visible atop the tank in Figure 2-1.

Access to the tanks is challenging due to the steep terrain and lack of an improved pathway. CRD Operators can access the tank from a point on Deacon Hill Road through an unimproved trail through the woods, though this access is across private property for which a right of way has not been established. Deacon Hill Road includes steep grades and extremely narrow sections where 2-way traffic is not possible. Due to its remote location, the road receives little or no winter maintenance. The unimproved trail access is generally adequate for operators on foot but is extremely challenging when equipment needs to be carried to the tanks for maintenance activities such as servicing the level transmitter or cleaning the tanks. The other access was from Mariners Way; however, this requires a steeper and longer hike compared to the upper access route off Deacon Hill Road. CRD Operations reports recent leak detection efforts in this area as extremely challenging.

To understand the operation of the system, relevant background information was collected from the CRD and a site visit was conducted on 21 September 2023. Background information reviewed included:

- Record drawings for Arbutus Water Co Ltd., the original system owner (various dates, mostly around 1976)
- Surfside Water System Strategic Asset Management Plan, CRD 2011
- Various documents related to tanks at Skana Water System (a nearby system with similar tanks)
- Surfside Reservoir Condition Assessment Report, CRD 2021

2.2 Potential Sites for Replacement Tanks

In addition to the background information reviewed, the CRD prepared a memorandum dated August 2023 entitled *System Review and Options Analysis for Tank Replacement & Relocation*. This memorandum provided a summary of recent water production and demand in the system, and outlined two potential options for siting of replacement tanks which could improve the site access. The two locations identified were:

- Option A: “Gravity System” – location of proposed tanks would be within the CRD Regional Park at Mount Parke, at an elevation similar to the existing tanks
- Option B: “Pumped System” – location of proposed tanks near the existing water treatment plant, with pressure raised to the upper pressure zone using pumps.

To supplement these information sources, a site visit was conducted by Associated Engineering staff on 21 September 2023 with support from CRD Engineering and Operations personnel. Photographs from the site visit are included as Appendix A to this memorandum. During the site visit it was observed that the existing tanks were in serviceable condition with localized surface rust only. Based on these observations, a third option was added for consideration:

- Option C: “Existing Tanks” – wherein refurbishment of the existing tanks could extend their lifespan.

Figure 2-3 Illustrates the three potential tank locations identified in relation to the existing system, while Table 2-1 compares some important considerations for the options.

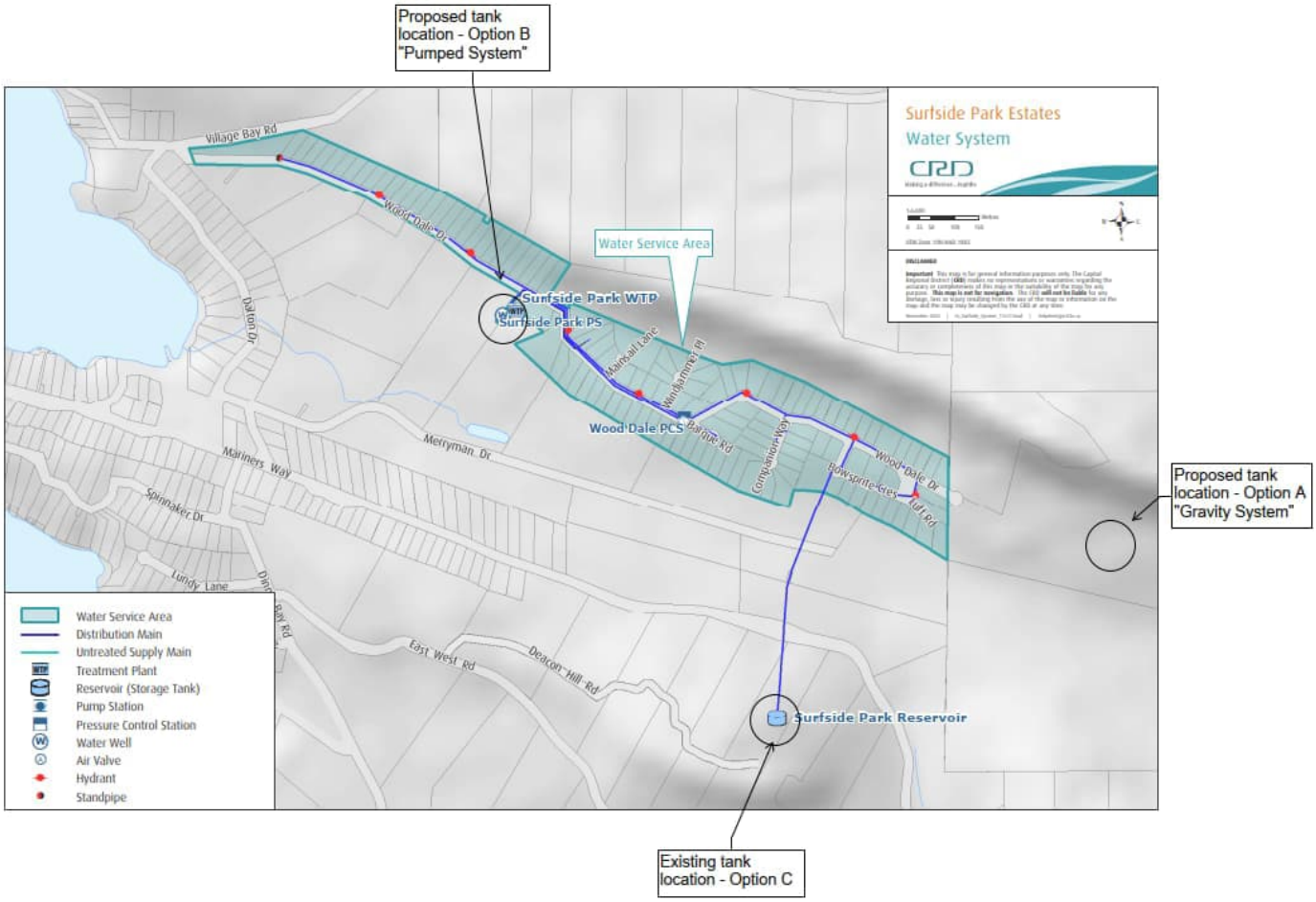


Figure 2-3: Potential Tank Locations Identified

Table 2-1: Key Considerations for Potential Tank Locations

	Option A Gravity System	Option B Pumped System	Option C Existing Tanks
Site location	Flat clearing in park	Flat areas near treatment plant	Steep terrain
Elevation	Allows for gravity system	Requires pumping	Allows for gravity system
Access	Existing gravel road in park.	Shared driveway at existing plant	Very challenging
Land Use	CRD Parks has indicated location is feasible.	Private property	Existing
Electrical & Controls	Require new electrical supply and radio communication	Existing electrical supply and controls	Existing solar panel and radio

The water consumption was reviewed to understand what size of tanks are appropriate for this system. The average water production in the system over the 5 years from 2018 to 2022 was 31.7 m^3/day and average metered usage of 13.7 m^3/d. This metered usage equates to 196 L/d per household, a low number which may indicate that some of the homes are not occupied on a full time basis. Depending on whether production or metered usage is considered, the tank turnover is likely at least 2 to 4 days at average flow. The usage numbers also indicate 57% of the water is non-revenue. The long section of pipe connecting the reservoirs to the system was identified by the CRD as a significant contributor to the non-revenue water in the system, and leak detection and repair work conducted by the CRD in May & June of 2022 is likely not reflected in these figures. No water quality issues were reported within the system.

3 STAKEHOLDERS

The primary stakeholders for the tank replacement are the customers whose potable water is supplied from the system. Other stakeholders include the Capital Regional District Integrated Water Services (IWS) who operates the system, and for Option A CRD Parks and other park users.

4 OBJECTIVE

The objective of this memorandum is to review available information and recommend next steps for the future water storage needs of the Surfside Estates system.

5 TECHNICAL REVIEW OF SYSTEM

This memorandum is primarily aimed at determining a preferred location for new water storage tanks for the Surfside Park Estates Water System. This section of the memorandum begins with a review of tank sizing and material considerations for replacement tanks, followed by detailed discussion regarding each of the location options identified earlier in the memorandum and illustrated in Figure 2-3.

5.1 Tank Sizing

Replacement tanks for the Surfside Estates Water System should be designed in accordance with the BC Ministry of Health's 2023 Design Guidelines for Drinking Water Systems in British Columbia. Other relevant regulations were considered including the Mayne Island Trust Land Use Bylaw No.146, but the provincial guidelines provide the most comprehensive direction for reservoir design. Use of these guidelines will be beneficial for obtaining the required Permit to Construct Waterworks at the completion of design.

Two sizing options are provided within the provincial guidelines, depending upon whether water is stored for fire protection or not. If fire storage is not provided, the guidelines indicate that storage equal to maximum day demand should be provided. Using the peaking factor of 2.75 from the guidelines together with the average water production rate of 31.7 m^3/d this equates to a recommended 87 m^3 of storage, or approximately ¾ of the volume available in the existing tanks. If fire storage is to be provided, the simplified method within the Fire Underwriters Survey (FUS) guideline Water Supply for Public Fire Protection indicates a flow rate of 4,000 L/min for a duration of 90 minutes, based on floor areas under 450 m^2 (4,800 ft^2) and separation between structures of at least 3 metres. The provincial guidelines indicate that equalization and emergency storage should be added to this, resulting in a total required

volume of 478 m^3. Table 5-1 summarizes the calculated volumes. This is approximately four times as much storage as the current system has.

Table 5-1 Fire Storage Reservoir Volume

Component	Volume (m^3)
Fire Storage *(4,000 L/min x 90 minutes)*	360
Equalization Storage (0.25 x 87 m^3)	22
Emergency storage (0.25 x 360 m^3 + 0.25 x 22 m^3)	96
Total	478

The maximum day demand noted above is based on current water production including significant non-revenue water. If the CRD is successful in reducing non-revenue water in the system and lower total production can be demonstrated, then lower numbers and smaller tanks could be justified. The maximum day demand and recommended tank capacity derived from it should be reviewed again in detail as design progresses.

A volume of 478 m^3 would be a significant change to the system, with more than two weeks of water stored at average day demand. If non-revenue water was decreased substantially, the storage duration would see an inversely proportional increase. These long water ages could result in degraded water quality within the system. Additional work would be required to determine what flowrate could be delivered to the existing hydrants within the Surfside Estates System, since a larger tank needs to be paired with appropriately sized piping and hydrants in order to deliver water for fire protection.

5.2 Tank Material

Tanks suitable for potable water service may be manufactured from a wide variety of materials. For field-erected tanks away from large population centres, bolted steel tank construction is common. Shop fabricated tanks are available in a wider range or materials, including various polymers, coated steel or stainless steel.

Cross-linked Polyethylene

Cross-linked polyethylene is a polymer with excellent mechanical properties that can be manufactured into tanks within a manufacturing facility. The material is suitable for storage of potable water, and can be procured with NSF 61 certification. A carbon black additive can be added to the polymer during manufacturing to reduce the effects of UV exposure which can cause the material to become brittle over time. The mechanical properties of cross-linked polyethylene allow it to provide adequate performance even under seismic loading. A polyethylene tank would be expected to last at least 20 years, and due to this relatively short life expectancy this option was not considered further.

Stainless Steel

Stainless steel is another candidate material which offers many of the benefits of steel while being more resistant to environmental corrosion. Stainless steels are generally still susceptible to corrosion in the presence of chloride (salt), including the sodium hypochlorite which is added to the Surfside water for disinfection. When tank size becomes

small and the relative cost of applying coatings is more significant, this can be a good option. Stainless steel can be passivated, rapidly forming a thin layer of oxide which prevents more significant corrosion. A stainless steel tank with proper maintenance would be expected to last more than 50 years if chloride levels are carefully managed. Stainless steel was not considered further due to the additional care required for management of chlorides.

Steel

Bolted steel tanks have been used for many years for many applications including reservoir and other liquid storage purposes. This type of tank can provide an economical way to combine shop coating of panels with field erection for a robust tank. Historically, depending on the corrosiveness of the stored liquid, epoxy coated steel tanks have performed satisfactorily with service life of the epoxy coating lasting at least 30 years. Glass-fused steel tanks have also been used in many similar applications where the estimated maintenance life can extend beyond 50 years. Cathodic protection is often used as an additional measure to protect these tanks and prolong the overall service life. These tanks can be assembled on site using relatively lightweight equipment.

When the required tank size is small enough to facilitate shipping of a complete tank, it is also practical to fabricate a steel tank off site, apply factory coatings to the entire fabrication, and deliver a complete tank to site. This is likely how the existing tanks were constructed. Epoxy coated steel would be a likely choice, and coating life of at least 30 years could be expected. A shop fabricated tank requires relatively little field work and can provide better quality control compared to a field-fabricated tank. A cathodic protection system could also be provided for such tanks. A large crane would be required to lift a shop fabricated tank.

Corrosion within a steel tank often takes place above the water line within the tank where excessive moisture exchanges with oxygen and create corrosion when metal is exposed. Therefore, regular maintenance and monitoring programs to inspect for corrosion will help extend the overall service life of any metallic tank. Such programs can be performed through observation at the rooftop hatch of the tank where a maintenance crew would access by using a ladder mounted on the side of the tank. For larger tanks, two access manways should be installed at the bottom of the tank at opposite sides. This will improve the safety access from a confined space perspective and improved ventilation. A vertical caged ladder with a vertical safety lifeline should be provided to access to the roof top.

At this stage, it has been assumed that glass-fused bolted steel tanks would be used if fire storage is provided, and shop-fabricated epoxy-coated carbon steel tanks otherwise. These options can be considered in more detail as the work progresses, and it is also possible to procure a tank in such a way that a contractor will propose the tank that provides the best value to the Surfside system from more than one acceptable solution.

5.3 Option A – Gravity System

Construction of new tanks within Mount Parke would result in a water system that operates in the same way as the existing system but provides greatly improved access to the storage tanks for operations and maintenance and eliminates the section of piping which is believed to be causing much of the non-revenue water loss. This would require the construction of new tanks complete with foundations, piping from the existing end of line off Wood Dale Drive, and instrumentation complete with power supply and communication system. Since tanks at this location would be hydraulically similar to the existing tanks, no modifications to the treatment plant or PRV would likely be required. Figure 5-1 illustrates the required upgrades.

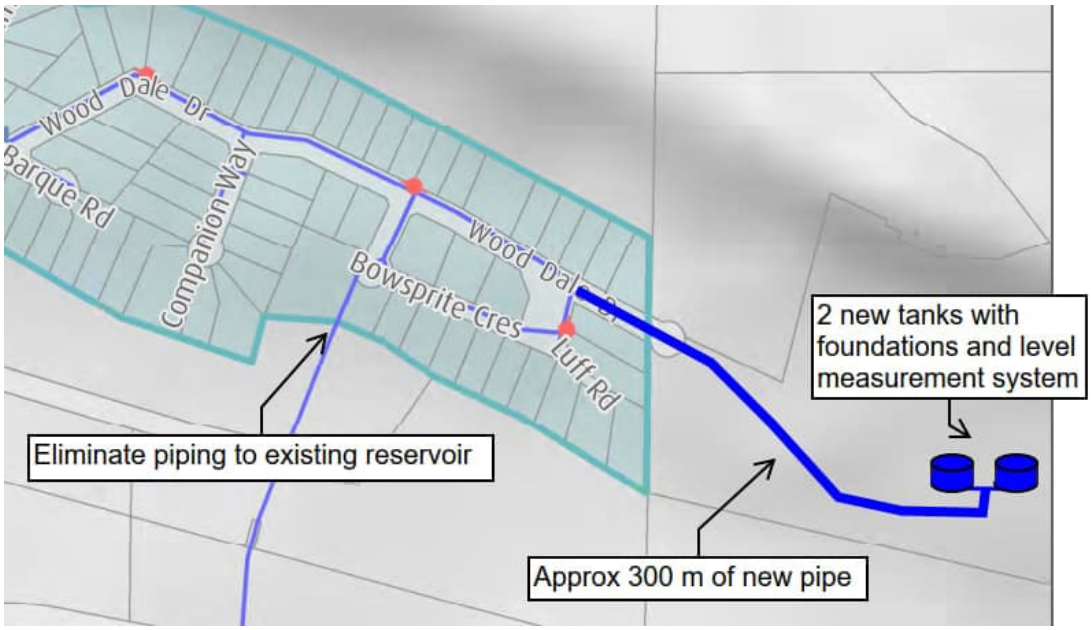


Figure 5-1 – Option A Gravity System Upgrade Concept

The ability to construct and maintain piping and tanks within a park is relatively unusual and the ability to do this should be confirmed, with a formal agreement for land use put in place. Approximately 300 metres of new pipe would be required to be installed along the existing gravel roadway. The existing clearing appears to be of suitable size and at the appropriate elevation for construction of new tanks. A desktop review was conducted by Thurber Engineering Ltd. which suggests that a soil or rock berm or other method could be used to mitigate a slope stability concern at this location.

It may be economical to provide utility power to the site if the power wiring is installed at the same time as the piping, and this would eliminate the maintenance required for the current solar power system. If a radio is to be used for communicating tank level to the water treatment plant, a radio path study will be required.

Archaeological and environmental constraints should be evaluated before confirming the preferred site.

The likely costs of Option A are provided in Table 5-2 below:

Table 5-2 Gravity System Class D Opinion of Probable Cost

Description	Cost without fire storage	Cost with fire storage
Piping connection	$180,000	$180,000
Tanks complete with foundations	$500,000	$1,000,000
Electrical & Instrumentation	$170,000	$170,000
Contractor Overhead and Profit (10%)	$85,000	$135,000
Escalation Contingency (40%)	$340,000	$540,000
Construction Contingency (30%)	$255,000	$405,000
Total Anticipated Project Cost	$1.5M	$2.4M

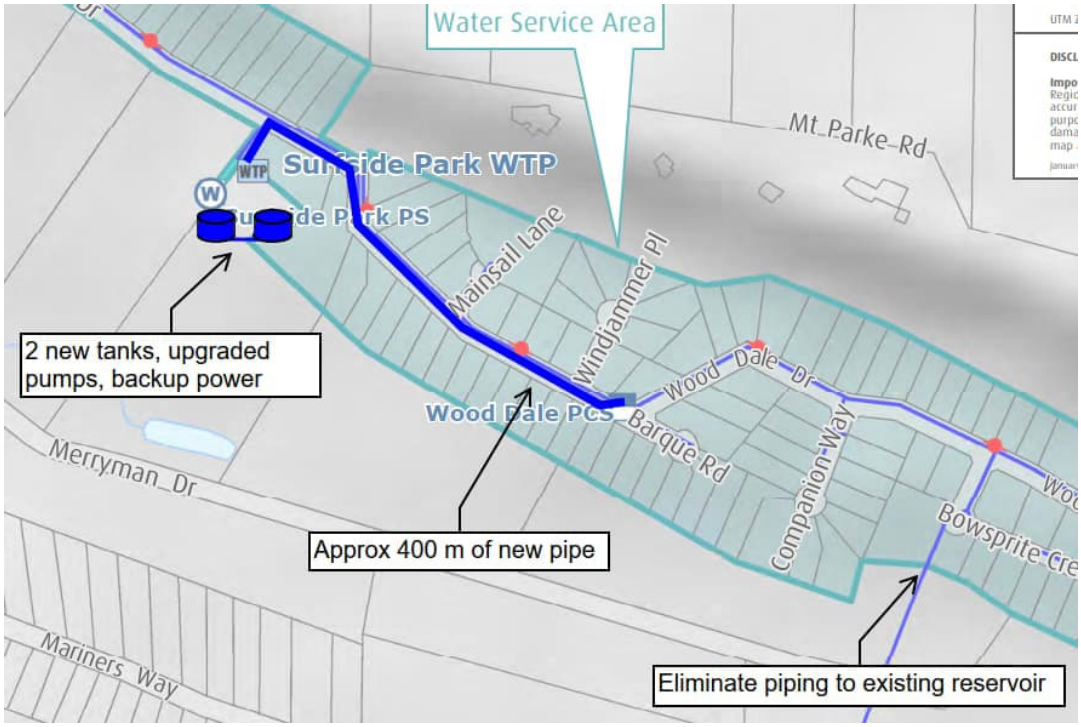
5.4 Option B – Pumped System

Construction of new tanks adjacent to the existing water treatment plant will require a reconfiguration of the water system since system pressure will be provided by pumps rather than by gravity as in the existing system. This option would require construction of new tanks complete with foundations, upgraded piping from the water treatment plant to the tie-in point, construction of new pumps with a pressure tank, and addition of backup power to the treatment plant. Adding tanks at this location would eliminate the need for communication to remote sites within the Surfside Estates System. No changes to the PRV station would be anticipated. Figure 5-2 Illustrates the required upgrades for this option.

The existing land at the treatment plant does not include adequate space to accommodate new tanks, so additional land would need to be acquired at this location. Discussion with adjacent landowners should be undertaken.

Although all of the work is to be done is located at a site with existing power supply, it is likely that the single phase power would be a significant constraint for the larger pumps required. This would require careful consideration during design but could likely be overcome. Since the system would have increased reliance on continuous power, a diesel backup power generator would be required.

Geological, archaeological and environmental constraints should be evaluated before confirming the preferred site.



The likely costs of Option B are provided in Table 5-3 below:

Table 5-3 Pumped System Class D Opinion of Probable Cost

Description	Cost without Fire Storage	Cost with Fire Storage
Piping connection	$400,000	$400,000
Tanks complete with foundations	$500,000	$1,000,000
Electrical & Instrumentation	$250,000	$300,000
Pump & Mechanical Upgrades	$50,000	$150,000
Contractor Overhead and Profit (10%)	$120,000	$180,000
Escalation Contingency (40%)	$480,000	$720,000
Construction Contingency (30%)	$360,000	$540,000
Total Anticipated Project Cost	$2.2M	$3.2M

5.5 Option C – Existing Tanks

Based on a visual inspection of the exterior and the operator's description of the interior condition, the existing tanks appeared to have some remaining useful life. This could likely be further extended by renewing the coatings. Retrofitting the foundation system to provide seismic capacity might also be feasible. Creating a reliable all-weather access to the tanks would be more expensive than the other options considered, due to the steep slopes and need to obtain additional property rights. Renewal of the piping which supplies the reservoir would also add expense. As such, this option was not considered further.

5.6 Option Comparison and Next Steps

Any of the three options described above could be viable upgrades for addressing the concerns with the existing tanks. The lowest cost option is Option A, a gravity system with tanks located in Mount Parke Regional Park. Option B, a pumped system with new tanks near the existing water treatment plant, could also be viable but is expected to have higher costs. Option C, correcting the issues with the existing tanks, is expected to be the most expensive option primarily because of the difficulties in improving access to the tanks. Based on these considerations, Option A is the preferred option to consider.

In order to move forward the tank replacement, a review of archaeological, geotechnical, and environmental constraints should be undertaken. A detailed review of available information should be conducted and/or daily usage monitored during peak demands to determine an appropriate design maximum day demand which can be used for tank sizing.

Should the anticipated costs of at least $1.5 million depending on the preferred option exceed available funding, the CRD could consider deferring this work since an external visual inspection suggests that the existing tanks may have useful life remaining. In this case, a detailed tank condition assessment should be conducted, and options to renew coatings evaluated. Options for improving capacity and resilience of the existing foundation system should also be conducted by qualified structural and geotechnical specialists. If this option is pursued, higher operation and maintenance costs will be incurred due to the access constraints and water leakage until such time as the tanks are replaced.

6 SUMMARY

The existing potable water storage tanks for the Surfside system have some corrosion, are very difficult to access for maintenance, are likely unable to resist seismic forces in case of an earthquake, and are connected to the customer base by pipes that are believed to have significant leakage. Two feasible upgrade options were considered, and it is expected that Option A for locating new tanks within Mount Parke Regional Park will provide the best value to the stakeholders. The anticipated costs for Option A are approximately $1.5 Million to install new shop fabricated steel tanks of similar size to the existing, or $2.4 Million to install new bolted steel tanks which would be capable of storing adequate water for firefighting.

7 RECOMMENDATIONS

It is recommended that the CRD pursue siting of replacement tanks within Mount Parke Regional Park. If it is desired to defer this work, upgrades to the coatings and foundations of existing tanks should be considered.

The effectiveness of recent distribution pipe repairs should be reviewed by comparing water production with invoicing.

This report presents our findings regarding the Mayne Island Surfside Tanks Replacement Options.

Associated Engineering (B.C.) Ltd. Permit to Practice 1000163

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Project Manager

SD/JM/ia

Attachments:

- Appendix A – Site Photos

APPENDIX A – SITE PHOTOS

Figure A-1 WTP Pumps

Figure A-2 WTP Clearwell

Figure A-3 Pressure Control Station

Figure A-4 Fire Hydrant

Figure A-5 Existing Reservoir

Figure A-6 WTP Backwash Tanks

Figure A-7 WTP PRV

Figure A-8 WTP Valves

Figure A-9 Existing Reservoir #2

Figure A-20 Reservoir Fill/Discharge

Figure A-31 Reservoir #2 Corrosion

Figure A-12 Existing Reservoir Antenna/Transmitter

Figure A-13 Existing Reservoir Concrete Saddles

Figure A-14 WTP Arsenic Removal Process

Figure A-15 Existing Reservoir Side Profile

Figure A-16 Existing Reservoirs

Figure A-17 Existing Wellhouse

Figure A-18 Existing WTP

Figure A-19 Existing WTP Pump Control Panel

THURBER ENGINEERING LTD.

November 9, 2023 File No.: 41872

Capital Regional District
479 Island Highway
Victoria, B.C.
V9B 1H7

Attention: Katarina Konicek, PMP, P.Eng.

SURFSIDE PARK ESTATES WATER SYSTEM, MAYNE ISLAND, B.C.
ROCKFALL HAZARD ASSESSMENT – REVISION 1

Dear Katarina,

At the request of the Capital Regional District (CRD), Thurber Engineering Ltd. (Thurber) has completed a desktop study to review the rockfall hazard to a proposed water storage location on Mayne Island, B.C. This letter provides the results of our desktop study and provides a discussion of the rock fall hazard and some potential protection measures. This revision supersedes our letter issued November 8, 2023.

It is a condition of this letter that the performance of Thurber's professional services is subject to the attached Statement of Limitations and Conditions.

1. BACKGROUND

We understand that the CRD is looking to present water system upgrade options to the Local Service Committee for their water storage within the Surfside Park Estates Water System on Mayne Island, B.C. A potential water storage tank location has been identified approximately 230 m east of the end of Wood Dale Drive within Mount Parke Regional Park. The site is located at the base of a talus slope and steep bedrock cliff, which are about 40 m and 85 m tall, respectively.

Golder completed a rockfall hazard study in 1999, which addressed the rockfall hazard presented by the steep rock cliff above Wood Dale Drive, west of the project site. The Golder study indicated that there are potentially unstable blocks of rock on the crest and face of the cliff, which are likely to fall in the future due to natural processes. This is verified by the presence of talus at the base of the cliff. The report provided a hazard area map and recommended a series of potential protection measures that could be constructed to protect the lots along Wood Dale Drive. This same cliff band extends eastward above the proposed project site.

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2. DESKTOP STUDY

The elements reviewed as part of the desktop study are summarized in the following subsections. As requested, a site reconnaissance has not been conducted by Thurber at this time.

2.1 Geology

The bedrock geology of Mayne Island is characterized by the Nanaimo Group, a conglomerate unit comprising boulders, cobbles and pebbles. The project site is bound to the north by a 50 m to 85 m tall cliff band with a 40 m tall talus slope at its base. The talus extends linearly about 90 m from the base of the cliff. Photographs of the site provided by CRD and Associated Engineering (AE) indicate that the proposed water storage site is relatively flat, with an excavation face into the conglomerate bedrock at the north end of the site. Talus is visible in the forest north of the site, including large, moss covered boulders that appear to be up to about 3 m in diameter.

2.2 LiDAR Analysis

The report titled “The Assessment of Rockfall Hazard at the Base of Talus Slopes, 1993” by S.G. Evans and O. Hungr, indicates that talus slopes generally form between 32° and 38° below the apex (i.e., the base of the rockfall source) with small debris accumulated near the apex and large debris accumulating near the toe of the talus slope. Evans and Hungr defined the rockfall shadow as a zone where large boulders come to rest beyond the toe of the talus slope. The report indicated that an empirical minimum shadow angle of 27.5° is suggested from rockfall vulnerability studies (i.e., a 27.5° or 1.9H:1V line projected downward from the bottom of the bedrock outcrops).

The rockfall hazard at the proposed site was assessed using publicly available LiDAR data, obtained from the B.C. online LiDAR database. Representative cross sections were cut through the project site and on either side of the site to assess whether the proposed location is within the talus zone or the rockfall shadow of the cliff band.

3. HAZARD ASSESSMENT AND DISCUSSION

Based on the results of our desktop study, the proposed water tank location is within the rockfall shadow of the cliff band. Figures 1, 2 and 3 show the location of the project site with respect to the cliff, talus zone and rockfall shadow. It should be noted that these preliminary lines are based on a desktop study only and could possibly be refined after a site reconnaissance and rockfall trajectory analyses.

Generally, geotechnical approaches to geohazard problems such as rockfall include avoiding the hazard, protection measures, and/or mitigation measures. Protection measures are implemented to protect structures from a rockfall that will occur. Examples of protection measures include soil or rock berms, walls and rockfall fences. Mitigation measures are implemented to reduce the probability of a rockfall event occurring. Examples of mitigation measures include rock scaling and rock bolting. In general at this location, avoidance would be the more practical measure. Avoiding the rockfall hazard would mean establishing sufficient setbacks from the hazard zone such that the risk to the water tanks and individuals would be sufficiently low and considered acceptable. The tanks should be located at least on the south side of the road, which delineates the rockfall shadow zone as shown in Figures 1 and 2.

If the water tanks are to be located within the rockfall shadow zone, rockfall protection measures would be the most practical and economic option. The following sections discuss some potential different protection options.

3.1 Rockfall Protection Options

The selection of the most suitable rockfall protection measure would depend on the size and impact velocity of the boulders, the available space and the construction and installation costs. Periodic maintenance will be required for all rockfall protection systems, which include clearing the catchment area of rockfalls and fallen trees and repairs to the structures.

High level estimates of costs are provided for comparison options only. Cost estimates assume that the water storage structure will comprise two 4 m tall and 4 m diameter tanks. Detailed design of the rockfall protection measure is required to determine more accurate costs. This includes a site reconnaissance to estimate the size and frequency of rockfall events and a rockfall analysis. This information is crucial in determining the geometry of the protection measure, and in turn the cost.

3.1.1 Soil or Rock Berm

A soil or rock berm is an effective rockfall protection measure, provided the required space is available. Soil berms are typically constructed from granular materials, which can be sourced on- or off-site. The height and width of the barrier depends on the size and trajectory of the boulders it is designed to retain. The drawback to berms as a rockfall protection measure is the amount of space required. Berms require a width of two to three times the height of the berm and a catchment area of at least several metres.

Depending on the actual size and specific location of the water storage structure it may also be possible to design a rockfall deflection berm to direct rockfall around the structure.

Based on experience with recent projects, the cost to build a soil or rock berm is in the order of $60 per cubic meter. For a 4 m tall and 20 m long berm, the estimated cost is in the order of $60,000. It may be possible to use the local talus material to construct the berm, if the existing material is a suitable size, which would help to reduce the construction costs.

3.1.2 Modular Block Wall

A modular block or gabion basket wall is an effective rockfall protection measure, with a smaller footprint and cross-sectional area than a berm. Depending on the size and velocity of the anticipated boulders it is expected to retain, the modular block wall may be reinforced or unreinforced. Where rockfall is expected to have a kinetic energy of less than about 500 kJ, the modular block wall could possibly be unreinforced. Reinforcement comprising of a high tensile strength cable or back to back walls with geogrid is typically required for rockfall with a kinetic energy above about 500 kJ. A modular block or gabion basket wall would require a catchment width of at least several metres. The height of the barrier would depend on the size of the rockfall it is designed to retain.

A single modular block wall could cost in the order of $1,000 per square meter of wall face. For a 4 m tall modular block wall, the estimated cost is in the order of $110,000. We estimate that cable reinforcement could increase the cost by about 10% to 20% and back to back walls would be about double the cost.

3.1.3 Rockfall Fence

Rockfall fences could be designed for rockfall with kinetic energies in the range of 650 kJ to 3,000 kJ. Rockfall fences are designed to contain falling rock by significantly deforming to dissipate the rock's energy. The fence comprises a net that is suspended from posts and cables which are anchored into the ground and requires a minimum length of about 25 m for installation. The technical specifications of the fence components depend on the size and velocity of the expected rockfall.

The cost of the fence materials is estimated to be about $600 to $800 per linear meter. Installation costs would be in the order of $2,500 per linear meter. The estimated cost for a 4 m tall rock fall fence is in the order of $110,000. There are several local suppliers that could be contacted for high level pricing and to assess the feasibility of installing the systems.

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- Geobrugg
- Trumer Schutzbauten
- Macafferri

4. FURTHER WORK

If moving the location of the water storage structure is not considered practical, it is recommended that a rockfall assessment be completed as part of the design phase. The assessment would determine a more reliable required setback distance if the water tank location could be adjusted and provide design options for appropriate protection measures. The work would include completing a site reconnaissance to determine the size of pre-existing rockfall on site and the frequency of occurrence and a detailed rockfall trajectory analysis using commercial software programs such as Rocfall2 or similar. This analysis would estimate the rockfall energy at impact and would allow the preliminary design of potential rockfall protection options.

5. CLOSURE

We trust this information meets your present needs. If you have any questions, please contact the undersigned.

Yours truly,
Thurber Engineering Ltd.
Stephen Bean, M.Eng., P.Eng.
Review Engineer

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. M. AUSTIN
55428
2023-11-09

Thurber Engineering Ltd.
Permit to Practice #1001319

Dominique Austin, P.Eng.
Geotechnical Engineer

Attachment

- Statement of Limitations and Conditions
- Figure 1 – Plan View - Ortho imagery
- Figure 2 – Plan View – LiDAR
- Figure 3 – Cross Sections

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STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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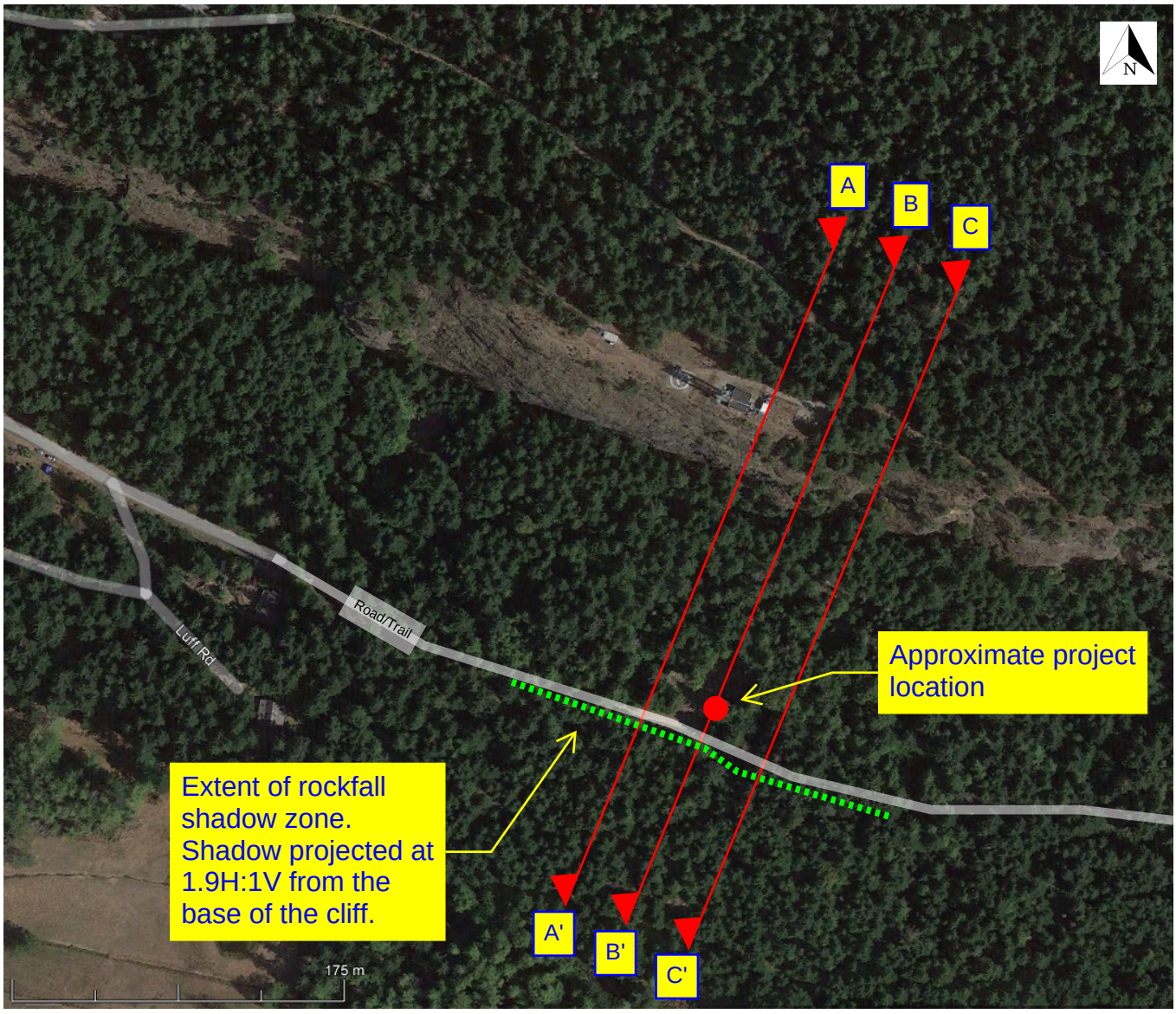

Figure 1 - Site Plan View - Orthoimagery

Section lines correspond to cross sections shown in Figure 3.

THURBER

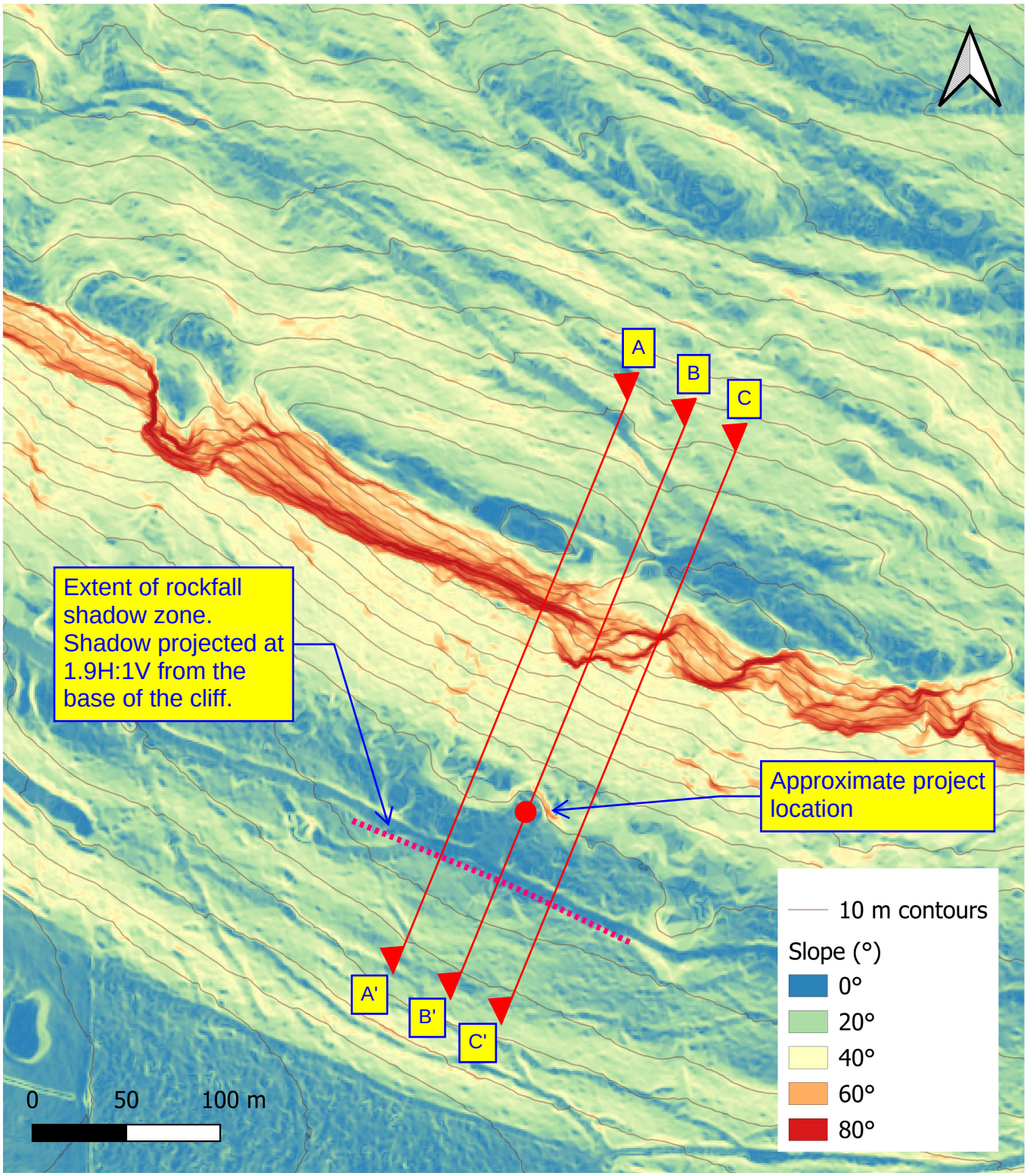

Figure 2 - Site Plan View - LiDAR

Section lines correspond to cross sections shown in Figure 3.

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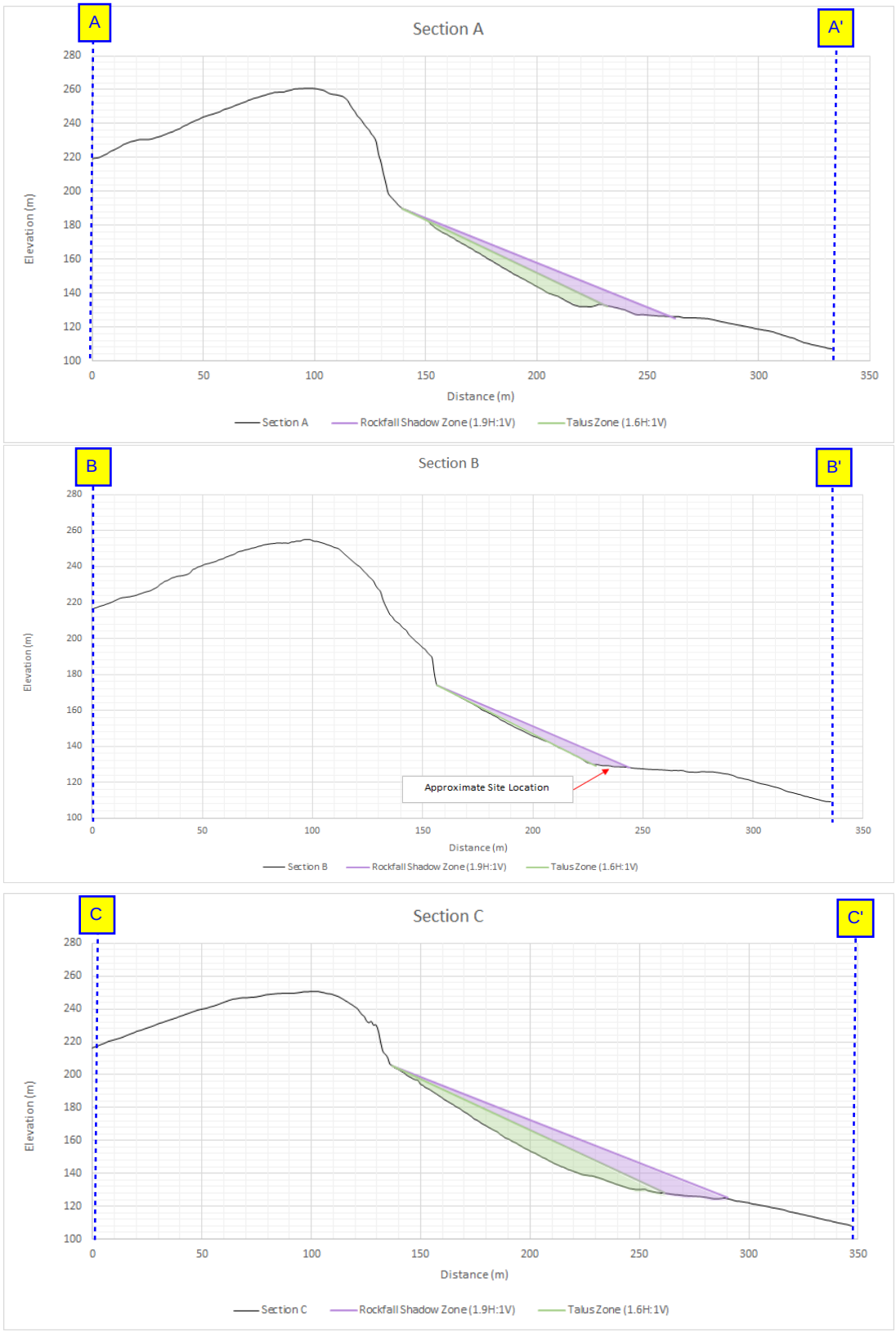


Figure 3 - Talus and Rock Fall Shadow Zones

Matrix of Elector Approval Processes

CRITERIA	PETITION	ALTERNATIVE APPROVAL PROCESS (AAP)	ASSENT VOTING (REFERENDUM)
Legislation	LGA s. 337 – EA services LGA ss. 347, 407, 408 CC s. 212 (4) to (6)	LGA s. 345	LGA Part 4
Length to complete[1]	Up to 4 months	Up to 7 months	Up to one (1) year
Approx. Cost of Elector Approval Method	$500 - $3,000 *for the mailing and delivery of petition letter/form*	$1,500 - $10,000 *for paid advertising*	$70,000 + *for paid advertising and 3 days of voting*
Format	Signed Petition per property	Signed Elector Response form	Secret Ballot
Success is…	Petition must be signed by the **owners of at least 50% of the parcels** that would be subject to the local service tax, and the persons signing must be the **owners of parcels that in total represent at least 50% of the assessed value of land and improvements** that would be subject to the local service tax	When the number of elector response forms submitted by the AAP deadline **is less than the 10% threshold**	When a **majority** of the votes cast are in favour *Majority = 50% plus 1*
Failure is….	Receiving an <u>insufficient value</u> (less than 50% parcels and 50% of assessed values) of signed petitions by the <u>requested</u> response deadline	When the number of <u>verified</u> elector response forms submitted by the AAP deadline reaches or exceeds the 10% threshold	Less than a majority of the votes cast are in favour

[1] Calculation is based on a START date of either 1) date petition letter is distributed or 2) date that CRD Board gives 3rd reading of Bylaw

Matrix - Participating Area Approval Processes

CRITERIA	PETITION	ALTERNATIVE APPROVAL PROCESS (AAP)	ASSENT VOTING (REFERENDUM)
Administrative Pros	Can be administered before a Bylaw is drafted Only one petition response per property	Requires less resources than assent voting With 2/3 Board approval, AAP is to be conducted for the ENTIRE PROPOSED SERVICE AREA to increase the 10% threshold	Cost-efficient to run assent voting at same time as General Local Elections (next in 2026)
Administrative Cons	Most time intensive approval process for **program area staff** to administer and communicate with participants in the service May require an open house or "petition signing" event	Must wait for Inspector Approval before proceeding with AAP In smaller service areas, a 10% threshold may be too small for an AAP to be successful (i.e. 100 estimated voters results in a threshold of 10 received responses) If unsuccessful, bylaw must be abandoned, or ASSENT VOTING must be held within 80 days of AAP response deadline	Would have a major impact on operations and may require additional resources to conduct (i.e. contracted staff and auxiliary) Very expensive to publish all statutory notices as it will include call for scrutineers for and against the question
Voter Pros	All property owners are directly notified of petition Property owners are given a number of weeks to consider proposal and respond by the requested response date	Voters have at least 30 days to participate by submitting a signed Elector Response Form May submit form electronically by email	Most democratic with majority of voters deciding outcome (voters = property owners and tenants)
Voter Cons	Only one petition response per property When more than one owner on title, signatures from the majority of owners on title is required	Notification of AAP is indirect with one statutory in newspapers and one posted on CRD Public Notices webpage Additional communication methods may be considered	Limited to advance and general voting opportunities (i.e. 3 opportunities within a 10-day period) or must apply to vote by mail ballot Considered unfair by landlord property owners as tenants may vote on matters impacting tax requisition

June XX, 2025

File:

Dear Property Owner(s) in the Surfside Park Estates Water Service area,

RE: LOAN AUTHORIZATION PETITION FOR SURFSIDE PARK ESTATES WATER SERVICE AREA

The Surfside Park Estates water system is in need of upgrades and current capital reserves are insufficient to cover the projected capital costs of $2,000,000. This project includes the planning, design and construction of the infrastructure upgrades and replacements. Key components include equipment and material purchases, watermains and storage tank replacements.

If property owners in the Surfside Park Estates Water Service would like the CRD to finance the costs of the works on their behalf, and undertake the capital works necessary to upgrade the water system, a form of public petition is enclosed for property owners to complete.

If a property is owned by more than one person, the *Local Government Act* requires that a majority of the owners must sign the petition and return it to the CRD in order for it to be counted in the affirmative. For the petition to be successful, the owners of at least 50% of the properties must consent and those properties must represent at least 50% of the net taxable value in the service area. Petitions that are not returned will be counted in the negative. It is important to note that the borrowing and taxation will apply to all properties in the service area (not just the property owners who voted yes).

Before completing and returning the petition, property owners are encouraged to review relevant background information provided at http://www.crd.ca/surfside-ws

Should you have question or concerns please contact Natalie Tokgoz, Manager of Water Distribution Engineering and Planning by email at ntokgoz@crd.bc.ca.

Please return the enclosed petition, in the envelope provided, to the CRD no later than August 29, 2025.

Sincerely,

Alicia Fraser
General Manager
Infrastructure and Water Services

Attachments: 3

Surfside Park Estates Local Service Petition
FAQ
Surfside Park Estates Water Service Establishment Bylaw No. 1, 2003

cc: Ted Robbins, Chief Administrative Officer
Kristen Morley, General Manager, Corporate Services

AF:mm

To: Capital Regional District Board
Attn: Infrastructure and Water Services
479 Island HWY Victoria, BC, V9B 1H7
Email: iwsadministration@crd.bc.ca

PETITION

TO AUTHORIZE THE PROPOSED BORROWING OF TWO MILLION DOLLARS ($2,000,000) FOR INFRASTRUCTURE UPGRADES IN THE SURFSIDE PARK ESTATES WATER SERVICE AREA

Petition deadline: August 29, 2025

I/We do hereby petition the Capital Regional District (CRD) to borrow monies for capital project works in the **Surfside Park Estates Water Service** (map of area enclosed) on Mayne Island within the Southern Gulf Islands Electoral Area.

I/We understand and agree that:

1. The proposed borrowing is in relation to the service established under the Capital Regional District Bylaw Bylaw No. 3087, "Surfside Park Estates Water Service Establishment Bylaw No. 1, 2003;
2. The estimated total amount of the proposed borrowing is up to $2,000,000;
3. The purpose of this proposed borrowing is to complete the required capital works, facilities and equipment necessary to upgrade the water system;
4. The maximum term for which debentures for the proposed borrowing will be issued is 25 years; and
5. The annual costs of the debt related to proposed borrowing will be recovered through annual tax requisition from all the taxable folios (currently there are 105 folios).

Legal Description of property:

[Insert Legal Description]

Mailing Address:

I/We am/are the Registered Owner(s) of the above noted property:

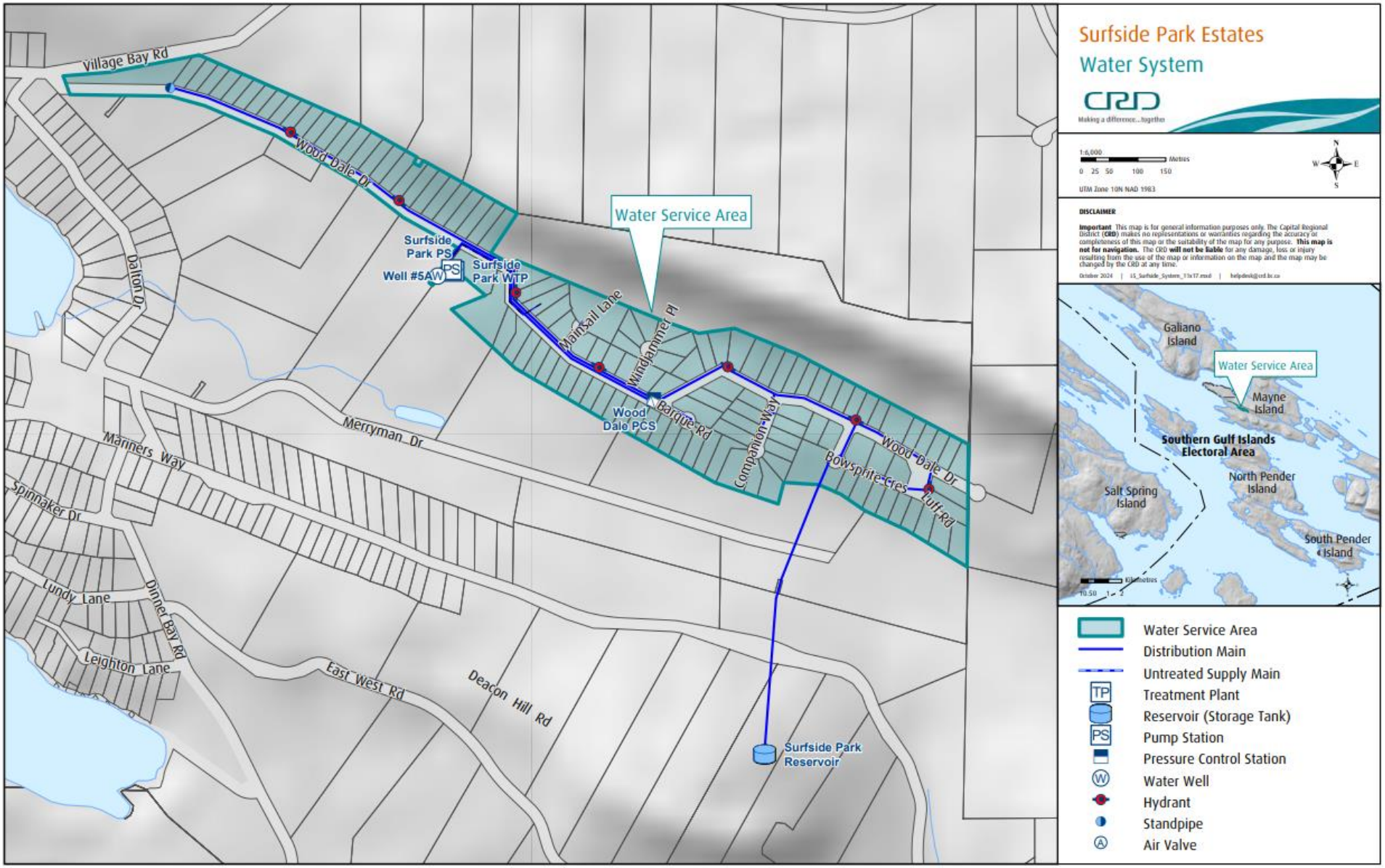
[Insert Owner's Name]		
Full Name - Owner on Title	Signature	Date
[Insert Owner's Name]		
Full Name - Owner on Title	Signature	Date
[Insert Owner's Name]		
Full Name - Owner on Title	Signature	Date

Please note: Where more than one person is the registered owner of a lot, the signatures of a MAJORITY of the owners are required.
If the owner is an incorporated body (society, incorporated business, etc.) document(s) verifying signing authority for the corporation are required.

A map identifying the Surfside Park Estates Water Service is on the back page of this petition.

Appendix C

To: Capital Regional District Board
Attn: Infrastructure and Water Services
479 Island HWY Victoria, BC, V9B 1H7
Email: iwsadministration@crd.bc.ca



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BYLAW NO. 3087

Surfside Park Estates Water Service Establishment Bylaw No. 1, 2003

Consolidated for Public Convenience

(This bylaw is for reference purposes only)

ORIGINALLY ADOPTED NOVEMBER 14, 2003
(Consolidated with Amending Bylaw 3246)

For reference to original bylaws or further details, please contact the Capital Regional District,
Legislative Services Department, 625 Fisgard St., PO Box 1000, Victoria BC V8W 2S6
T: (250) 360-3127, F: (250) 360-3130, Email: legserv@crd.bc.ca, Web: www.crd.ca

CAPITAL REGIONAL DISTRICT

BYLAW NO. 3087

****

A BYLAW TO ESTABLISH A SERVICE AREA WITHIN THE ELECTORAL AREA OF SOUTHERN GULF ISLANDS FOR THE PURPOSES OF OPERATING A WATER SUPPLY SYSTEM

****

WHEREAS:

A. The Board of the Capital Regional District may, by bylaw, establish and operate a service under the provisions of Section 800 of the *Local Government Act*.

B. Assent of the electors of the service area is required pursuant to Section 801.2 of the *Local Government Act.*

NOW THEREFORE, the Board of the Capital Regional District enacts as follows:

1. The service being established, and to be operated, is the supply, conveyance, treatment, storage and distribution of water to be known as the Surfside Park Estates Water Service.

2. The boundaries of the service area are shown in heavy outline on the plan attached to this Bylaw as Schedule "A".

3. Only the Electoral Area of the Southern Gulf Islands includes a participating area for this service.

4. The annual costs for the service may be recovered by one or more of the following:

   (a) by the requisition of money under Section 806 of the *Local Government Act* to be collected by a property value tax to be levied and collected on land and improvements within the service area;

   (b) by way of an annual parcel tax;

   (c) by the imposition of fees and charges to be imposed by bylaw under Section 797.2 of the *Local Government Act;* or

   (d) by revenues raised by way of agreement, enterprise, gift, grant or otherwise.

5. The maximum amount that may be requisitioned for the service will be the greater of:

   (a) ($79,500) seventy-nine thousand five hundred dollars; or

   (b) an amount equal to the amount that could be raised by a property value tax rate of ($13.97) thirteen dollars and ninety-seven cents per ($1,000) one thousand dollars which, when applied to the net taxable value of land and improvements within the service area, will yield the maximum amount that may be requisitioned under Section 806.1 of the *Local Government Act* for the service.

6. This Bylaw may be cited as the “Surfside Park Estates Water Service Establishment Bylaw No. 1, 2003”.

READ A FIRST TIME THIS	13th	DAY OF	August	2003
READ A SECOND TIME THIS	13th	DAY OF	August	2003
READ A THIRD TIME THIS	13th	DAY OF	August	2003
APPROVED BY THE INSPECTOR OF MUNICIPALITIES THIS	12th	DAY OF	September	2003
RECEIVED THE ASSENT OF THE ELECTORS UNDER SECTION 801.2 OF THE *LOCAL GOVERNMENT ACT* THIS	8th	DAY OF	November	2003
ADOPTED THIS	12th	DAY OF	November	2003

Original Signed

CHAIR

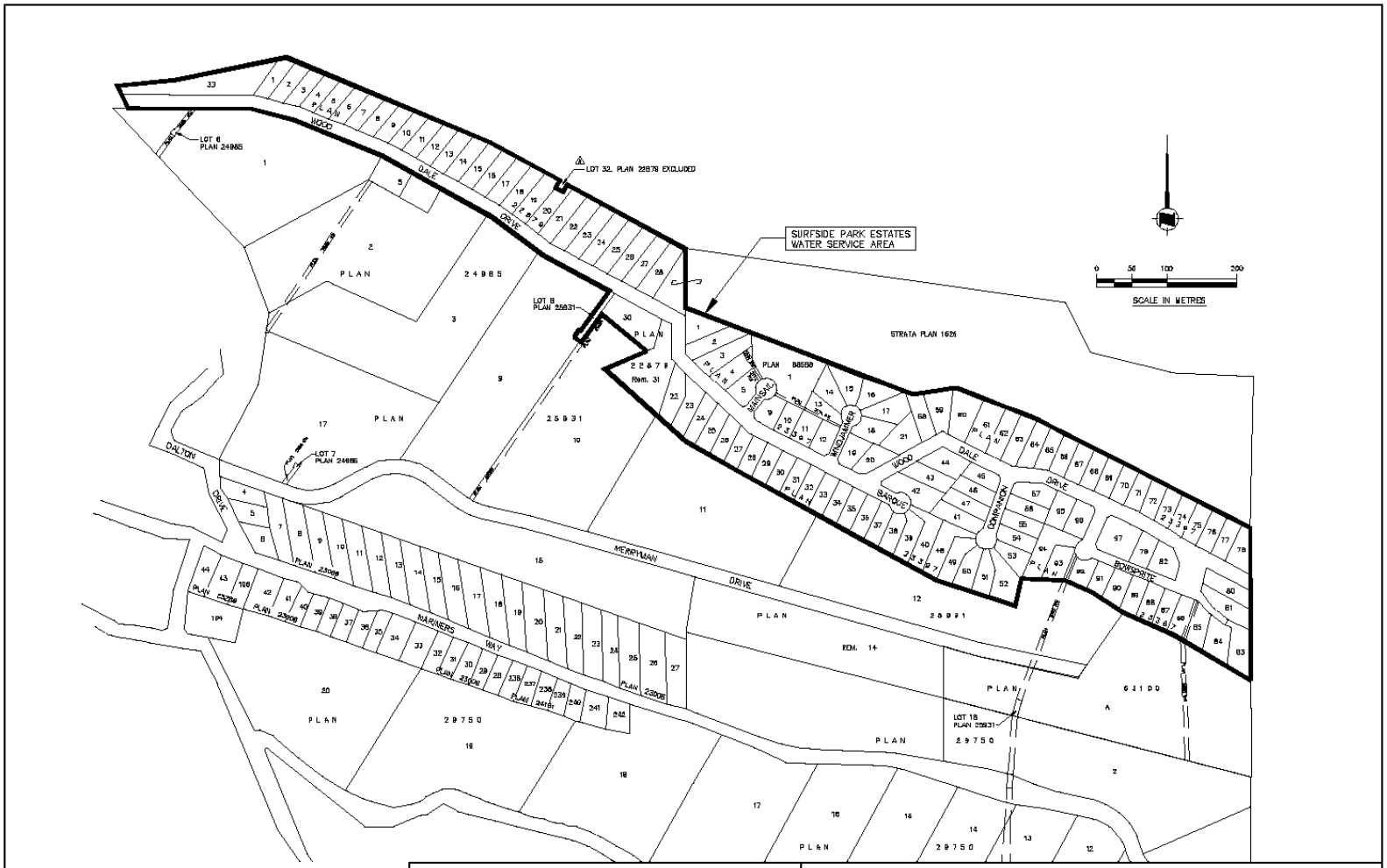
Original Signed

SECRETARY

FILED WITH THE INSPECTOR OF MUNICIPALITIES THIS 14th DAY OF November 2003

Appendix C

(Bylaw 3246)



CAPITAL REGIONAL DISTRICT

Environmental Services

SURFSIDE PARK ESTATES WATER SYSTEM

SCHEDULE 'A' TO BYLAW 3246
SURFSIDE PARK ESTATES WATER SERVICE
ESTABLISHMENT BYLAW No. 1, 2003,
AMENDMENT BYLAW NO. 1, 2005

DESIGNED	DRAWN	SCALE	CHECKED	APPROVED	DATE	DWG. NO.	REV.	SHT OF
G.H.	M.M.	AS SHOWN			10/12/04	27-D222-1A	3	1 OF 1

Making a difference...together

REPORT TO SURFSIDE PARK ESTATES WATER SERVICE COMMITTEE
MEETING OF THURSDAY, JUNE 26, 2025

SUBJECT **Surfside Park Estates Water Service 2025-2029 Capital Plan Amendment**

ISSUE SUMMARY

Additional funds are required to complete Capital Project #25-02 – Replacement of Ultraviolet (UV) Equipment at the Surfside Water Treatment Plant (WTP).

BACKGROUND

The Existing UV equipment at the Surfside WTP is at the end of its service life and requires repair components that are no longer supported by the vendor. Given the critical nature of this equipment, the 2025 capital plan was developed to include $7,500 for replacement of the existing Hallett 30 UV System. Earlier this year, the existing reactor failed, resulting in the need to expedite the project. Model upgrades and cost escalation that has occurred over the last year has resulted in the replacement Hallet 750PN unit exceeding the price originally budgeted. Furthermore, the recent changes to the new model require additional Supervisory Control and Data Acquisition (SCADA) integration and components to fully realize the remote monitoring and control capabilities of this model. Staff are requesting a budget increase for Capital Project #25-02 of $7,500 to $15,000 to cover the additional costs. This increase would be funded within the existing capital plan in 2025 by deferring a portion of Capital Project #24-02 – Source Water Surveillance into 2026. A revised 2025-2029 Capital Plan is included as Appendix A for reference.

ALTERNATIVES

Alternative 1
That the Surfside Park Estates Water Service Committee recommends that the Electoral Areas Committee recommends to the Capital Regional District Board:

That the Surfside Park Estates Water 2025 - 2029 Capital Plan be amended to:

1. Increase the 2025 project budget for the Replacement of Ultraviolet (UV) Equipment at the Surfside Water Treatment Plant (WTP) (25-02) by $7,500 from $7,500 to $15,000, funded from Capital Reserve Fund.
2. Defer $7,500 of project budget for the Source Water Surveillance project (24-02), funded from Capital Reserve Fund, from 2025 to 2026.

Alternative 2
That this report be referred back to staff for additional information.

IMPLICATIONS

Financial Implications

Additional funding of $7,500 is required to complete the integration of the new UV equipment. This funding can be reallocated from Capital Project #24-02 – Source Water Surveillance in 2025 by deferring $7,500 of this project budget to 2026.

This would align with the anticipated implementation of a similar project for another local water service on Mayne Island, potentially benefiting from economies of scale.

Table 1 below summarizes the proposed changes and the net impact on the Capital Reserve Fund in 2025 and 2026. The Capital Reserve Fund has an estimated balance of $49,039 at the end of 2026 which appears sufficient to cover the additional $7,500 funding required.

Table 1:

Replacement of Ultraviolet (UV) Equipment Project (25-02)	
Total Approved Project Budget	$7,500
Total Costs to Complete	$15,000
Additional Funding Required	$7,500
Additional Funding Source:	
Capital Reserve Fund (CRF)	$7,500
Source Water Surveillance Project (24-02)	
Deferral of $7,500 budget from 2025 to 2026 (CRF Funded)	($7,500)
2025 Net Impact on CRF Balance	$0
2026 Impact on CRF Balance	($7,500)

Service Delivery Implications

UV disinfection is a critical stage in the water treatment process for the Surfside Park Estates water service. Not proceeding with the improvements could result in significant water quality risks.

CONCLUSION

A Capital Plan amendment is required to finish the integration of the UV Equipment at the Surfside Park Estates Water Treatment Plant. Funding for the additional fees is proposed to be provided by deferring other items within the Capital Plan.

RECOMMENDATION

That the Surfside Park Estates Water Service Committee recommends that the Electoral Areas Committee recommends to the Capital Regional District Board:

That the Surfside Park Estates Water 2025 - 2029 Capital Plan be amended to:

1. Increase the 2025 project budget for the Replacement of Ultraviolet (UV) Equipment at the Surfside Water Treatment Plant (WTP) (25-02) by $7,500 from $7,500 to $15,000, funded from Capital Reserve Fund.
2. Defer $7,500 of project budget for the Source Water Surveillance project (24-02), funded from Capital Reserve Fund, from 2025 to 2026.

Submitted by:	Joseph Marr, P. Eng., Senior Manager, Infrastructure Engineering
Concurrence:	Alicia Fraser, P. Eng., General Manager, Infrastructure and Water Services
Concurrence:	Nelson Chan, MBA, FCPA, FCMA, Chief Financial Officer, GM Finance & IT
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

ATTACHMENT

Appendix A: Revised 2025 Capital Plan

CAPITAL REGIONAL DISTRICT

5 YEAR CAPITAL PLAN

2025 - 2029

Service #: 2.667

Service Name: Surfside Park Estates (Mayne)

PROJECT DESCRIPTION				PROJECT BUDGET & SCHEDULE									
Project Number	Capital Expenditure Type	Capital Project Title	Capital Project Description	Total Project Budget	Asset Class	Funding Source	Carryforward from 2024	2025	2026	2027	2028	2029	5 - Year Total
23-01	Replacement	Alternative Approval Process	Undertake an alternative approval process to borrow funds to carry out water system improvements in future years.	$ 15,000	S	Res	$ 15,000	$ 15,000	$ -	$ -	$ -	$ -	$ 15,000
24-01	Replacement	Wood Dale Drive Water Main Replacement	Replace approximately 200 m of leaking water main along Wood Dale Drive.	$ 300,000	S	Debt	$ -	$ -	$ 300,000	$ -	$ -	$ -	$ 300,000
24-02	New	Source Water Surveillance	Construct source water surveillance for water quantity monitoring.	$ 20,000	E	Res	$ -	$ 12,500	$ 7,500	$ -	$ -	$ -	$ 20,000
25-01	Replacement	Water Storage Tank Replacement	Design and construction new water storage tank.	$ 1,700,000	S	Debt	$ -	$ 50,000	$ 1,250,000	$ 400,000	$ -	$ -	$ 1,700,000
25-02	Replacement	Replacement of UV Equipment	Existing UV equipment is at end of life and is needing repair parts which are no longer supported.	$ 15,000	S	Res	$ -	$ 15,000	$ -	$ -	$ -	$ -	$ 15,000
28-01	Replacement	Watermain Replacement Program	Replacement of select watermains within the distribution network to address leaks and reduce non revenue water.	$ 5,600,000	S	Debt	$ -	$ -	$ -	$ -	$ 50,000	$ 450,000	$ 500,000
													$ -
													$ -
													$ -
													$ -
													$ -
													$ -
													$ -
													$ -
													$ -
													$ -
													$ -
			Grand Total	$ 7,650,000				$ 92,500	$ 1,557,500	$ 400,000	$ 50,000	$ 450,000	$ 2,550,000

Making a difference...together

REPORT TO SURFSIDE PARK ESTATES WATER SERVICE COMMITTEE
MEETING OF THURSDAY, JUNE 26, 2025

SUBJECT **2024 Annual Report - Cover Report**

ISSUE SUMMARY

Per the *Drinking Water Protection Act*, a water supplier must prepare and make public, within 6 months of the end of the calendar year, an annual report. The Annual Report provides a summary of the Surfside Water Service for 2024.

BACKGROUND

The Surfside Park Estates Water System is located on the southwest side of Mayne Island in the Southern Gulf Islands Electoral Area and provides drinking water to approximately 70 service connections. Capital Regional District (CRD) is responsible for the operation and maintenance of the system and the overall quality of the drinking water provided to customers in the Surfside Water System.

RECOMMENDATION

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

Submitted by:	Jason Dales, B. SC., WD IV, Senior Manager, Wastewater Infrastructure Operations
Submitted by:	Joseph Marr, P. Eng., Senior Manager, Infrastructure Engineering & Planning
Submitted by:	Varinia Somosan, CPA, CGA, Senior Manager, Financial Services / Deputy CFO
Concurrence:	Glenn Harris, Ph.D., R.P.Bio., Acting General Manager, Parks, Recreation and Environmental Services
Concurrence:	Alicia Fraser, P. Eng., General Manager, Infrastructure and Water Services

ATTACHMENT(S)

Appendix A: 2024 Annual Report
Appendix B: 2024 Statement of Operations and Reserve Balances

Surfside Water System

2024 Annual Report

CRD | Drinking Water

Introduction

This report provides a summary of the Surfside Park Estates Water Service for 2024 and includes a description of the service, summary of the water supply, demand and production, drinking water quality, operations highlights, capital project updates and financial report.

Service Description

The community of Surfside is a rural residential development located on Mayne Island in the Southern Gulf Islands Electoral Area which was originally serviced by a private water utility. In 2003 the service converted to the Capital Regional District (CRD). The Surfside Water Service (Figure 1) area is made up of 127 parcels of which 105 parcels can be inhabited encompassing a total area of approximately 25 hectares. Of the 105 parcels, 70 were actively connected to the water system in 2024.

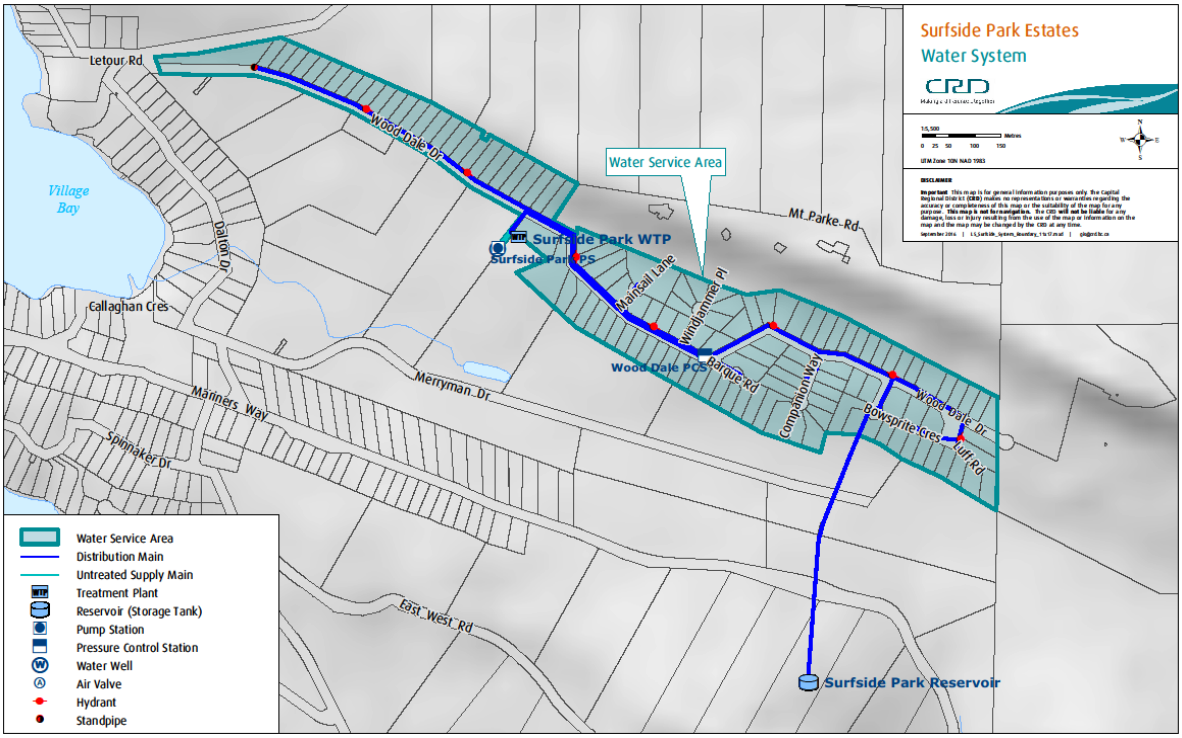


Figure 1: Surfside Park Estates Water Service

The Surfside water system is primarily comprised of:

- One groundwater well, related pumping and control equipment and building.
- Disinfection process equipment (filters, ultraviolet [UV] light and chlorine).
- Two steel storage tanks (total volume is 113 cubic meters).
- Distribution system (3,800 meters of water mains).
- Other water system assets: 70 service connections and water meters, five hydrants, three standpipes, 30 gate valves, one air release valve, Supervisory Control and Data Acquisition (SCADA) system and portable generator.

Water Supply

Groundwater supply monthly water levels are highlighted for 2024 in Figure 2. Groundwater levels for 2024 are 19% lower than the 5-year average. Aquifer levels are trending down, likely the result of water system leaks and ongoing drought in which the Province declared level 5 drought conditions for the Southern Gulf Islands for a third consecutive year.

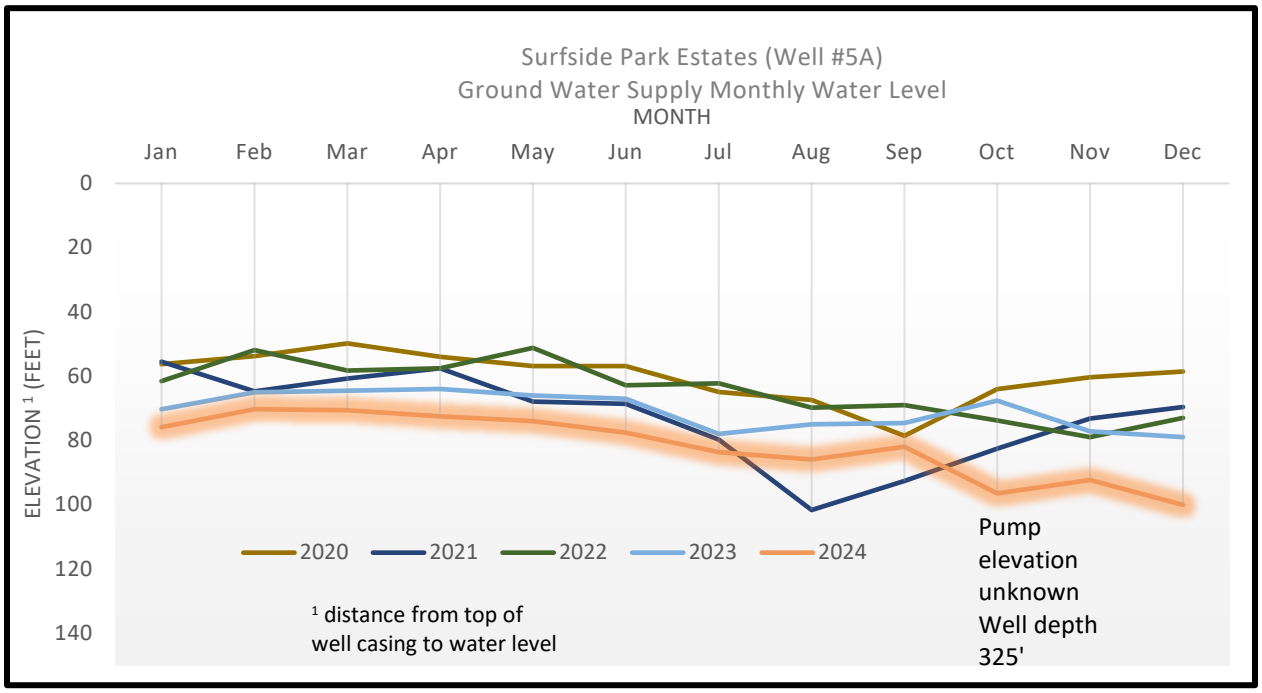


Figure 2: Surfside Park Estates Well #5A Groundwater Supply Monthly Water Level

Water Production and Demand

Referring to Figure 3, 17,069 cubic meters of water was extracted (water production) from the groundwater source (Well #5) in 2024; a 24% increase from the previous year and a 43% increase from the five-year average. Water demand (customer water billing) for the service totaled 5,348 cubic meters of water; a 18% increase from the previous year but right in line with the five-year average.

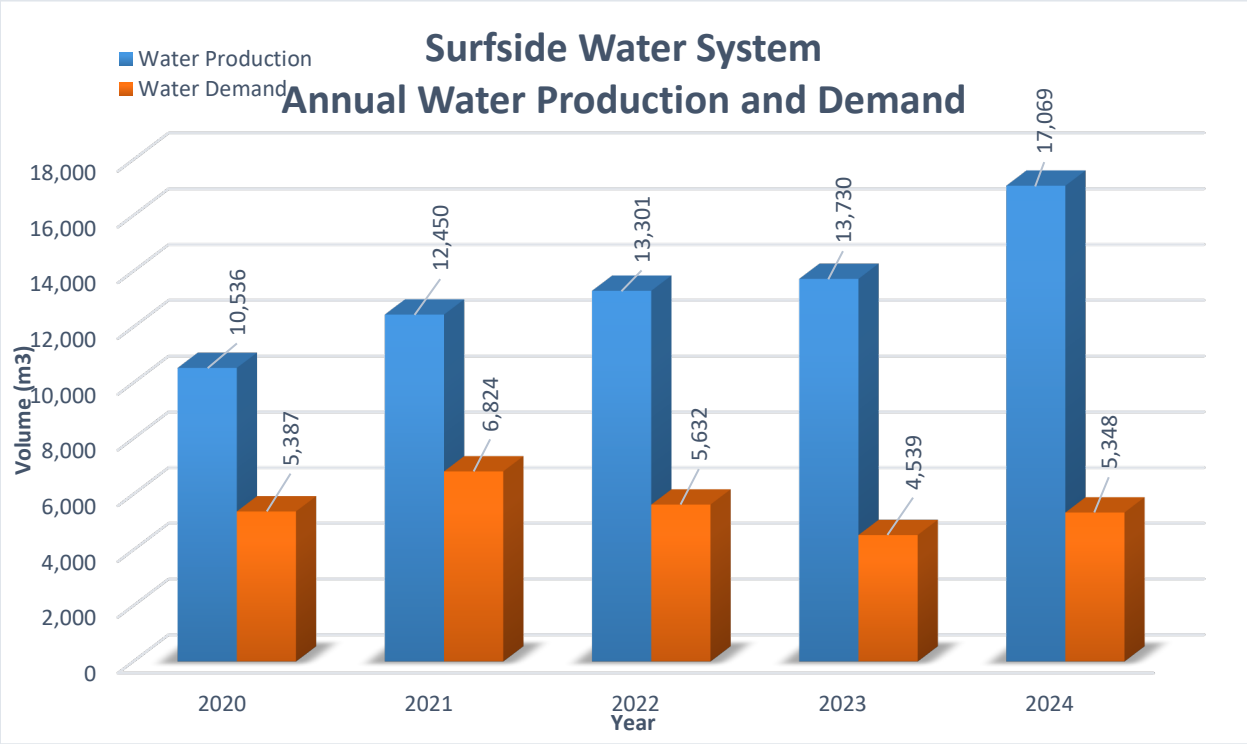


Figure 3: Surfside Park Estates Water Service Annual Water Production and Demand

The difference between annual water production and annual customer water demand is referred to as non-revenue water and can include water system leaks, water system maintenance and operational use (e.g. water main flushing, filter system backwashing), potential unauthorized use and fire-fighting use.

The 2024 non-revenue water (11,721 cubic meters) represents approximately 69% of the total water production for the service area. Approximately 264 cubic meters of water can be attributed to operational use so the remaining amount (67%) of non-revenue water is considered significant for a small water service. It is important to note that leak detection and repair efforts continue to be prioritized including a more robust and focused leak detection program.

Figure 4 below illustrates the monthly water production for 2024 along with the historical water production information for the previous four years. Typically, the monthly water production trend is greatest during the summer period (June to September). However, monthly water production for the most part is consistent throughout the year which indicates limited outdoor water use. The second half of 2024 including a major peak in November is a result of increasing water loss in the distribution system.

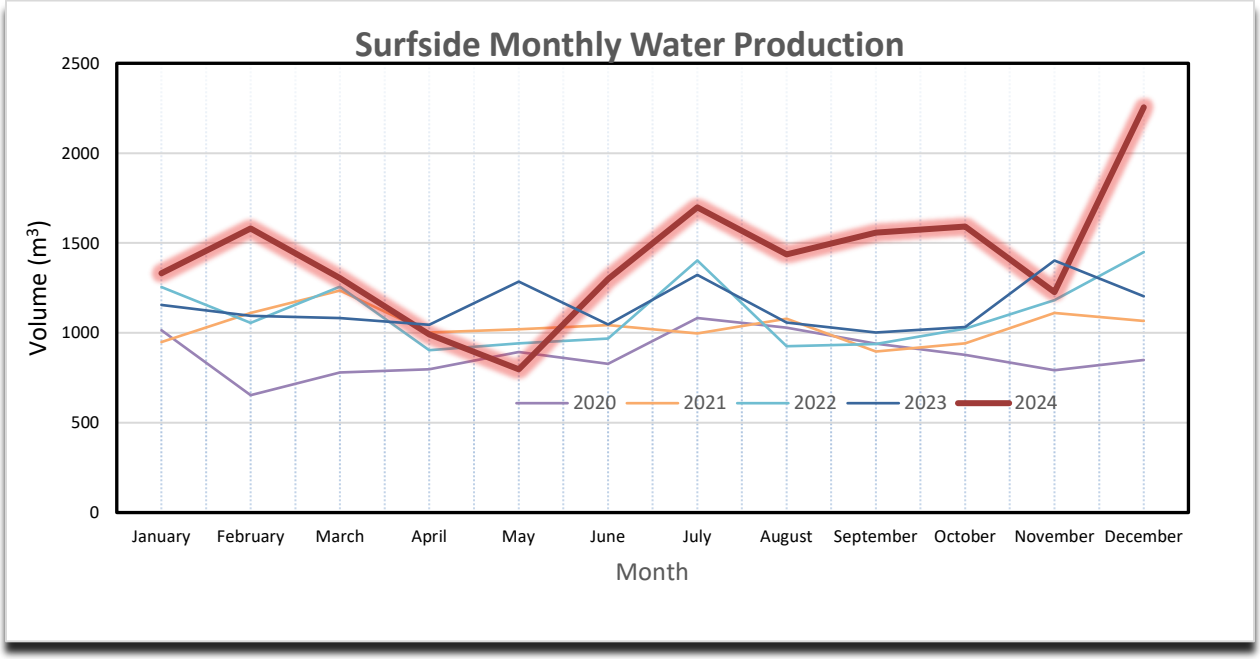


Figure 4: Surfside Park Estates Water Service Monthly Water Production

Drinking Water Quality

Staff completed the water quality monitoring program at Surfside based on the regulatory requirements and system specific risks. Samples were collected at regular frequencies from both the raw water as well as from several sampling stations at the treatment plant and in the distribution system. The samples were submitted for various analyses to the CRD's Water Quality Lab or to external laboratories for special analyses such as disinfection by-products or metals.

In general, the water system performed well in 2024 and supplied drinking water of good quality to its customers. None of the raw water samples tested positive for *E. coli* or total coliform bacteria in 2024. Also, all treated water samples tested negative for *E. coli* or total coliform bacteria in 2024. The raw water exhibited consistently high arsenic concentrations as well as elevated iron and manganese concentrations. A trend analysis confirmed that arsenic concentrations have slowly risen in Well #5 over the years. This, combined with exacerbating system leakage and high-water production, resulted in the arsenic filter media expiring more quickly and suddenly in 2024. On May 31, the system experienced an arsenic exceedance, and a water quality advisory was issued, which was resolved again on June 14. The system came close to a second exceedance in August but managed to avoid another advisory. To address the issue, CRD staff started testing weekly for arsenic levels and implemented a leak detection and repair program.

The data below provides a summary of the water quality characteristics in 2024:

Raw Water:

- Results from Well #5, the only water source, indicated that produced water contained no *E. coli* bacteria and no total coliform bacteria.
- The raw water continued to have naturally high concentrations of arsenic, iron and manganese. The arsenic concentration in the raw water ranged from 49.6 to 77.3 µg/L. That is slightly higher than in 2023. Manganese had a median concentration of 29.4 µg/L which is slightly lower than in 2023.
- The raw water turbidity was low with a median of 0.58 Nephelometric Turbidity Unit (NTU).
- The raw water was slightly hard (median hardness 27.1 mg/L (CaCO3). Annual median pH was 9.0 which is much higher than historically. This could be due to inaccuracies with the pH probe.

Treated Water:

- The treated water was safe to drink with no *E. coli* or total coliform bacteria in any sample.
- The treated water turbidity was very low with a median of 0.15 NTU.
- The arsenic concentration after treatment was generally below the maximum allowable concentration (MAC) of 10 µg/L. The annual median arsenic concentration was 5.7 µg/L. Between May 31 and June 14, the water system was on an arsenic related water quality advisory due to an exceedance in the treated water leaving the treatment plant. After a filter media change, subsequent extensive system flushing, and testing confirmed safe levels of arsenic throughout the system, the advisory was rescinded. When a similar event was narrowly avoided in August, CRD staff started weekly testing for arsenic levels and commenced a leak detection and repair program. This will hopefully slow the filter media expiring and allow the operators to better assess the remaining lifespan of the filter media.
- In June and December, manganese and iron concentrations in the treated water slightly exceeded the aesthetic objective in the Health Canada guidelines. This is not typical for this system and indicates that the effectiveness of the iron and manganese filtration system may also have been affected by the system leakage induced high flows.
- The annual average levels of the disinfection by-product total trihalomethanes (TTHM) were well below the MAC. Haloacetic acids (HAA) were not tested in 2024. Typically, when THM concentrations are low, HAA are also low.
- The free chlorine residual concentrations ranged from 0.05 to 1.49 mg/L in the distribution system indicating good secondary disinfection in most parts of the system except for some dead-end sections with higher water age.

Table 1 and 2 below provide a summary of the 2024 raw and treated water test results.

Water quality data collected from this drinking water system can be reviewed on the CRD website:

https://www.crd.bc.ca/about/data/drinking-water-quality-reports

Operational Highlights

The following is a summary of the major operational issues that were addressed by CRD Infrastructure & Water Services staff:

- Water treatment plant:
  - Well #5A pump electrical cable corrective maintenance.
  - Water Treatment Plant (WTP) extraction fan corrective maintenance.
  - WTP failed exterior lighting replaced.
  - Public Service Announcement (PSA) issued in May regarding elevated arsenic concentrations in the treated water system.
  - Multiple unbudgeted arsenic media replacements through 2024 due to high water loss.
  - Replacement of the water reservoir failed solar power battery system.
  - Corrective maintenance and repairs made on chemical feed pump .
  - Emergency callout due to hydro power outage in November and December. Standby generator was deployed due to the length of time the water treatment plant was without power.
- Significant leak detection efforts in the distribution system through 2024 including some testing requiring service disruptions.
- Water service line repair near Barque Road.
- Wooddale pressure regulating valve station - replacement of a failed isolation valve.
- Additional water sampling and water system flushing performed due to higher arsenic levels.

Capital Projects Update

The Capital Projects that were in progress or completed in 2024 include:

- System Review Project – A system review and tank replacement options assessment was completed in 2023 and in 2024 staff began reviewing options to fund these replacement works, including the alternative approval process (AAP) or petition process.

Financial Report

Please refer to the attached 2024 Statement of Operations and Reserve Balances.

Revenue includes parcel taxes (Transfers from Government), fixed user fees (User Charges), and interest on savings (Interest earnings), a transfer from the Operating Reserve Fund, and miscellaneous revenue such as late payment charges (Other revenue).

Expenses include all costs of providing the service. General Government Services include budget preparation, financial management, utility billing and risk management services. CRD Labour and Operating Costs include CRD staff time as well as the costs of equipment, tools, and vehicles. Debt servicing costs are interest and principal payments on long term debt. Other Expenses include all other costs to administer and operate the water system, including insurance, water testing and electricity.

The difference between Revenue and Expenses is reported as Net revenue (expenses). Any transfers to or from capital or reserve funds for the service (Transfers to own funds) are deducted from this amount and it is then added to any surplus or deficit carry forward from the prior year, yielding an Accumulated Surplus (or deficit). In alignment with Local Government Act Section 374 (11), any deficit must be carried forward and included in next year's financial plan.

For questions related to this Annual Report please email IWSAdministration@crd.bc.ca

Table 1

Table 1: 2024 Summary of Raw Water Test Results, Surfside Water System										
PARAMETER		**2024 ANALYTICAL RESULTS**				**CANADIAN GUIDELINES**	**2014-2023 ANALYTICAL RESULTS**			
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum	Range Maximum	≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum	Range Maximum
ND means Not Detected by analytical method used										
Physical Parameters										
Hardness as $CaCO_3$	mg/L	**27.1**	14	4.77	37.8	No Guideline Required	36.6	48	4.28	60.3
Turbidity	NTU	**0.575**	12	0.3	11		0.415	58	0.12	1.34
Water Temperature	deg C	**11.2**	16	9.6	12.2	15°C AO	6.8	202	5.2	21.6
pH	pH units	**9.05**	2	8.9	9.2	AO pH 7.0 -10.5	8.7	24.0	7.0	9.0
Total Organic Carbon	mg/L	**0.535**	4	0.48	0.69		0.69	29	0.44	4.89
Metals										
Aluminum	ug/L as Al	**17.00**	14	8.3	90.6	2900 MAC / 100 OG	13.7	48	7.2	65
Antimony	ug/L as Sb	**< 0.5**	14	< 0.5	< 2	6 MAC	< 0.5	48	< 0.5	< 2.5
Arsenic	ug/L as As	**54.05**	14	49.6	77.3	10 MAC	53.7	130	32.4	91.6
Barium	ug/L as Ba	**46.85**	14	19.9	56.5	1000 MAC	56.05	48	15.5	75.5
Beryllium	ug/L as Be	**< 0.1**	14	< 0.1	< 0.4		< 0.1	48	< 0.1	< 3
Bismuth	ug/L as Bi	**< 1**	14	< 1	< 4		< 1	45	< 1	< 5
Boron	ug/L as B	**1820.00**	14	1630	3260	5000 MAC	1740	48	846	2800
Cadmium	ug/L as Cd	**< 0.01**	14	< 0.01	< 0.04	7 MAC	< 0.01	48	< 0.01	0.135
Calcium	mg/L as Ca	**8.88**	14	1.73	12.5	No Guideline Required	11.95	48	1.54	19.6
Chromium	ug/L as Cr	**< 1**	14	< 1	< 4	50 MAC	< 1	48	< 1	21.4
Cobalt	ug/L as Co	**< 0.2**	14	< 0.2	< 0.8		< 0.2	48	< 0.2	30
Copper	ug/L as Cu	**1.68**	14	< 0.2	114	2000 MAC / ≤ 1000 AO	0.6	48	< 0.2	21.7
Iron	ug/L as Fe	**33.50**	14	17	1850	≤ 100 AO	25.2	47	< 10	155
Lead	ug/L as Pb	**0.42**	14	< 0.2	2.55	5 MAC	< 0.2	48	< 0.2	3.11
Lithium	ug/L as Li	**65.00**	14	60.4	84.6		64.2	29	50.4	83.8
Magnesium	mg/L as Mg	**1.18**	14	0.11	1.66	No Guideline Required	1.655	48	0.1	2.85
Manganese	ug/L as Mn	**29.40**	14	< 2	57.4	120 MAC / ≤ 20 AO	37.15	48	< 4	76.4
Molybdenum	ug/L as Mo	**< 1**	14	< 1	< 4		< 1	48	< 1	23
Nickel	ug/L as Ni	**< 2**	14	< 1	5.5		< 1	48	< 1	93
Potassium	mg/L as K	**1.66**	14	1.34	1.81		1.835	48	1.18	2.56
Selenium	ug/L as Se	**< 0.2**	14	< 0.1	0.74	50 MAC	< 0.1	48	< 0.1	1.24
Silicon	ug/L as Si	**7025.00**	14	5870	8190		7205	48	5770	10300
Silver	ug/L as Ag	**< 0.02**	14	< 0.02	< 0.08	No Guideline Required	< 0.02	48	< 0.02	< 10
Sodium	mg/L as Na	**130.50**	14	121	188	≤ 200 AO	124.5	48	13.1	182
Strontium	ug/L as Sr	**196.50**	14	45.9	265	7000 MAC	254.5	48	0.312	410
Sulfur	mg/L as S	**17.55**	14	15.4	27.9		17.6	45	11.7	28.7
Thallium	ug/L as Tl	**0.01**	14	< 0.01	< 0.04		< 0.01	45	< 0.01	< 0.05
Tin	ug/L as Sn	**< 5**	14	< 5	< 20		< 5	48	< 5	< 25
Titanium	ug/L as Ti	**< 5**	14	< 5	< 20		< 5	48	< 5	< 25
Uranium	ug/L as U	**< 0.1**	14	< 0.1	< 0.4	20 MAC	< 0.1	45	< 0.1	< 0.5
Vanadium	ug/L as V	**< 5**	14	< 5	< 20		< 5	48	< 5	< 25
Zinc	ug/L as Zn	**< 10**	14	< 5	23.8	≤ 5000 AO	< 5	48	< 5	185
Zirconium	ug/L as Zn	**< 0.1**	14	< 0.1	< 0.4		< 0.1	45	< 0.1	< 0.5
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	**< 1**	12	< 1	< 1		< 1	120	0	< 10
E. coli	CFU/100 mL	**< 1**	12	< 1	< 1		< 1	120	<1	< 10
Heterotrophic bacteria, 7 day	CFU/mL	Not analyzed in 2024					0	1	0	0
Parasites										
Cryptosporidium, Total oocysts	oocysts/100 L	Last tested in 2015				Zero detection desirable	<1	2	<1	<1
Giardia, Total cysts	cysts/100 L	Last tested in 2015				Zero detection desirable	<1	2	<1	<1

Table 2

Table 2: 2024 Summary of Treated Water Test Results, Surfside Water System										
PARAMETER	2024 ANALYTICAL RESULTS					CANADIAN GUIDELINES	2014-2023 ANALYTICAL RESULTS			
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum	Range Maximum	≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum	Range Maximum
ND means Not Detected by analytical method used										
Physical Parameters										
Hardness	mg/L as CaCO3	**25.3**	45	6.43	36.4		33.8	78	19	55.9
pH	pH units	**7.8**	3	6.8	9.2	AO pH 7.0 -10.5	8.5	26	7	8.9
Turbidity	NTU	**0.15**	12	0.1	0.65		0.15	118	0	1.8
Total Organic Carbon	mg/L	**0.585**	8	0.38	0.65		< 0.5	57	< 0.2	1.51
Water Temperature	deg C	**11.9**	178	3.6	20.1	15°C AO	7.75	1664	0.3	24.5
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	**< 1**	61	< 1	< 1	0 MAC	< 1	433	0	1
E. coli	CFU/100 mL	**< 1**	61	< 1	< 1	0 MAC	< 1	433	<1	< 1
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2024				No Guideline Required	< 10	44	<1	940
Disinfectants										
Disinfectants										
Chlorine, Free Residual	mg/L as Cl2	**0.58**	174	0.05	1.49		0.56	1676	0.04	2.06
Chlorine, Total Residual	mg/L as Cl2	**0.65**	3	0.39	1.09		0.59	1036	0.12	1.87
Disinfection By-Products										
Disnfection Byproducts										
Bromodichloromethane	ug/L	**3.4**	8	2.1	6.2		2.5	10	1.3	5.7
Bromoform	ug/L	**5.0**	8	2.6	18.0		5.8	59	< 0.1	15
Chloroform	ug/L	**1.6**	8	1.1	3.1		1.85	10	1.1	4.6
Chlorodibromomethane	ug/L	**6.7**	8	3.3	11.0		5.05	10	1.8	12
Total Trihalomethanes	ug/L	**17.5**	8	9.9	34.0	100 MAC	20	58	5.7	50
Haloacetic Acids (HAAs)										
HAA5	ug/L	Not tested in 2023				80 MAC	< 0.1	2	< 0.1	< 0.1
Metals										
Aluminum	ug/L as Al	**9.9**	45	< 3	42.2	2900 MAC / 100 OG	5	77	< 3	59
Antimony	ug/L as Sb	**< 1**	45	< 0.5	< 2	6 MAC	< 0.5	77	< 0.05	< 2.5
Arsenic	ug/L as As	**5.7**	45	< 0.2	21	10 MAC	4.455	172	< 0.09	31
Barium	ug/L as Ba	**34.6**	45	4	50.8	1000 MAC	44.6	77	3.2	69.9
Beryllium	ug/L as Be	**< 0.2**	45	< 0.1	< 0.4		< 0.1	77	< 0.1	< 3
Bismuth	ug/L as Bi	**< 2**	45	< 1	< 4		< 1	75	< 1	< 5
Boron	ug/L as B	**1900**	45	1460	2220	5000 MAC	1800	77	1200	2240
Cadmium	ug/L as Cd	**< 0.02**	45	< 0.01	< 0.04	7 MAC	< 0.01	77	< 0.01	< 0.1
Calcium	mg/L as Ca	**8.11**	45	2.4	11.7	No Guideline Required	10.3	78	5.91	18
Chromium	ug/L as Cr	**< 2**	45	< 1	< 4	50 MAC	< 1	77	< 1	< 10
Cobalt	ug/L as Co	**< 0.4**	45	< 0.2	< 0.8		< 0.2	77	< 0.2	24
Copper	ug/L as Cu	**2.25**	45	0.44	95.3	2000 MAC / ≤ 1000 AO	3.2	77	0.91	21.8
Iron	ug/L as Fe	**13**	45	< 5	185	≤ 100 AO	6.2	77	< 5	104
Lead	ug/L as Pb	**< 0.4**	45	< 0.2	4.95	5 MAC	< 0.4	77	< 0.2	1.55
Lithium	ug/L as Li	**65.1**	45	53.3	79.8		61.7	53	54.3	71.1
Magnesium	mg/L as Mg	**1.27**	45	0.104	1.79	No Guideline Required	1.855	78	1.04	3.05
Manganese	ug/L as Mn	**< 2**	45	< 1	27.8	120 MAC / ≤ 20 AO	< 1	77	< 1	31
Molybdenum	ug/L as Mo	**< 2**	45	< 1	< 4		< 1	77	< 1	< 20
Nickel	ug/L as Ni	**< 2**	45	< 1	13.4		< 1	77	< 1	< 50
Potassium	mg/L as K	**1.64**	45	1.37	1.85		1.79	78	1.47	2.35
Selenium	ug/L as Se	**< 0.2**	45	< 0.1	< 0.4	50 MAC	< 0.1	77	< 0.1	< 0.5
Silicon	ug/L as Si	**6560**	45	330	8160		7130	77	2350	8950
Silver	ug/L as Ag	**< 0.04**	45	< 0.02	< 0.08	No Guideline Required	< 0.02	77	< 0.02	< 10
Sodium	mg/L as Na	**134**	45	110	153	≤ 200 AO	127	78	102	147
Strontium	ug/L as Sr	**193**	45	15.2	294	7000 MAC	285	77	171	399
Sulphur	mg/L as S	**18.5**	45	14.5	22.4		17.7	76	13.8	22.4
Thallium	ug/L as Tl	**< 0.02**	45	< 0.01	< 0.04		< 0.01	75	< 0.01	< 0.05
Tin	ug/L as Sn	**< 10**	45	< 5	< 20		< 5	77	< 5	< 25
Titanium	ug/L as Ti	**< 10**	45	< 5	< 20		< 5	77	< 5	< 25
Uranium	ug/L as U	**< 0.2**	45	< 0.1	< 0.4	20 MAC	< 0.1	75	< 0.1	< 0.5
Vanadium	ug/L as V	**< 10**	45	< 5	< 20		< 5	77	< 5	< 25
Zinc	ug/L as Zn	**< 10**	45	< 5	31	≤ 5000 AO	7.8	77	< 5	167
Zirconium	ug/L	**< 0.2**	45	< 0.1	0.41		< 0.1	75	< 0.1	< 0.5

CAPITAL REGIONAL DISTRICT

SURFSIDE WATER
Statement of Operations (Unaudited)
For the Year Ended December 31, 2024

		2024	2023
Revenue			
Transfers from Government		24,620	23,790
User Charges		104,852	101,474
Other revenue from own sources:			
Interest Earnings		-	51
Transfer from Operating Reserve		9,384	1,500
Recovery from Claim Reimbursement		1,775	-
Other Revenue		673	634
Total Revenue		141,304	127,449
Expenses			
General Government Services		5,342	5,050
Contract for Services		3,339	2,774
CRD Labour and Operating costs		122,846	83,474
Supplies		3,552	5,221
Other Expenses		20,225	23,360
Total Expenses		155,304	119,879
Net revenue (expenses)		(14,000)	7,570
Transfers to own funds:			
Capital Reserve Fund		-	5,570
Operating Reserve Fund		-	2,000
Annual surplus/(deficit)		(14,000)	-
Accumulated surplus/(deficit), beginning of year		-	-
Accumulated surplus/(deficit), end of year	$	(14,000)	-

CAPITAL REGIONAL DISTRICT

SURFSIDE WATER
Statement of Reserve Balances (Unaudited)
For the Year Ended December 31, 2024

	Capital Reserve	
	2024	**2023**
Beginning Balance	53,732	70,105
Transfer from Operating Budget	-	5,570
Transfer from Completed Capital Projects	-	60
Transfer to Capital Projects	-	(25,000)
Interest Income	2,572	2,997
Ending Balance	56,304	53,732

	Operating Reserve	
	2024	**2023**
Beginning Balance	15,471	14,255
Transfer from Operating Budget	-	2,000
Transfer to Operating Budget	(9,384)	(1,500)
Interest Income	729	716
Ending Balance	6,816	15,471

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REPORT TO SURFSIDE PARK ESTATES WATER SERVICE COMMITTEE
MEETING OF THURSDAY, JUNE 26, 2025

SUBJECT **Capital Projects and Operational Update - June 2025**

ISSUE SUMMARY

To provide the Surfside Park Estates Water Service Committee with capital project status reports and operational updates.

BACKGROUND

The Surfside Park Estates Water System is located on the southwest side of Mayne Island in the Southern Gulf Islands Electoral Area and provides drinking water to approximately 70 customers. Capital Regional District (CRD) Infrastructure and Water Services is responsible for the overall operation of the water system with day-to-day operation, maintenance, design, and construction of water system facilities provided by the CRD Infrastructure, Planning and Engineering and Infrastructure Water Operations divisions. The quality of drinking water provided to customers in the Surfside Park Estates Water System is overseen by the CRD Water Quality division.

CAPITAL PROJECT UPDATE

23-01 | Alternative Approval Process (AAP) / Petition

Project Description: Undertake an AAP or petition to borrow funds to carry out water system improvements in future years.

Project Rationale: Capital Reserves are insufficient to carry out needed capital improvements in the water service. In the absence of grant funding, approval to secure debt will be required in order to proceed with capital improvements.

Project Update and Milestones:

- CRD has incorporated preliminary cost estimates into the 2025 Capital Plan and will await Committee review and comment prior to proceeding with the means to secure debt funding.
- Separate staff report proposed outlining staff recommendation for obtaining public approval to secure debt funding.

Milestone	Completion Date
Staff Report for Commission direction on borrowing process	June 2025
Funding approved	March 2024

25-02 | Replacement of UV Equipment

Project Description: Replacement of UV equipment at the Surfside Water Treatment Plant.

Project Rationale: Existing UV equipment is at end of life and is needing repair parts which are no longer supported. Replacement is deemed necessary.

Project Update and Milestones:

- Existing unit failure led to expedited order of replacement unit. Price escalation since budgeting in previous year, as well as new controls requiring additional SCADA integration effort have resulted in cost overruns. Capital Plan Amendment has been provided in a separate June 2025 staff report.

Milestone	Completion Date
Capital Plan Amendment for additional controls upgrades	June 2025
Installation of replacement UV reactor complete	Q2 2025

OPERATIONAL UPDATE

This is an operational update reporting period from February through May 2025.

- On March 4th, 2025, Operations conducted leak detection efforts of the Surfside Water System and identified several leaks at various locations within the water service area. Leak repair planning was initiated, and repairs were prioritized and scheduled based on fixing the largest leak locations first. The following are the leak sites and estimated leak flow rates:
    - Water tank fill line located between Mariners Way and the water tank: 8.5 m3/day
    - 336 Wood Dale Drive service line repair/replacement: 13 m3/day
    - 362/364 Barque Road service line repairs and standpipe isolation valve leak replacement: 9.8 m3/day.
    - Luff Road leaking 50mm diameter isolation gate valve and connection: 4.6 m3/day.

- The water leak repairs completed in March resulted in a significant reduction in daily water production for the service. Prior to the leak repairs, the average daily water production was approximately 68m3/day and after leak repairs approximately 25m3/day.
- Emergency replacement of the failing water tank solar power panels and charging system. The solar charging system recharges the battery bank which provides power to the water tank level monitoring equipment and communications system. Water level monitoring and communications is a critical function of the water system and without water level monitoring, refilling of the water tanks would not function automatically placing the system at significant risk. This equipment replacement was not budgeted for and will have a negative impact on the 2025 operating budget.
- Changeout/replacement of water treatment plant arsenic filtration media for Vessel A and Vessel B in February. It is anticipated that the arsenic filtration media replacement will be less frequent given the water leak repairs completed in March. This will have a positive impact on the operations budget.
- Water treatment plant UV equipment replacement. The replacement is part of an approved capital project 25-02.
- Several emergency callouts due to system communications failures and water tank high level alarms. This was primarily due to the failing water tank solar panels and charging system.
- Continued with weekly metals (arsenic) water quality sampling and testing frequency through the reporting period. Given the significant reduction in daily water production because of leak repairs, the frequency of this testing will be reduced to biweekly through June and July at which time sampling and testing frequency will revert back to monthly.

RECOMMENDATION

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

Submitted by:	Dan Robson, A.Sc.T., Manager, Saanich Peninsula and Gulf Islands Operations
Submitted by:	Jared Kelly, P.Eng., Manager, Capital Projects
Concurrence:	Joseph Marr, P.Eng., Senior Manager, Infrastructure Planning and Engineering
Concurrence:	Jason Dales, B.Sc., WD IV., Senior Manager, Infrastructure Wastewater Operations
Concurrence:	Alicia Fraser, P.Eng., General Manager, Infrastructure and Water Services

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EEP 25-27

REPORT TO SURFSIDE PARK ESTATES WATER SERVICE COMMITTEE
MEETING OF THURSDAY, JUNE 26, 2025

SUBJECT Arsenic Health Guidelines

ISSUE SUMMARY

Health Canada proposes to lower the maximum acceptable concentration (MAC) for arsenic in drinking water from 10 µg/L to 5 µg/L. This will have operational and financial implications for Capital Regional District's (CRD) Surfside Water System on Mayne Island.

BACKGROUND

The CRD Surfside Water Service on Mayne Island uses source water from a groundwater well that exhibits naturally high arsenic concentrations. The existing water treatment plant was originally designed to reduce arsenic concentrations to meet the current Health Canada guidelines with a MAC of 10 µg/L. Now Health Canada proposes to lower the MAC to 5 µg/L. This proposal is currently in the consultation stage and CRD staff engaged in the water quality committee of the Canadian Water & Wastewater Association, had the opportunity to provide Health Canada with concerns and comments around operational and financial implications. It is however expected that Health Canada's proposal will eventually be accepted, and by approximately early 2026 this new MAC will be applied to all drinking water systems in Canada.

IMPLICATIONS

Based on the strategic goals of the CRD's Corporate Plan, the CRD is committed to provide high quality and safe drinking water to its communities. To consistently meet the proposed new MAC, the Surfside Water Service would have to increase operational and water quality monitoring expenditures or replace the existing arsenic treatment system with one that was specifically designed to meet the new MAC long-term. Both options will have financial implications to the utility and its customers.

CONCLUSION

It is anticipated that Health Canada will lower the maximum acceptable concentration for arsenic in drinking water from 10 µg/L to 5 µg/L. The Surfside Water Service on Mayne Island will face additional operating expenditures when this regulatory change is implemented. The CRD will work with the Committee to prepare for this scenario by including the anticipated additional operational costs and in addition prepare an arsenic water treatment process options and alternatives review in the five-year capital plan in the 2026 budget. The treatment options review will compare the current treatment process in relation to other potentially more cost-effective treatment technology solutions to ensure consistent and reliable supply of high quality and safe drinking water.

RECOMMENDATION

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

Submitted by:	Glenn Harris, Ph.D., R.P.Bio., Acting General Manager, Parks, Recreation & Environmental Services
Concurrence:	Alicia Fraser, P. Eng., General Manager, Infrastructure and Water Service