Capital Regional District

625 Fisgard St.,
Victoria, BC V8W 1R7

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

Wednesday, February 28, 2024 | **1:30 PM** | **6th Floor Boardroom, 625 Fisgard Street, Victoria, BC V8W 1R7**

C. Coleman (Chair), D. Kobayashi (Vice Chair), M. Alto, S. Brice, J. Brownoff, J. Caradonna, Z. de Vries, B. Desjardins, S. Goodmanson, K. Murdoch, D. Murdock, C. Plant, L. Szpak, D. Thompson, S. Tobias

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. 24-109 Minutes of the June 28, 2023 and the minutes of the October 11, 2023 Core Area Liquid Waste Management Committee Meeting

Recommendation: That the minutes of the Core Area Liquid Waste Management Committee meetings of June 28, 2023 and October 11, 2023 be adopted as circulated.

Attachments: Minutes - June 28, 2023

Minutes - October 11, 2023

4. Chair's Remarks

5. Presentations/Delegations

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

Delegations will have the option to participate electronically. Please complete the online application at www.crd.bc.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 CRD Board at crdboard@crd.bc.ca.

6. Committee Business

6.1. 24-035 2024 Core Area Liquid Waste Management Committee Terms of Reference

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

Attachments:
Staff Report: 2024 CALWMC ToR
Appendix A: 2024 CALWMC ToR - Approved Dec 13 2023
Appendix B: 2024 CALWMC ToR - Redlined

6.2. 24-196 Core Area Inflow & Infiltration Program - 2023 Summary

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

Attachments:
Staff Report: Core Area Inflow & Infiltration Program - 2023 Summary
Appendix A: Core Area I&I Program 2023 Report
Appendix B: Key I&I Stats for the Core Area Municipalities and First Nations
Appendix C: Table Comparing Measured to Allocated Flows (Bylaw 4304)
Appendix D: Map Summarizing I&I in the CRD's Core Area

6.3. 24-197 Core Area Wastewater Treatment Plant Odour Mitigation Strategy

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

Attachments:
Staff Report: Core Area Wastewater Treatment Plant Odour Mitigation Strategy
Appendix A: Odour Investigation Action Plan

6.4. 24-228 Previous Minutes of Other CRD Committees and Commissions for Information

Recommendation: There is no recommendation. The following minutes are for information only.
a) Technical and Community Advisory Committee minutes of October 27, 2023
b) Technical and Community Advisory Committee minutes of November 24, 2023
c) Technical and Community Advisory Committee minutes of January 19, 2024

Attachments:
Minutes: TCAC - October 27, 2023
Minutes: TCAC - November 24, 2023
Minutes: TCAC - January 19, 2024

7. Notice(s) of Motion

8. New Business

9. Adjournment

The next meeting is June 26, 2024.

To ensure quorum, please advise Jessica Dorman (jdorman@crd.bc.ca) if you or your alternate cannot attend.

Capital Regional District

625 Fisgard St.,
Victoria, BC V8W 1R7

Meeting Minutes

Core Area Liquid Waste Management Committee

Wednesday, June 28, 2023 **1:30 PM** **6th Floor Boardroom**
625 Fisgard Street
Victoria, BC V8W 1R7

PRESENT
Directors: C. Coleman (Chair), M. Alto, J. Brownoff (EP), J. Caradonna, Z. de Vries, B. Desjardins (EP), S. Goodmanson, C. Harder (for L. Szpak), K. Murdoch, C. Plant, D. Thompson, S. Tobias (EP), I. Ward (for D. Kobayashi) (EP), M. Westhaver (for D. Murdock)

Staff: T. Robbins, Chief Administrative Officer; L. Hutcheson, General Manager, Parks and Environmental Services; I. Jesney, Acting General Manager, Integrated Water Services; K. Morley, General Manager, Corporate Services; S. May, Senior Manager, Facilities Management and Engineering Services; S. Orr, Senior Committee Clerk; J. Dorman, Committee Clerk (Recorder)

EP - Electronic Participation

Regrets: Director(s) S. Brice, D. Kobayashi, D. Murdock, L. Szpak

The meeting was called to order at 1:31 pm.

1. Territorial Acknowledgement

Director Goodmanson provided a Territorial Acknowledgement.

2. Approval of Agenda

MOVED by Director Alto, SECONDED by Director Goodmanson,
That the agenda for the June 28, 2023 Core Area Liquid Waste Management Committee meeting.
CARRIED

3. Adoption of Minutes

3.1. 23-448 Minutes of the March 22, 2023 Core Area Liquid Waste Management Committee Meeting

MOVED by Director Alto, SECONDED by Director Murdoch,
That the minutes of the Core Area Liquid Waste Management Committee meeting of March 22, 2023 be adopted as circulated.
CARRIED

4. Chair's Remarks

Chair Coleman provided get well wishes to Director Kobayashi and thanked Ian Jesney on behalf of the Committee as Ian moves into retirement.

5. Presentations/Delegations

There were no presentations or delegations.

6. Committee Business

6.1. 23-435 Core Area Liquid Waste Management Committee Mid-Year Update

I. Jesney spoke to Item 6.1.

Discussion ensued on the following:
- non-compliance benchmarks and threshold for penalties
- warranty periods
- dispute process
- Lafarge timelines and backlog processing
- viability of other options
- gasification

MOVED by Director Murdoch, SECONDED by Director Goodmanson,
That the Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:
That staff be directed to amend the Core Area Wastewater Operations Service Financial Plan (3.717) to increase expenditures in 2023 by up to $3,021,000 due to Biosolids Disposal and Residual Treatment Facility Revenue budget variances with such expenditures to be funded from Operational Reserves (3.717).
CARRIED

6.2. 23-431 Liquid Waste Management Plan - Amendment 13

L. Hutcheson spoke to Item 6.2.

Discussion ensued on the following:
- Clover Point overflow/outfall
- First Nations consultation
- TCAC roles and responsibilities

MOVED by Director Plant, SECONDED by Director Alto,
The Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:
1. That staff be directed to:
a) retain an engineering consultant to review options regarding the CRD's proposed amendments to the Inflow and Infiltration section of the Core Area Liquid Waste Management Plan;
b) reconvene the Technical and Community Advisory Committee to review and provide recommendations to staff on Liquid Waste Management Plan updates and scope of public consultation; and
c) return to the Core Area Liquid Waste Management Committee with a report detailing the results of the consultant review and the Technical and Community Advisory Committee prior to making a submission to the Province regarding Amendment 13 to the Core Area Liquid Waste Management Plan.
2. That the revised Terms of Reference for the Technical and Community Advisory Committee be adopted.

MOVED by Director Plant, SECONDED by Director Alto,
That the main motion be amended by adding in the TCAC Terms of Reference under the Membership section before - TCAC Chair "(Chair of the Core Area Liquid Waste Management Committee)".
CARRIED
OPPOSSED: Tobias

MOVED by Director Plant, SECONDED by Director de Vries,
That the main motion be amended by adding in the TCAC Terms of Reference "The Committee shall meet on a monthly basis, and have special meetings, as required, at the call of the Chair".
CARRIED

The question was called on the main motion as amended.
The Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:
1. That staff be directed to:
a) retain an engineering consultant to review options regarding the CRD's proposed amendments to the Inflow and Infiltration section of the Core Area Liquid Waste Management Plan;
b) reconvene the Technical and Community Advisory Committee to review and provide recommendations to staff on Liquid Waste Management Plan updates and scope of public consultation; and
c) return to the Core Area Liquid Waste Management Committee with a report detailing the results of the consultant review and the Technical and Community Advisory Committee prior to making a submission to the Province regarding Amendment 13 to the Core Area Liquid Waste Management Plan.

2. That the revised Terms of Reference for the Technical and Community Advisory Committee be adopted with the following amendments:
a) 1- Chair of the Core Area Liquid Waste Management Committee - TCAC Chair
b) The Committee shall meet on a monthly basis, and have special meetings, as required, at the call of the Chair.
CARRIED

7. Notice(s) of Motion

There were no notice(s) of motion.

8. New Business

There was no new business.

9. Adjournment

MOVED by Director Alto, SECONDED by Director Thompson,
That the June 28, 2023 Core Area Liquid Waste Management Committee meeting be adjourned at 2:14 pm.
CARRIED

_____
CHAIR

_____
RECORDER

Capital Regional District

625 Fisgard St.,
Victoria, BC V8W 1R7

Meeting Minutes

Core Area Liquid Waste Management Committee

Wednesday, October 11, 2023 | **9:00 AM** | **6th Floor Boardroom, 625 Fisgard Street, Victoria, BC V8W 1R7**

Special Meeting

PRESENT
Directors: C. Coleman (Chair), D. Kobayashi (Vice Chair), S. Brice, J. Caradonna, Z. de Vries (EP), M. Dell (for M. Alto), B. Desjardins (EP), S. Goodmanson (9:15 am) (EP), K. Murdoch, D. Murdock (9:30 am), C. Plant, L. Szpak, D. Thompson (EP), S. Tobias (9:05 am) (EP)

Staff: T. Robbins, Chief Administrative Officer, N. Chan, Chief Financial Officer; A. Fraser, General Manager, Integrated Water Services; L. Hutcheson, General Manager, Parks and Environmental Services; J. Dales, Senior Manager, Wastewater Infrastructure Operations; J. Marr, Senior Manager, Infrastructure Engineering; P. Kickham, Manager, Environmental Regulation; Y. Li, Senior Financial Officer, Finance and Technology; M. Lagoa, Deputy Corporate Officer; J. Dorman, Committee Clerk (Recorder)

EP - Electronic Participation

Regrets: Directors M. Alto, J. Brownoff

The meeting was called to order at 9:00 am.

1. Territorial Acknowledgement

Vice Chair Kobayashi provided a Territorial Acknowledgement.

2. Approval of Agenda

MOVED by Director Kobayashi, SECONDED by Director Murdoch,
That the agenda for the October 11, 2023 Core Area Liquid Waste Management Committee meeting be approved.
CARRIED

3. Presentations/Delegations

There were no presentations or delegations.

4. Special Meeting Matters

4.1. 23-733 Service Planning 2024 - Wastewater Community Need Summary

A. Fraser spoke to item 4.1.

Discussion ensued on the following:
- wastewater versus environmental service system involvement
- resource differentiation between core area wastewater management and integrated water services
- odour control mitigation
- funding sources and staffing budget allocations
- biosolids management
- overflows and inflow and infiltration

MOVED by Director Caradonna, SECONDED by Director Szpak,
The Core Area Liquid Waste Management Committee recommends the Committee of the Whole recommend to the Capital Regional District Board:
That Appendix A, Community Need Summary - Wastewater, be approved as presented and form the basis of the Provisional 2024-2028 Financial Plan.
CARRIED

4.2. 23-734 2024 Core Area Liquid Waste Management Service Operating and Capital Budget

A. Fraser spoke to Item 4.2.

Discussion ensued on the following:
- asset management plan and equipment replacement fund
- carbon usage from gasification
- odour mitigation and program
- inflow and infiltration program operations
- retiring debt, long term debt servicing and capital replacement reserve
- tipping fees for biosolids

MOVED by Director Caradonna, SECONDED by Director Kobayashi,
The Core Area Liquid Waste Management Committee recommends the Committee of the Whole recommend to the Capital Regional District Board:
1. Approve the 2024 Core Area Liquid Waste Management Service operating and capital budgets as presented;
2. Direct staff to balance the 2023 actual revenue and expenses on the transfer to the operating reserve; and
3. Direct staff to update carry forward balances in the 2024 Capital Budget for changes after year end.
CARRIED

4.3. 23-708 2023 Technical and Community Advisory Committee and Core Area Liquid Waste Management Committee Terms of Reference Update

L. Hutchenson spoke to Item 4.3.

Discussion ensued on the following:
- Esquimalt chamber position on committee
- mandates of the Core Area Liquid Waste Management Committee (CALWMC) and the Technical and Community Advisory Committee (TCAC)

MOVED by Director Kobayashi, SECONDED by Director Desjardins,
The Core Area Liquid Waste Management Committee recommends to the Capital Regional District Board:
That the updated Terms of Reference for the Core Area Liquid Waste Management Committee and Technical and Community Advisory Committee be approved as presented.
CARRIED

5. Adjournment

MOVED by Director Caradonna, SECONDED by Alternate Director Dell,
That the October 11, 2023 Core Area Liquid Waste Management Committee meeting be adjourned at 10:01 am.
CARRIED

_____
CHAIR

_____
RECORDER

Making a difference...together

REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, FEBRUARY 28, 2024

SUBJECT **2024 Core Area Liquid Waste Management Committee Terms of Reference**

ISSUE SUMMARY

To provide the 2024 Core Area Liquid Waste Management Committee Terms of Reference for information.

BACKGROUND

Under the *Local Government Act* and the CRD Board Procedures Bylaw, the CRD Board Chair has the authority to establish standing committees and appoint members to provide advice and recommendations to the Board.

On December 13, 2023, the CRD Board approved the 2024 Terms of Reference for standing committees. Terms of Reference (TOR) serve to clarify the mandate, responsibilities and procedures of standing committees and provide a point of reference and guidance for the committees and members.

Clarity on long-term biosolids management was added to the TORs for the Core Area Liquid Waste Management Committee (CALWMC), the Technical and Community Advisory Committee (TCAC), and the Environmental Services Committee.

The Environmental Services Committee mandate on resource recovery opportunities now includes the long-term Biosolids Management Plan. While CALWMC will continue to serve as the steering committee for TCAC, the TCAC will report through the Environmental Services Committee on long-term biosolids management planning.

The 2024 CALWMC TOR is attached as Appendix A, and a redlined copy is attached as Appendix B.

The TOR are being provided for information to the Committee. Any proposed revisions to the TOR will require ratification by the Board.

CONCLUSION

Terms of Reference serve to clarify the mandate, responsibilities and procedures of committees and provide a point of reference and guidance for the committees and their members. Any future revisions to the TOR will require ratification by the Board.

RECOMMENDATION

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

Submitted by:	Marlene Lagoa, MPA, Manager, Legislative Services & Deputy Corporate Officer
Concurrence:	Larisa Hutcheson, P. Eng., General Manager, Parks & Environmental Services
Concurrence:	Alicia Fraser, P. Eng., General Manager, Integrated Water Services
Concurrence:	Kristen Morley, J.D., General Manager, Corporate Services & Corporate Officer
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

ATTACHMENT(S)

Appendix A: 2024 CALWMC Terms of Reference - Approved Dec 13 2023
Appendix B: 2024 CALWMC Terms of Reference - Redlined

Terms of Reference

CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE

PREAMBLE

The Capital Regional District (CRD) Core Area Liquid Waste Management Committee (CALWMC) is a standing committee established by the CRD Board and will oversee and make recommendations to the Board regarding the Core Area Liquid Waste Management Plan (CALWMP). Recommendations related to long-term biosolids management planning in the CALWMP shall be referred to the Environmental Services Committee.

The Committee's official name is to be:

Core Area Liquid Waste Management Committee

1.0 PURPOSE

a) The mandate of the Committee is to oversee and make recommendations to the Board regarding the:

i. administration and regulatory reporting for the Core Area Liquid Waste Management Plan

ii. Core area trunk sewers and sewage disposal systems

b) The Committee will act as the steering committee of the Technical and Community Advisory Committee, as outlined in Appendix A.

2.0 ESTABLISHMENT AND AUTHORITY

a) The Committee will make recommendations to the Board for consideration.

b) The Board Chair will appoint the Committee Chair, Vice Chair and Committee members annually.

3.0 COMPOSITION

a) The membership is comprised of all directors on the CRD Board from the following municipalities that are participants in the Core Area Liquid Waste Management Plan:

- Colwood
- Esquimalt
- Langford
- Oak Bay
- Saanich
- Victoria
- View Royal
- An elected representative and alternate from each of the Songhees Nation and Esquimalt Nation Councils (Board Procedures Bylaw No. 3828)

b) All Board members are permitted to participate in standing committee meetings, but not vote, in accordance with the CRD Board Procedures Bylaw; and

c) First Nation members are permitted to participate in standing committee meetings at their pleasure, in accordance with the CRD Procedures Bylaw, where the Nation has an interest in matters being considered by the committee.

4.0 PROCEDURES

a) The Committee shall meet quarterly and have special meetings as required at the call of the Committee Chair;

b) The agenda will be finalized in consultation between staff and the Committee Chair and any Committee member may make a request to the Chair to place a matter on the agenda through the Notice of Motion process;

c) With the approval of the Committee Chair and Board Chair, Committee matters of an urgent or time sensitive nature may be forwarded directly to the Board for consideration; and

d) A quorum is a majority of the Committee membership and is required to conduct Committee business.

5.0 RESOURCES AND SUPPORT

a) The General Manager, Integrated Water Services and General Manager, Parks & Environmental Services will act as a liaison to the Committee with support from other departments, as required; and

b) Minutes and agendas are prepared and distributed by the Corporate Services Department.

Approved by CRD Board December 13, 2023

APPENDIX A

STEERING THE TECHNICAL AND COMMUNITY ADVISORY COMMITTEE

In accordance with the Terms of Reference of the Technical and Community Advisory Committee (TCAC) approved by the Capital Regional District Board (CRD), October 11, 2023, the Core Area Liquid Waste Management Committee (CALWMC) will steer the TCAC as follows:

- Make requests to TCAC for appropriate technical and community consultation advice and input in order to facilitate informed decision-making in a variety of CALWMP matters
- Dissolve the TCAC at a time determined by the CALWMC

Terms of Reference

CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE

PREAMBLE

The Capital Regional District (CRD) Core Area Liquid Waste Management Committee (CALWMC) is a standing committee established by the CRD Board and will oversee and make recommendations to the Board regarding the Core Area Liquid Waste Management Plan (CALWMP). Recommendations related to long-term biosolids management planning in the CALWMP shall be referred to the Environmental Services Committee.

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5.0 RESOURCES AND SUPPORT

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b) Minutes and agendas are prepared and distributed by the Corporate Services Department.

Approved by CRD Board _____

APPENDIX A

STEERING THE TECHNICAL AND COMMUNITY ADVISORY COMMITTEE

In accordance with the Terms of Reference of the Technical and Community Advisory Committee (TCAC) approved by the Capital Regional District Board (CRD), October 11, 2023, the Core Area Liquid Waste Management Committee (CALWMC) will steer the TCAC as follows:

- Make requests to TCAC for appropriate technical and community consultation advice and input in order to facilitate informed decision-making in a variety of CALWMP matters
- Dissolve the TCAC at a time determined by the CALWMC

Making a difference...together

IWS 24-01

REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, FEBRUARY 28, 2024

SUBJECT **Core Area Inflow & Infiltration Program - 2023 Summary**

ISSUE SUMMARY

To present a summary of activities and accomplishments of the Core Area Inflow & Infiltration (I&I) Program for the period of 2022 to mid-2023, including infrastructure work carried out by the participating municipalities and efforts related to private property I&I.

BACKGROUND

The Core Area Liquid Waste Management Plan (CALWMP) sets out goals and commitments for municipalities, First Nations and the Capital Regional District (CRD) to manage I&I through the Core Area I&I Management Plan. Each year, the Core Area I&I Program presents progress toward meeting these commitments in an annual report that is distributed to each of the core area municipalities and First Nations. This staff report summarizes the highlights of that report, the full report, titled Core Area I&I Program 2023 Report, attached as Appendix A and is available on the public website here:

https://www.crd.bc.ca/about/document-library/documents/plans-reports/wastewater-stormwater/2023-reports

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

- Colwood diligently inspects its new underground infrastructure to manage and prevent I&I. In 2022 to mid-2023, Colwood identified and corrected two cross connections, found two manholes with I&I issues (fixes in progress), and camera inspected 7.6 kilometers of sewer pipe.

- Esquimalt developed a plan for I&I reduction in the Colville Catchment, which was identified as the top priority in its I&I Management Plan. Detailed designs for the work will be prepared in the second half of 2023 with construction to follow. In 2022 to mid-2023, Esquimalt lined 80 meters of sewer main and repaired or replaced 21 sewer laterals and seven stormwater laterals. Working with the CRD Source Control program, Esquimalt removed a cross-connection that was a source of contaminants to the Gorge Waterway.

- Langford has a young sewer system and proactively keeps its I&I low to preserve sewer capacity for future growth. In 2022 to mid-2023, Langford completed numerous inspections in the Happy Valley Catchment and Phelps catchments to ensure that the inspection chambers in low lying areas were tight throughout the wet weather season. Langford also inspected 92 manholes and 5.0 kilometers of sewer main for I&I. Follow-up work included plugging manholes suspected of being sources of I&I during large storms and repairing or upgrading inspection chambers.

- Oak Bay will soon be starting construction of the Uplands Sewer Separation Project. The first phase with focus on the Humber catchment and will include new stormwater infrastructure (mains, manholes, catch basins, laterals) and the relining of three kilometers of sewer main. It's anticipated that construction will start shortly and be completed by December 2025. In 2022/2023, Oak Bay found 18 sewer cross-connections, nine of which have already been fixed. Oak Bay currently has several sanitary/stormwater upgrade projects in progress or in the pipeline. Oak Bay records show that 25 new sewer laterals were installed, and three unused sewer laterals were capped.

- Saanich continues its sewer maintenance and repair program, including camera inspections, sewer relining, smoke testing and flow monitoring. In 2022 to mid-2023, Saanich removed five stormwater cross-connections to the sewer system. It repaired or replaced 2.0 kilometers of sanitary sewer (including 134 new sewer service connections with inspection chambers), 15 sewer connections (with inspection chambers) and 19 manholes. It camera-inspected 18.4 kilometers of sewer main and completed eight spot repairs. Saanich also updated its Sewer Master Plan and sewer model, developed a replacement strategy for "no-corrode" (tarpaper) sewer laterals, and is developing an ongoing camera inspection program for critical sewers and trunk sanitary sewers.

- Victoria continues to manage its sewer repair and replacement work according to its sewer master plan. In 2022 to mid-2023, Victoria relined or replaced 1.5 kilometers of sewer pipe, eight manholes and 63 sewer laterals. T-liner technology, which focuses on sealing the interface of the sewer main and laterals, was used at 27 locations. Victoria camera inspected 34 kilometers of sanitary sewer mains. 470 meters of sewer mains were replaced by open trench excavation along with 16 sanitary laterals.

- View Royal continued its programs related to sewer maintenance and repairs, camera inspections, sewer flushing and flow monitoring. In 2022 to mid-2023, View Royal upgraded the Helmcken Bay pump station, including the addition of a flow meter.

- Esquimalt Nation had its sewer system inspected in 2018. Follow-up work included removing/capping four unused sewer laterals, repairing a manhole, doing a sewer main spot repair, and renewal of the Nation's sewer pump station. The Nation's sewer flows are not currently measured but the CRD plans to install a permanent sewer flow meter for the Nation in 2024. Amongst other things, the meter will be useful for determining if additional I&I reduction work is needed.

- Songhees Nation does routine sewer maintenance and repairs, as needed. In 2015, the Nation hired a consultant to investigate its sewer system for I&I sources and to provide detailed designs for remediation. For years, the work was ready for tender and awaiting funding from Indigenous Services Canada. It's been indicated that construction will start in 2024.

Through the Core Area I&I Program (see Appendix D, map summarizing I&I in the CRD's Core Area), the CRD continues to work with its municipal and First Nations partners on I&I-related management and reduction efforts. This includes regional flow monitoring, standardizing I&I approaches, preparing management plans and annual reports, education programs and private property I&I initiatives. This also involves coordination with municipalities and national

organizations that are dealing with similar issues. Key actions completed in 2022 to mid-2023 included:

- Flow data vetting and analyses (summary in Appendix B) along with a comparison of measured sewer flows to the flow allocations in CRD Bylaw No. 4304 (Appendix C) .
- Supporting the CRD update of Section Five of the CALWMP, which deals I&I and overflows. (The Province required this update as part of its conditional approval of Amendment 12 of the CALWMP.)
- Presenting a 1.5 hour webinar to the Canadian Association of Home and Property Inspectors encouraging the use of the CRD's educational materials related to "inspecting and maintaining underground pipes to reduce the risk of basement flooding".
- Work with the Saanich Peninsula municipalities to prepare initial I&I management plans (draft), including pump station derived sewer flow data, using tools and techniques from the Core Area I&I Program. (This work was funded through a separate budget.)

In 2023, CRD staff started work towards a 2024 submission of CALWMP Amendment 13 to the Ministry of Environment and Climate Change Strategy which will update the I&I section with new commitments that better reflect current sewer infrastructure, wastewater treatment and municipal asset management plans.

IMPLICATIONS

Environmental & Climate Implications

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

Intergovernmental Implications

As a condition of the Ministry of Environment and Climate Change Strategy's (ENV) conditional approval of Amendment 12 to the CALWMP, the CRD was required to submit an amendment to the commitments pertaining to management of I&I and sanitary sewer overflows.

A Technical and Community Advisory Committee (TCAC) was established in late 2023 to provide recommendations to the Core Area Liquid Waste Management Committee (CALWMC) for CALWMP Amendment 13. This committee has met monthly since October 2023. Kerr Wood Leidal Associates Ltd. has been retained to prepare a report and make recommendations for the TCAC and CALWMC regarding Amendment 13.

First Nations consultation, in collaboration with the CRD's First Nations Relations team, and referral to all service participants will occur after the CALWMC receives TCAC comments and approves the final package.

Social Implications

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

Financial Implications

The CRD engages with core area municipalities and First Nations to identify and reduce the amount of rain and groundwater that enters the sanitary sewer system. The Core Area Inflow & Infiltration Program budget is $408,000. The Core Area I&I Program prepares annual reports and management plans, generates sewer flow data for I&I analyses, assist municipalities with tasks related to I&I, develops strategies for addressing private property I&I and education and prepares monthly flow/I&I reports for each core area municipality and First Nation.

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

CONCLUSION

This staff report summarizes the Inflow & Infiltration (I&I) related activities and accomplishments of the Core Area I&I Program, participating municipalities and First Nations for 2022 to mid-2023. While much work has been done to date, modelling indicates that sub five-year overflows will continue at the Clover Point long outfall. A Technical and Community Advisory Committee was convened in 2023 to review and make recommendations regarding an amendment to regional and municipal I&I commitments, which will need to be maintained or enhanced to prevent overflows for less than five-year rainfall events and ensure compliance with provincial regulation. The annual report will be forwarded to the core area municipal engineers for use in their I&I reduction programs.

RECOMMENDATION

There is no recommendation, this report is for information only.

Submitted by:	Joseph Marr, P.Eng., Senior Manager, Infrastructure Engineering
Concurrence:	Jason Dales, B.SC., WD IV, Senior Manager, Wastewater Infrastructure Operations
Concurrence:	Alicia Fraser, P. Eng., General Manager, Integrated Water Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

ATTACHMENT(S)

Appendix A: Core Area I&I Program 2023 Report
Appendix B: Key I&I Stats for the Core Area Municipalities and First Nations
Appendix C: Table Comparing Measured Flows to Allocated Flows in Bylaw 4304
Appendix D: Map Summarizing I&I in the CRD's Core Area

APPENDIX A

Core Area Inflow & Infiltration Program - 2023 Report

Capital Regional District | October 2023

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List of Appendices

CORE AREA INFLOW & INFILTRATION PROGRAM

2023 REPORT

EXECUTIVE SUMMARY

The Core Area Liquid Waste Management Plan (CALWMP) sets out goals and commitments for the municipalities, First Nations and Capital Regional District (CRD) to manage I&I through the Core Area I&I Management Plan. Each year, the Core Area I&I Program documents progress toward meeting these commitments in an annual report that is distributed to each of the core area municipalities and First Nations. Overviews of municipal I&I actions, along with specific actions from this reporting period, are as follows:

- Colwood diligently inspects its new underground infrastructure to manage and prevent I&I. In 2022 to mid-2023, Colwood identified and corrected two cross connections, found two manholes with I&I issues (fixes in progress), and camera inspected 7.6 kilometers of sewer pipe.

- Esquimalt developed a plan for I&I reduction in the Colville Catchment, which was identified as the top priority in its I&I Management Plan. Detailed designs for the work will be prepared in the second half of 2023 with construction to follow. In 2022 to mid-2023, Esquimalt lined 80 meters of sewer main and repaired or replaced 21 sewer laterals and seven stormwater laterals. Working with the CRD Source Control program, Esquimalt removed a cross-connection that was a source of contaminants to the Gorge Waterway

- Langford has a young sewer system and proactively keeps its I&I low to preserve sewer capacity for future growth. In 2022 to mid-2023, Langford completed numerous inspections in the Happy Valley Catchment and Phelps catchments to ensure that the inspection chambers in low lying areas were tight throughout the wet weather season. Langford also inspected 92 manholes and 5028 meters of sewer main for I&I. Follow-up work included plugging manholes suspected of being sources of I&I during large storms and repairing or upgrading inspection chambers.

- Oak Bay will soon be starting construction of the Uplands Sewer Separation Project. The first phase with focus on the Humber catchment and will include new stormwater infrastructure (mains, manholes, catch basins, laterals) and the relining of three kilometers of sewer main. It's anticipated that construction will start in Fall of 2023 and be completed by December 2025. In 2022/2023, Oak Bay found 18 sewer cross-connections, nine of which have already been fixed. Oak Bay currently has several sanitary/stormwater upgrade projects in progress or in the pipeline. Oak Bay records show that 25 new sewer laterals were installed, and three unused sewer laterals were capped.

- Saanich continues its sewer maintenance and repair program, including camera inspections, sewer relining, smoke testing and flow monitoring. In 2022 to mid-2023, Saanich removed five stormwater cross-connections to the sewer system. It repaired or replaced 2,000 meters of sanitary sewer (including 134 new sewer service connections with inspection chambers), 15 sewer connections (with inspection chambers) and 19 manholes. It camera-inspected 18,400 meters of sewer main and completed eight spot repairs. Saanich also updated its Sewer Master Plan and sewer model, developed a replacement strategy for "no-corrode" (tarpaper) sewer laterals, and is developing an ongoing camera inspection program for critical sewers and trunk sanitary sewers.

- Victoria continues to manage its sewer repair and replacement work according to its sewer master plan. In 2022 to mid-2023, Victoria relined or replaced 1,510 meters of sewer pipe, eight manholes and 63 sewer laterals. T-liner technology, which focuses on sealing the interface of the sewer main and laterals, was used at 27 locations. Victoria camera inspected 34 kilometers of sanitary sewer mains. 470 meters of sewer mains were replaced by open trench excavation along with 16 sanitary laterals.

- View Royal continued its programs related to sewer maintenance and repairs, camera inspections, sewer flushing and flow monitoring. In 2022 to mid-2023, View Royal upgraded the Helmcken Bay pump station, including the addition of a flow meter.

- Esquimalt Nation had its sewer system inspected in 2018. Follow-up work included removing/capping four unused sewer laterals, repairing a manhole, doing a sewer main spot repair, and renewal of the Nation's sewer pump station. The Nation's sewer flows are not currently measured but the CRD plans to install a permanent sewer flow meter for the Nation in late 2023/2024. Amongst other things, the meter will be useful for determining if additional I&I reduction work is needed.

- Songhees Nation does routine sewer maintenance and repairs, as needed. In 2015, the Nation hired a consultant to investigate its sewer system for I&I sources and to provide detailed designs for remediation. For years, the work was ready for tender and awaiting funding from Indigenous Services Canada. It's been indicated that construction will start in 2024.

Through the Core Area I&I Program, the CRD continues to work with its municipal and First Nations partners on I&I-related management and reduction efforts. This includes regional flow monitoring, standardizing I&I approaches, preparing management plans and annual reports, education programs and private property I&I initiatives. This also involves coordination with municipalities and national organizations that are dealing with similar issues. Key actions completed in 2022-2023 included:

- Flow data vetting and analyses including a comparison of measured sewer flows to the flow allocations in CRD Bylaw No. 4304.
- Supporting the CRD update of Section 5 of the CALWMP, which deals I&I and overflows. (The Province required this update as part of its conditional approval of Amendment 12 of the LWMP.)
- A 1.5 hour webinar to the Canadian Association of Home and Property Inspectors regarding the CRD's educational materials related to "inspecting and maintaining underground pipes to reduce the risk of basement flooding".
- Work with the Saanich Peninsula municipalities to prepare initial I&I management plans (draft), including pump station derived sewer flow data, using tools and techniques from the Core Area I&I Program. (This work was funded through a separate budget.)

The following table summarizes the keys I&I related stats for each of the core are municipalities and First Nations.

Jurisdiction	**Ave. Pipe Age** [1] *(years)*	**Contributes to Overflows** *(for sub 5yr. storms)*	**Peak 24hr Flow** *(for a statistical 5yr. storm)*	
			Compared to ADWF [2]	**Compared to CRD Bylaw Flow Allocation** [3]
Colwood	20	No	2.3 x ADWF	41% Allocated Flow
Esquimalt	87	No	6.9 x ADWF	106% Allocated Flow
Langford	17	No	2.0 x ADWF	30% Allocated Flow
Oak Bay	76	Yes	~9.0 x ADWF	>143% Allocated Flow
Saanich	48	No	3.4 x ADWF	63% Allocated Flow
Victoria	95	Yes	5.4x ADWF	98% Allocated Flow

Jurisdiction	Ave. Pipe Age [1] *(years)*	Contributes to Overflows *(for sub 5yr. storms)*	Peak 24hr Flow *(for a statistical 5yr. storm)*	
			Compared to ADWF [2]	Compared to CRD Bylaw Flow Allocation [3]
View Royal	35	No	3.5 x ADWF	~50% Allocated Flow
Esquimalt First Nation [4]	43	No	5.1x ADWF	101% Allocated Flow
Songhees First Nation	43	No	5.1x ADWF	106% Allocated Flow

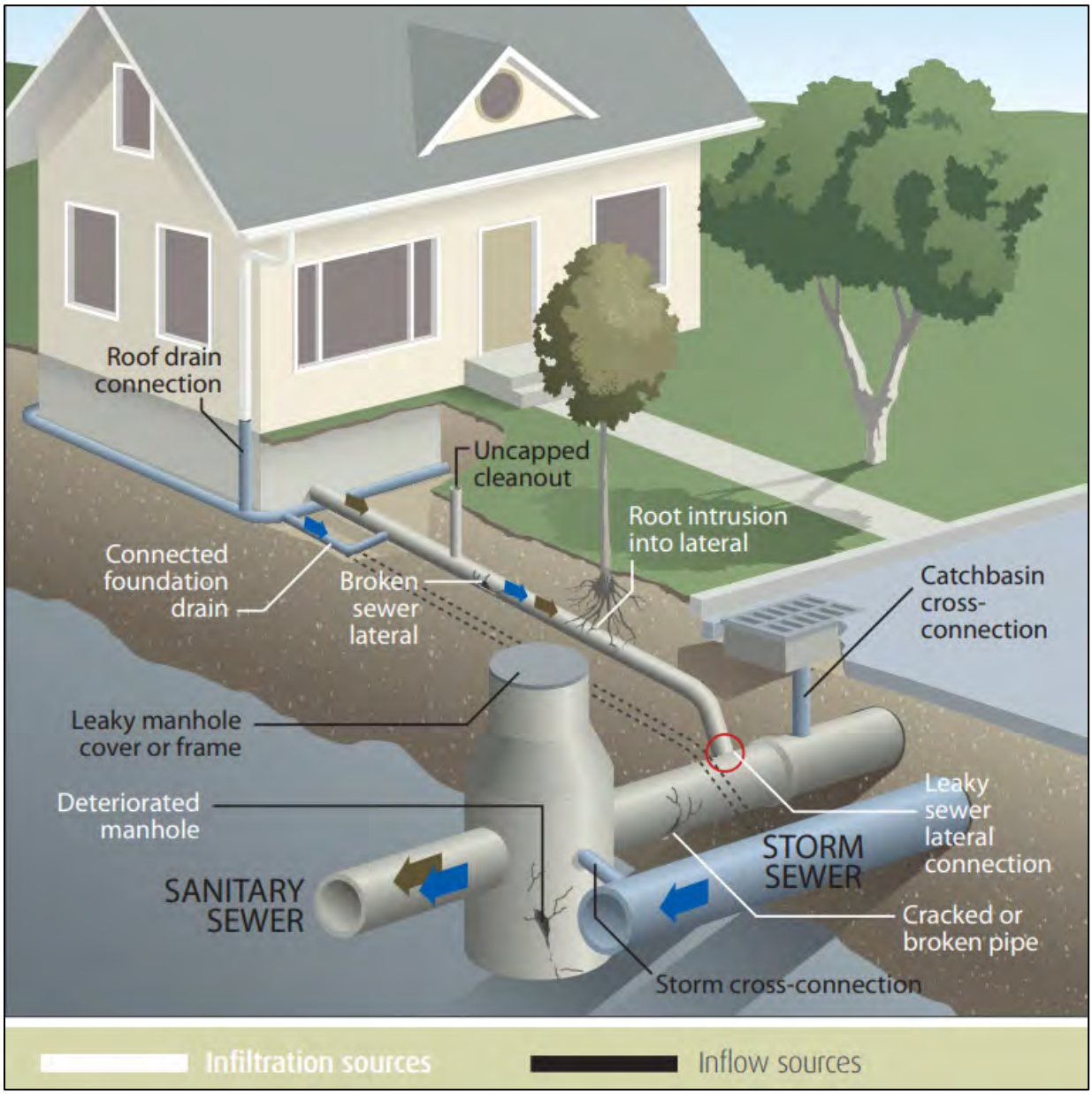
[1] Average pipe age directly correlates to I&I as pipes deteriorate over time. Additionally, pipe materials and installation practices have improved greatly over time.
[2] The key I&I commitment in the Liquid Waste Management Plan is to be under 4x ADWF by 2030.
[3] The peak 24-hour flow allocations in CRD Bylaw 4304 were setup based on requests from each municipality/First Nation, the core area sewer model and consultant expertise. If the allocations aren't exceeded, sub-5-year overflows should not occur.
[4] Jurisdiction is not flow metered. The flows are based on a correlation with a nearby catchment as recommended by a consultant.

1. BACKGROUND

1.1 Inflow & Infiltration

Inflow and infiltration (I&I) refers to rainwater and groundwater that enters the sanitary sewer through a variety of defects (Figure 1.1). Inflow sources allow rainwater to enter the sanitary sewer through improper plumbing connections such as cross-connected roof drains or catch basins. Infiltration sources allow groundwater to seep into the sanitary sewer through cracks or bad joints in sewer pipes and manholes. A certain amount of I&I is unavoidable and is accounted for in routine sewer design. However, when I&I exceeds design allowances, sewer capacity is consumed and may result in overflows, risks to health, damage to the environment and increased conveyance treatment and disposal costs.

Figure 1.1: Common Sources of I&I



1.2 Drivers for I&I Reduction

Municipalities have finite resources and budgets which must be allocated based on their council's priorities and direction. For an I&I related capital project to be approved, it generally needs to strongly support one or more of the following interrelated "drivers".

- Regulatory compliance (i.e., preventing overflows and excessive I&I).
- Asset management (i.e., maintaining sanitary sewer systems and replacing components at the end of their service life).
- Future growth (i.e. maintaining or creating sewer capacity for future development / densification.
- Climate change (i.e. climate models predict more extreme rainfall events in the future. As such, sewer capacity needs to be maintained or created to accommodate this to prevent overflows).
- Synergistic upgrades (i.e. combining related when doing upgrades (i.e. if a road needs to be dug up to replace sewers, there is an opportunity to cost effectively replace other buried infrastructure at the same time).

1.3 Study Area

The CRD's core area is a partnership of seven local governments and two First Nations. These include Colwood, Esquimalt, Langford, Oak Bay, Saanich, Victoria, View Royal, the Esquimalt Nation and the Songhees Nation. Sewer flows from these jurisdictions discharge to CRD trunk sewers. The flows are then conveyed to the McLaughlin wastewater treatment plant (Figure 1.2). Table 1.1 summarizes the sewer infrastructure in the core area.

Figure 1.2 Map of the Capital Regional District Core Area Highlighting the CRD Trunk Sewers

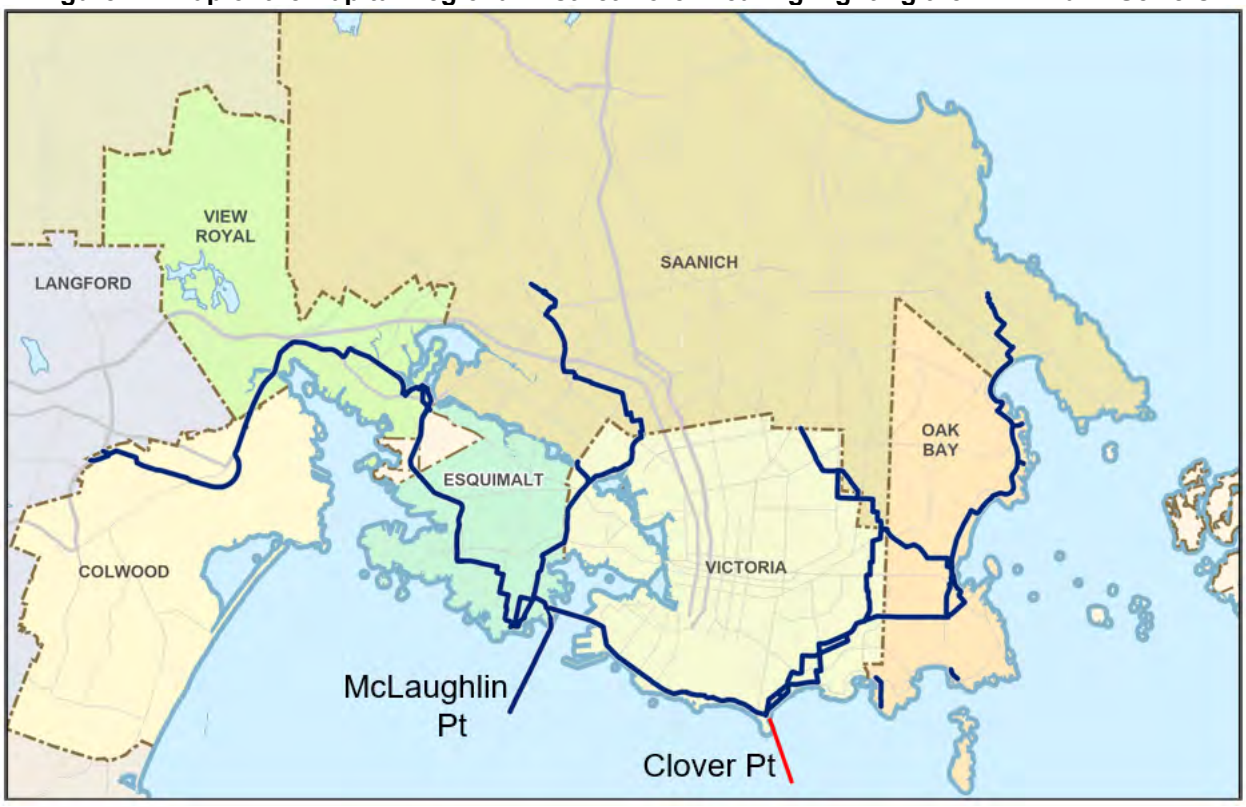


Table 1.1: Sewer Infrastructure in the CRD Core Area

** Excludes Hartland Landfill site, but includes Hartland Leachate Line*

Jurisdiction		Gravity Sewers (km)	Force Mains (km)	Man holes	Pump Stations	Laterals **	Average Pipe Age *** (years)	% Developed Properties Connected to Sewer
Colwood	Municipal	37	7.3	568	10	2,159	19	45%
	Private	5.2	3.7	120	12		20	
	Gov't of Canada	6.7	2.7	125	6		31	
Esquimalt	Municipal	57	4.0	874	12	3,404	55	100%
	Private	0.2	0.0	3	0		86	
	Gov't of Canada	16	4.5	368	23		50	
Langford	Municipal	118	22	1,769	14	8,522	16	83%
	Private	11.4	2.1	167	10		15	
Oak Bay	Municipal	100	2.0	1,312	7	3,813	75	100%
	Private	2.4	1.4	32	3		27	
Saanich	Municipal	550	19	6,503	39	29,475	42	94%
	Private	7.1	0.4	122	153		34	
Victoria	Municipal	233	3.2	2,855	12	13,676	94	100%
	Private	0.0	0.0	3	2		N/A	
View Royal	Municipal	45	5.8	864	17	2,119	34	96%
	Private	2.4	0.6	33	5		17	
First Nations	Esquimalt	1.4	0.3	22	1	N/A	27	100%
	Songhees	N/A	0.3	N/A	1	N/A	N/A	99%
CRD Owned *		52	48	293	16	3	0	N/A
Total		1,247	128	15,979	200	62,646		

*** Some estimated*

**** Based on gravity and force mains*

1.4 Liquid Waste Management Plan I&I Commitments

Section 5 of the CALWMP is entitled "*Management of Infiltration and Inflow and Control of Wastewater Overflows"* (Appendix A). The key commitment is as follows: "the *CRD and the participating municipalities commit to the following actions to reduce I&I sufficiently to reduce maximum daily wet weather flows to less than four times the average dry weather flow by 2030."*

As a condition of Amendment 12 to the CALWMP, the CRD is required to update Section 5 of the CALWMP. The current version of Amendment 12 is out of date as the action steps are complete. In the summer of 2023, the CRD initiated a formal process for the update of Section 5 (consultant, technical and community advisory committee, etc.) with the work taking place in the second half of 2023.

Appendix B contains the executive summary for the Core Area I&I Management Plan.

1.5 CRD Bylaw Requirements for I&I

CRD Bylaw 2312, as amended by Bylaw No. 4304 (2020), allocates the maximum allowable average dry weather flow and peak wet weather flow for each municipal / First Nation input into the regional sewer system. The bylaw also includes a process for addressing bylaw exceedances. To help assess compliance

with the bylaw, the CRD continuously measures the flows entering the regional sewer system and once a year sends each municipality / First Nations a summary of how their flows compare to their allocations.

The CRD also informs the core area municipalities and First Nations about their flows into the regional sewer system through monthly sewer reports (key tables, figures, stats, etc.) that are distributed quarterly. Appendix C contains an example of a monthly sewer report.

1.6 Progress on Reducing Overflows and Sewage Discharges to the Environment

Prior to late 2020, all core area sewage was discharged to the marine environment through the CRD's Clover pump station or Macaulay pump station deep sea outfalls. The sewage from both locations was screened for solids but was not treated. These discharges were allowed by permit, through the Ministry of Environment.

Prior to 2022, several CRD sites in the core area routinely overflowed during storm events. When overflows occurred, they were investigated, documented, and reported to Emergency Management BC.

Significant effort and resources have been used to reduce overflows and untreated discharges to the marine environment in the core area. Table 1.2 highlights this work.

Table 1.2: Core Area Projects to Reduce I&I / Overflows

Project	Impact on Overflows	Cost
McLoughlin Treatment Plant (2020)	Treats sewage for the entire core area.	~$760M Part of core area treatment plant project
Arbutus Storage Tank (2021)	Used during storm events to temporarily store sewer flows from Saanich. Results in additional downstream capacity and reduced overflow frequency/volumes at Clover.	
Trent Forcemain Connector (2021)	Removed a bottleneck in the CRD trunk sewer system. Eliminated overflows from multiple locations for sub-5-year storms.	
Clover Pump Station Upgrade and Forcemain (2020)	Pumps sewage from the east side of the core area to the treatment plant. Before 2020, none of this sewage was treated.	
Craigflower Pump Station Replacement (2015)	The old Craigflower pump station reached the end of its design life and did not have enough capacity for the Westshore's growth. The new pump station has more capacity, but the forcemain will need to be upsized to meet future demand.	
Trent Pump Station and Forcemain (2008)	Eliminated sub-100-year overflows to Bowker Creek, which is a highly sensitive receiving environment.	~$20M
Installed Screens / Screening Chambers at all CRD Overflow Locations	The screens ensure that any overflowing sewage doesn't have particles over six millimeter in size, reducing impacts on the environment.	
Marigold Storage Tank (2001)	Eliminated sub-5-year overflows to Colquitz Creek and the Gorge Waterway, which are environmentally sensitive to sewage.	

Project	Impact on Overflows	Cost
Municipal PS upgrades (2000 ongoing)	Various projects including adding Supervisory Control and Data Acquisition (SCADA) systems, backup power and storage tanks to help eliminate overflows to nearby waterways; notably the Gorge Waterway.	
Oak Bay's Separation of the Combined Sewers in the Uplands (Ongoing, construction starting in 2023)	These sewers currently overflow during relatively small rainfall events. The Province and Oak Bay have an agreement in place for the separation of these sewers.	~$20M
Ongoing Flow Monitoring and I&I Analyses	The CRD and municipalities have mature, ongoing programs for sewer investigation, rehabilitation, upsizing, and renewal. The work is supported by the collection of sewer flow data from almost 100 sewer flow meter sites and routine I&I analyses.	

With the work in Table 1.2 largely complete, the core area sewer model predicts that the only location that should overflow for sub-5-year rainfall events is the Clover pump station long outfall; the same outfall that discharged sewage continuously from the 1970's to 2020. The model estimates that overflows would be at least 4x dilute (equivalent to primary treatment levels) for approximately 80 hours annually (less than 1% of the total annual flow). *Note that Oak Bay's combined sewers in the Uplands also overflow during rainfall events but Oak Bay has submitted a Combined Sewer Separation Plan to the Province for their approval.)*

Future overflow reductions would need to come from a combination of the following:

- I&I reduction work at the defect-by-defect level, which is expensive and time consuming. Ideally, this work would be addressed long term through Sewer Master Plans and Asset Management Plans due to the high cost. (For reference, its estimated that it would take less than $200 million to eliminate sub-5-year overflows from Clover, with work focused on municipal sewers and private laterals in Oak Bay and Victoria).
- Storage tanks, which are difficult to site and don't fix the underlying issues related to sewer condition and I&I. (For context, the core area "Sanitary Model Update and Flow Study" report notes that the peak overflow volume for a 5-year storm at Clover Point is 57,000 cubic meters, a volume roughly equivalent to 11 Arbutus storage tanks.
- Wet weather treatment plant(s), which would operate for approximately 80 hours per year and don't fix the underlying issues related to sewer condition and I&I.

Complicating things is the commonly accepted notion that half of all I&I comes from private property.

1.7 Public Property vs. Private Property I&I (PPI&I)

Property owners own and are responsible for maintaining their sewer laterals from their home/building to the property line. Municipalities own and are responsible for maintaining the municipal sewers as well as laterals located between the property line and the municipal sewer main (Figure 1.3). The exception to this is Oak Bay (Figure 1.4), where property owners own and are responsible for maintaining the entire lateral from their home/building to the municipal sewer main.

Figure 1.3: Sewer Lateral Ownership and Responsibility *(except Oak Bay)*

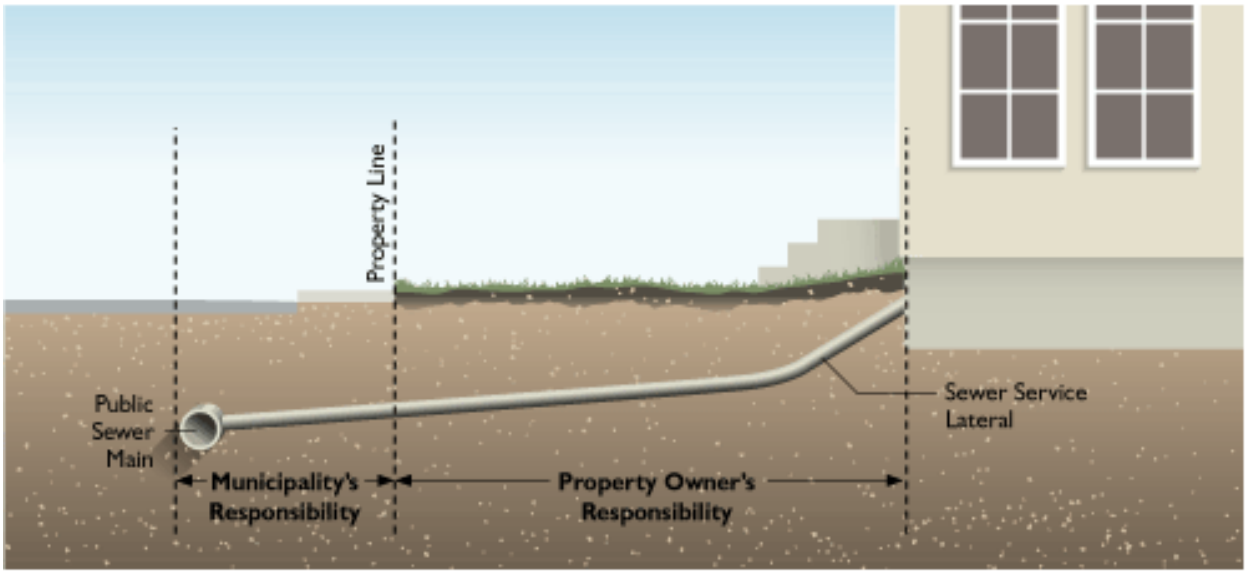
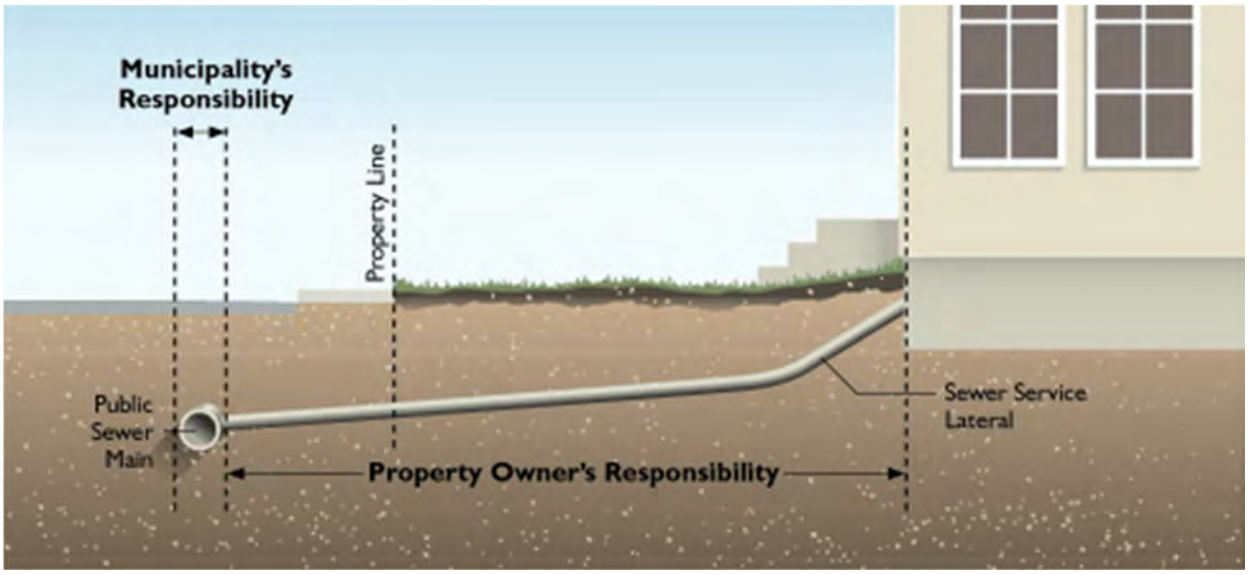


Figure 1.4: Sewer Lateral Ownership and Responsibility in Oak Bay



Municipalities and regional districts generally have mature programs for inspecting, maintaining, and replacing their sewer pipes. In contrast, property owners rarely inspect or repair their laterals unless there has been a pipe failure or blockage.

1.8 Private Property I&I Initiatives

In North America, it is commonly estimated that half of all I&I comes from private properties. As such, it is important that municipalities adopt strategies for addressing it. Since 2010, the core area I&I program has worked on education initiatives and options for private property I&I programs for the core area (Appendix D).

The CRD has two sets of well-developed education approaches for I&I. The goal of both approaches is to encourage the inspection and maintenance of sewer laterals. The first approach (2010) provides a general background on I&I and overflows. This approach is typical for I&I education in North America. The second approach (2020) focuses on encouraging the maintenance of underground pipes to prevent basement flooding. This approach is novel and was built through collaboration with stakeholder groups (insurance industry, realtors, plumbers, home inspectors, etc.). It resonates with the target audience, especially at the following times: time of home sale, when applying for a building permit, when interacting with a plumber or during times of flooding.

The CRD has also worked towards establishing private property I&I programs for the core area. This includes reports summarizing private property I&I approaches from around North America in 2011, 2014, and 2022 as well as novel local solutions. However, addressing private property I&I has proven difficult for the following reasons:

- Politically, these programs are hard to implement because it's so rare for municipalities with separated sewer systems (i.e., separate pipes for sewage and stormwater) to have programs that substantially address private property I&I. There are currently no such programs in Canada. The approximately 40 such programs in the USA were mandated by the Environmental Protection Agency.
- The work is expensive. Pipe inspections cost approximately $250 and fixes typically cost in the thousands.
- Municipalities have liability risks when working on (or requiring work on) private property.
- Municipalities face tough decisions for how they prioritize their finite municipalities resources (i.e., staff time, tax dollars).
- The issue is complicated. For example:
    - Private property I&I is only a problem in catchments with elevated I&I. It's often not a problem in younger catchments/municipalities with low I&I.
    - Fixing cross-connections is the most efficient way to address private property I&I but finding them is complex and time consuming.
    - Voluntary approaches generally have very little uptake.
    - Regulatory programs (i.e. time of sale lateral replacements) have the downside of impacting large numbers of properties that don't contribute to I&I. In addition, efforts to implement these programs consistently fail unless the programs are imposed by a regulator.

1.9 Core Area I&I Program

The I&I program is guided by the Core Area I&I Subcommittee, which was established in the mid-1990s to work regionally to identify various methods of reducing and controlling I&I. The subcommittee comprises representatives from the CRD, Colwood, Esquimalt, Langford, Oak Bay, Saanich, Victoria and View Royal, and typically meets several times per year. The goals of the program are to:

- Prepare annual I&I reports and I&I Management Plans.
- Collect or generate sewer flow data and analyze for I&I.
- Carry out studies to better understand I&I related issues and options for moving forward.
- Assist municipalities with tasks related to I&I.

- Develop strategies to understand and address private property I&I.
- Develop education strategies encouraging the repair and maintenance of private property laterals.
- Work in collaboration with Metro Vancouver and other jurisdictions on issues related to I&I.
- Prepare monthly wastewater flow/I&I reports for each core area municipality and First Nation (aimed at municipal engineering staff and First Nations administration) to help them better understand their sewer flows.

2. KEY ACTIONS: 2022 TO MID 2023

2.1 Colwood

Colwood diligently inspects its new underground infrastructure to manage and prevent I&I. In 2022 to mid-2023, Colwood:

- Discovered and corrected two cross connections.
- Repaired or replaced four sanitary sewer frames and castings.
- Repaired 10 inspection chambers.
- Camera inspected numerous inspection chambers.
- Camera inspected 7,606 meters of municipal sewer mains.
- Identified two sources of I&I in sanitary manholes (fixes in progress).
- Collected long-term flow data from Colwood's Wilfert, Metchosin, and Ocean pump stations along with the DND Belmont pump station (data collected by the CRD's I&I program).

Colwood's is currently drafting a report for council recommending an increase in municipal pump station flow monitoring, to help better understand I&I in the municipality. The plan is to work on this initiative with the CRD's I&I program. (The CRD provided similar support for in the past for Colwood's previous SCADA system).

2.2 Esquimalt

In 2022 to mid-2023, Esquimalt worked on the following I&I-related actions:

- Lined 80 meters of sewer main.
- Removed one cross connection on Gosper Crescent removing a source of contaminants to the Gorge Waterway. (Work was coordinated with the CRD Source Control program.)
- Started investigative work identified in Esquimalt's I&I Management Plan.
- Had a consultant develop a plan for I&I reduction in the Colville Catchment, which was identified as the top priority in the Esquimalt's I&I Management Plan. The plan will be used to hire a consultant for detailed design in the second half of 2023 with construction to follow.
- Procured and installed flow monitoring equipment. Data gathered from the new equipment will help staff narrow down I&I issues.
- Installed 15 new sanitary laterals, 15 new stormwater laterals and 10 catch basins.
- Repaired or replaced 21 sewer laterals and seven stormwater laterals that were impacted by blockages or failures.
- Continued its programs related to sewer cleaning, camera inspections and pipe assessments for the remaining portions of the storm and sanitary collection systems.

2.3 Langford

Langford has a rapidly expanding new sewer system. It diligently inspects new connections and is incentivized to monitor and repair the sewer system to preserve sewer capacity for future growth. In 2022 to mid-2023, Langford worked on the following I&I-related actions:

- Inspected 92 manholes for inflow and infiltration.
- Rehabilitated 37 sewer inspection chambers and inspected a further 54 others for I&I issues.

- Inspected and flushed 500 meters of sewer main for I&I focused camera inspections.
- Plugged suspect manholes in the Happy Valley catchment suspected of being sources of I&I issues during large storms.
- Completed numerous inspections in the Happy Valley Catchment and Phelps catchments to ensure inspection chambers in low lying areas were tight throughout the wet weather season.
- Installed 13 concrete boxes on sewer inspection chambers to protect them against damage and I&I issues.
- Repaired two manholes; one with frame and cover issues, and another with grading issues due to surrounding drainage.
- Camera inspected 5,028 meters of sewer. The inspection identified a municipal sewer pipe that had a significant break/gap in the pipe that was subsequently fixed.

2.4 Oak Bay

Oak Bay will soon be starting construction on the Uplands Sewer Separation Project. The first phase of the project will focus on the Humber catchment. The work will include new stormwater mains, manholes and catch basins on Beach Drive, Norfolk, Midland and Ripon, 53 stormwater catch basins along with 152 new stormwater laterals to each property. It also includes lining three kilometers of sewer main. It's anticipated that construction will start in Fall 2023 and be completed by December 2025.

Oak Bay's public works staff carried out the following I&I related actions:

- Flushed/cut/clean 10.7 kilometers of storm mains and 18.3 kilometers of sewer main.
- Dye tested 71 laterals and found 18 cross connections, nine of which have been fixed.
- Completed 25 storm main spot repairs and 18 sanitary sewer spot repairs.
- Installed seven new catch basins and replaced or repaired an additional 25 catch basins.
- Repaired two sewer laterals and two storm laterals.
- Installed one new stormwater manhole and repaired five storm manholes.

Oak Bay records show that the following I&I related work was carried out on private property:

- 16 new houses were constructed with new sewer laterals, storm laterals and inspection chambers.
- Three unused sewer laterals and one unused storm lateral were capped.
- Nine sewer laterals, 17 storm laterals were newly installed or replaced.
- Many inspection chambers were installed at existing homes.

Through contracts, Oak Bay:

- Is updating it storm drain master plan (ongoing).
- Completed storm drain infrastructure projects on Lincoln Road and Margate Avenue.
- Is in the process of updating sewer and stormwater infrastructure on Dalhousie Street.
- Completed reports including the Beach Drive Sanitary Sewer Feasibility Study and Options analysis, Windsor Sanitary Phase 1 and 2, Thompson Storm main upgrades, and Mayhew Storm main upgrades.
- Is in the planning stages for sewer and/or storm work on Runnymede Avenue, Topp Avenue, Meadow Place, Cadboro Bay and Estevan with construction anticipated in the second half of 2023 or 2024.

Oak Bay is planning its transition from paper-based asset management to a digitized approach. The new approach will standardize what information is captured, improve how the data integrates with the asset management program, and include procedures for improving workflows between Public Works and Engineering. The approach will be more efficient and make it easier to log and retrieve key data such as maintenance history, break history etc. As such, the approach will improve how I&I related defect are discovered and addressed.

Note that some of this work overlaps calendar years and thus may be documented in I&I Annual Reports for consecutive years.

2.5 Saanich

Saanich replaces and renews its sanitary sewer infrastructure through its capital and maintenance programs. Saanich carried out the following capital and maintenance activities in 2022/2023:

- Camera inspected and assessed 18,431 meters of sanitary sewer main, almost all on sanitary lines requiring frequently scheduled maintenance.
- Replaced or installed 2,003 meters of sanitary sewer, including 134 new sewer service connections with inspection chambers.
- Repaired 15 sewer service connections, including three which required full pipe replacements.
- Repaired 16 manhole and replaced three manholes.
- Completed eight sewer spot repairs.
- Removed five stormwater cross connections to the sanitary sewer system (three in Brett pump station catchment, two in Wetherby pump station catchment, and one in Cordova Bay pump station catchment).
- Repaired three manholes found to be causing I&I in Cordova Bay Lift Station catchment.
- Inspected 70 potential no corrode sanitary service connections.

Saanich carried out the following planning initiatives in 2022/2023:

- Update of the Sewer Master Plan and sanitary sewer model resulting in recommendations for addressing system deficiencies and prioritized planning initiatives.
- Work to address “no-corrode” (tarpaper) pipe in Saanich including field verified that Saanich’s list of no-corrode pipes was correct, input the data into Saanich’s GIS, and developed a no-corrode service connection replacement strategy.
- Flow monitoring investigations within the Garnet Lift Station and Ash Lift Station catchments to identify Peak Wet Weather Flows and I&I values.
- Developed an ongoing Closed-Circuit Television (CCTV) Program for all critical sewers and trunk sanitary sewers.

The following work is currently in progress:

- Sewer camera inspection and analysis of 30,295 meters of sanitary sewer mains including high priority sewers (checklist lines) and large diameter trunk mains.
- Sewer camera inspection program planning for high-risk sanitary sewers and forcemains.
- Planning the replacement of four sanitary sewer lift stations.
- Reviewing discharge points into the CRD trunk sewer system including I&I reviews and system capacity constraints.
- Operational reviews of the Beach Park Lift Station and Albina Lift Station including smoke testing for their catchment areas
- Developing an internal sewer flow monitoring program operating procedure and I&I response strategy.

2.6 Victoria

The City of Victoria continues to manage its sewer repair and replacement of its infrastructure as part of the Sewer Master Plan, which was fully updated in 2018.

Highlights of the I&I-related work carried out in 2022 include:

- Four FloDar flow meters were upgraded to 4G modems.
- 63.9 kilometers of sanitary sewer mains were cleaned by City crews.
- 11 kilometers of sewer mains were camera inspected by City crews.
- 5.4 km of sanitary sewer mains were inspected by contractors along with 755 sewer and stormwater laterals.

- 1,510 meters of sanitary sewer mains were relined using cured-in-place technology under the City's annual lining contract.
- 27 sanitary sewer laterals were relined using T-liner technology with a focus on sealing the main/lateral interface. As part of this work, eight inspection chambers were also installed, and 101 meters of sewer lateral were relined using cured-in-place technology.
- 354 linear meters of sanitary sewer mains, and five sanitary sewer manholes were replaced by open trench excavation by city crews and 29 sanitary sewer laterals were repaired/replaced during construction.
- The Disaster Mitigation and Adaptation Fund program under a federal grant has commenced. The program's goal is to upgrade select sewer, storm drain and water main infrastructure over nine years to address challenges due to natural hazards (e.g., earthquakes, climate change as well as increased demand). The design and construction work started in late 2020 and will continue until 2028. As part of the grant, six sanitary sewer manholes and 403 meters of sanitary sewer mains were replaced by open trench excavation by contractors in 2022.

Highlights of the I&I-related work carried out in in the first half of 2023 include:

- 11,900 meters of sanitary sewer mains were CCTV inspected by City of Victoria crews.
- 4,970 meters of sanitary sewer mains were inspected by contractors along with 157 sanitary sewer laterals.
- 77.3 kilometers of sanitary sewer mains were cleaned by City crews.
- Three sanitary sewer manholes were replaced by City crews as part of ongoing system maintenance.
- 130 meters of sanitary sewer mains were repaired by City crews following an assessment of the main condition.
- 12 sanitary sewer laterals were repaired, and 24 sanitary sewer laterals have been replaced by City crews.
- 118 linear meters of sanitary sewer mains was replaced by open trench excavation by City crews along with 11 sanitary laterals.
- One catch basin was upgraded.

2.7 View Royal

View Royal continues its sewer maintenance and repair program, which includes camera inspections, sewer flushing and flow monitoring. In 2022 to mid-2023, View Royal completed the following sewer work related to I&I:

- Continued its program of camera-inspecting and flushing sewer mains and manhole inspections.
- Upgraded the Helmcken Bay pump station, including the addition of a flow meter.

2.8 Esquimalt First Nation

In 2018, the Esquimalt Nation hired a consultant to inspect its sewer system and prepare a report containing recommendations for maintenance, repairs and I&I reduction. In 2019 and 2020, the First Nation removed/capped four unused sewer laterals, completed a point repair, grouted a manhole and renewed its pump station. In late 2023 / early 2024, the CRD plans to install a meter to measure the Nation's sewer entering the regional sewer system. The data will be used for core area sewer cost sharing and to monitor the Nation's I&I trends long-term.

2.9 Songhees First Nation

Songhees Nation does routine sewer maintenance and repairs, as needed. In 2015, the Nation hired a consultant to investigate its sewer system for I&I sources and to provide detailed designs for remediation.

For years, the work was ready for tender and awaiting funding from Indigenous Services Canada. It's been indicated that construction on the I&I reduction project will start in 2024.

2.9 CRD

The CRD carried out a number of I&I related actions in 2022 to mid-2023:

- Flow data vetting and I&I analyses for a large network of sewer flow meters.
- Preparing monthly reports for the core area municipalities and First Nations.
- Supporting the CRD update of Section 5 of the CALWMP, which deals I&I and overflows. (The Province required this update as part of its conditional approval of Amendment 12 of the LWMP.)
- The I&I Program delivered a 1.5-hour webinar to the Canadian Association of Home and Property Inspectors on February 28, 2023. The presentation focused on the CRD's educational materials to encourage homeowners to have their sewer laterals inspected to prevent basement flooding. Home inspectors are key stakeholders and were encouraged to use these materials to educate their clients.
- The CRD is in the process of installing six new permanent flow meters. Five of these meters will be used for cost sharing and assessing compliance with the municipal sewer flow allocations in Bylaw 4304. The remaining meter is needed for operational purposes. Construction (kiosks, conduit, meters, etc.) is anticipated for late 2023 and 2024.
- Through separate budgets, the I&I Program worked with the Saanich Peninsula municipalities to prepare initial I&I management plans (draft) using tools and techniques from the Core Area I&I Program. This included significant work to generate sewer flow data from municipal pump stations.

2.4 Future Initiatives

Table 2.1: Anticipated Next Steps for Supporting I&I Reduction

Action	Description / Timeline
Assessing the Accuracy of Municipal Pump Station Flow Data – Phase 2	• In 2021, a project was carried out to check the accuracy of municipal pump station flow data generated by the I&I program (Phase 1). For a small number of pump stations, it was found that the methods used to create the flow data were not suitable. The purpose of Phase 2 is to assess options for getting reliable flow data for these pump stations.
Rain Gauge Network Review / Calibration Checks	• Rainfall data is critical to I&I calculations. The purpose of this work is to do calibration checks of each of the core area owned rain gauges and to confirm that data is being stored accurately in SCADA.
Pump Station Flow Data for Colwood and Saanich	• Colwood and Saanich currently cannot derive sewer flow data from their sewer pump stations. The CRD and its consultants will work with both to assess options and may provide resources for implementation.
Municipal Pump Station Real Time Flows / I&I Monitoring	• Sewer flow data for a number of municipal pump stations is currently generated every few years by downloading data from SCADA (i.e., wetwell levels and pump starts/stops) and sending it to FlowWorks.com. The calculations are already setup online. The purpose of this task is to automate the process so that data can be viewed in FlowWorks.com in real time.

3. OVERFLOWS

3.1 Overview

Sanitary sewer overflows are releases of raw sewage into storm drains and/or local waterways. The majority of sewer overflows occur during heavy rainfall events as a result of I&I overwhelming the capacity of the sewer system. Overflows may also occur as a result of sewer blockage, pipe failure and pump station failures. Sewer overflows can expose people, pets and the environment to sewage, harmful chemicals, infectious bacteria, viruses, parasites, etc. The risks associated with sewage releases are influenced by the following characteristics of the receiving environments:

- public use (e.g., shoreline access, kayaking, swimming, shellfish harvesting)
- habitat sensitivity (e.g., productive or endangered habitats such as shellfish areas, kelp beds and herring spawning sites)
- flushing characteristics (e.g., exposed coastline or in-land waters)

CRD staff monitor regional overflow points through the CRD SCADA system, which alerts operators when overflows occur. The core area municipalities have similar systems for monitoring their pump stations for overflows. When overflows occur, they are investigated, documented and reported to Emergency Management BC.

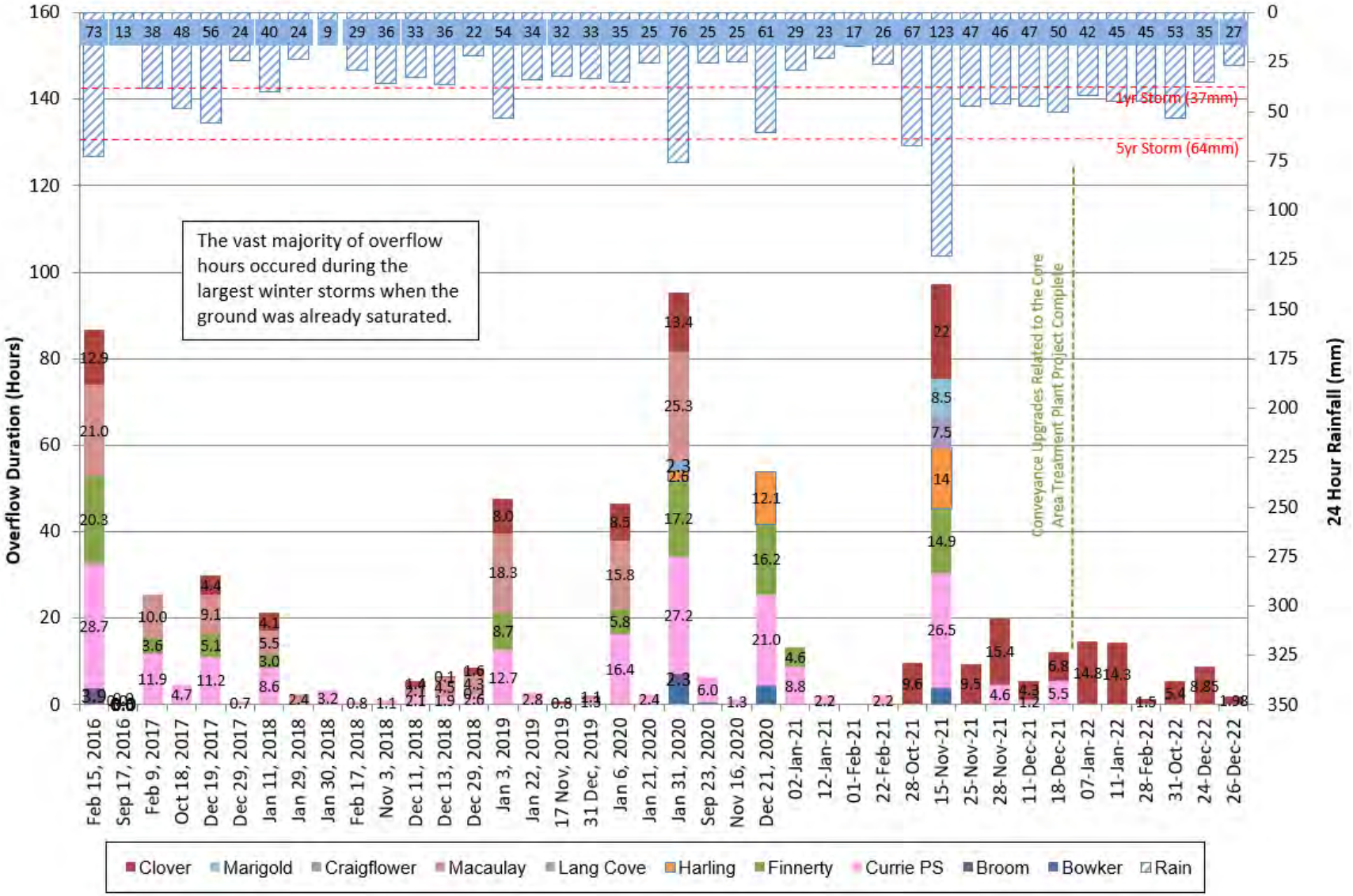
3.2 Reported Overflows

Figure 3.1 summarizes the specific overflow events by year for 2016 to mid-2023. Note that:

- The vast majority of overflow hours occur during very large storm events when conditions are saturated.
- Since the treatment plant project conveyance upgrades were complete (early 2022), the Clover long outfall is the only location in the core area to overflow for sub-5-year rainfall events.
- Overflows from the Humber and Rutland pump stations are excluded from Figure 3.1 because their catchments have combined sewers which overflow during most storms. Oak Bay already has an approved plan with the Province for separating these combined sewer catchments.

Since 2008, overflows to moderate and high sensitivity receiving environments (i.e. Bowker Creek, Gorge Waterway) have essentially been eliminated thanks to a number of high profile projects (see Table 1.2). The only exceptions to this were overflows to Bowker Creek: 1) during a summer storm when the Trent pump station was down for maintenance in 2013, related to the construction of the Trent Forcemain Connector in 2020, and an overflow during a 100-year storm in 2021.

Figure 3.1: CRD Overflows from 2016 to March 2023 (excluding the Uplands)



4. I&I RATES FOR THE CORE AREA

Regional I&I flow rates for the core area are generally analyzed every three years because there are not enough significant storm events to justify I&I analyses on an annual basis. In general, there are between zero to three significant storm events per year. The most recent I&I results analysis was completed using data up to March 2022. The results are documented in this report.

The results of the I&I analyses are summarized as follows:

- A map of the entire core area displaying the most recent 5-year peak I&I rates for individual catchments is in Figure 4.1.
- The individual I&I rates within each municipality have been converted into an overall weighted average for each municipality and compared with previous years' estimated I&I rates (see Table 4.1). This table is useful in providing a performance measure benchmark for each municipality to track overall I&I trends, but it must be interpreted with caution because it summarizes a vast amount of data into single municipal averages. For instance, a single very high I&I sub-area could skew the overall municipal average, or a single year of erratic weather and/or flow data could lead to misleading results. Therefore, it is prudent to allow sufficient time to measure the full effect of any I&I reduction work in addition to gathering, compiling and analyzing weather patterns and I&I rates to track overall trends.
- I&I tends to predictably increase as sewers age due to the deterioration of sewer material, types of sewer material, the environment and the installation practices of the day.
- In general, the rate of I&I tends to increase in proportion to the age of the system due to deterioration of sewer material, types of sewer material, the environment and the installation practices of the day. Older systems usually need more work than newer systems. The primary goal of the I&I program is to reduce I&I to an optimum cost-benefit level. It is expensive to size wastewater facilities to accommodate vast amounts of I&I, but it can be equally expensive to rehabilitate or replace sewers to reduce I&I. Therefore, the optimal I&I level is the most cost-effective combination of I&I reduction and I&I accommodation.

Figure 4.1: I&I Rates Map for the CRD Core Area

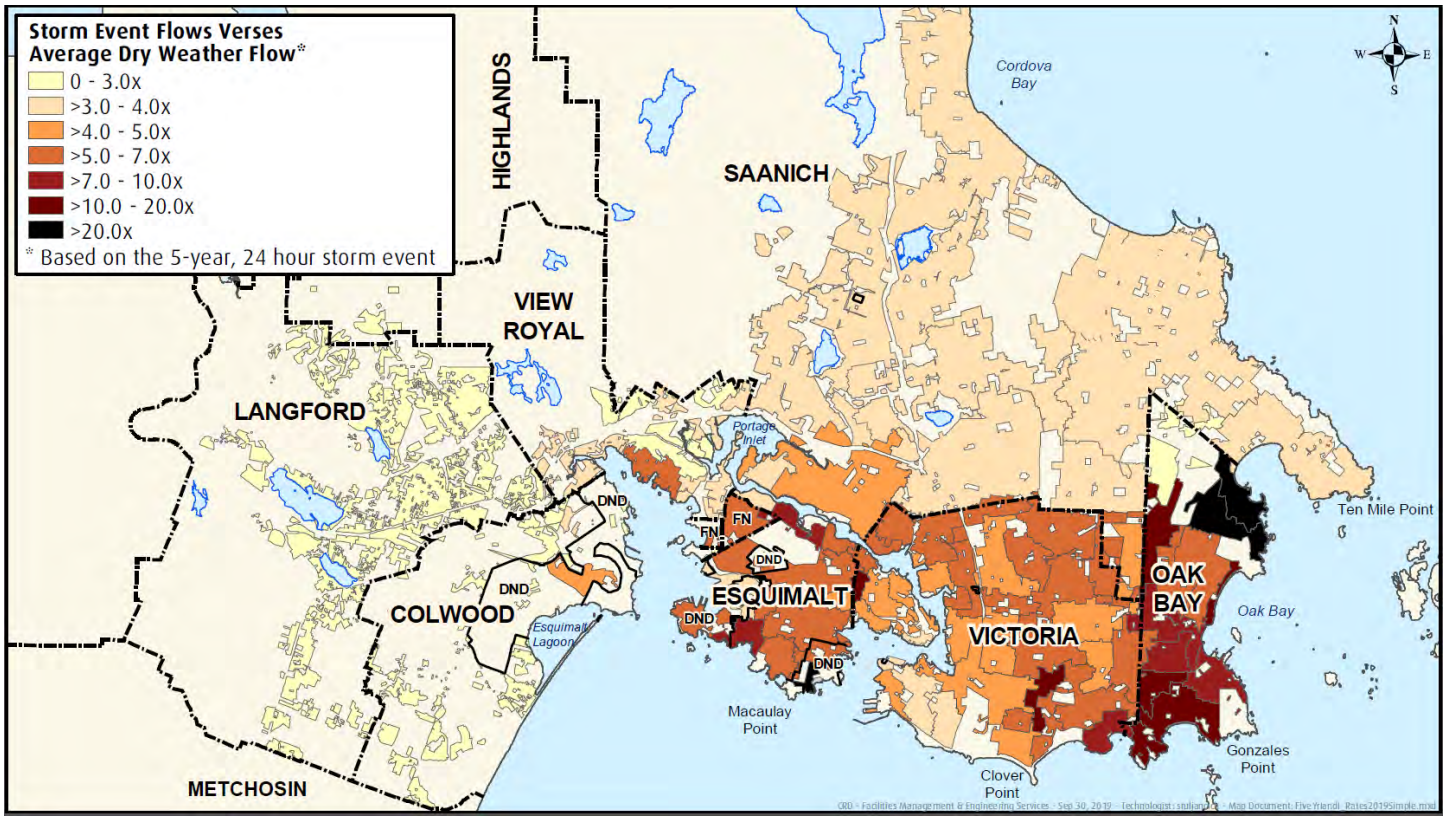


Table 4.1: Summary of CRD Core Area Municipal Peak 5-Year I&I Rates

Municipality	Ave. Age of Sewers	Estimated 5-Year I&I Rate [1] (L/ha/day)						5-Year Peak Flows [1] Compared to Average Dry Weather Flow (ADWF)
		2010	2012	2014	2016	2019	2022	
Colwood	20	10,309	8,540	7,965	8,777	8,777	8,777	2.3 x ADWF
Esquimalt	87	52,412	52,599	48,727	51,471	48,786	56,015	6.9 x ADWF
Langford	17	11,023	9,364	9,222	10,606	8,587	10,291	2.0 x ADWF
Oak Bay [2]	76	51,873	48,133	46,600	55,686	56,123	56,123 [3]	9.0 x ADWF
Saanich	48	15,514	13,613	15,427	15,223	14,369	15,932	3.4 x ADWF
Victoria	95	96,734	94,281	84,650	76,026	73,490	75,162	5.4 x ADWF
View Royal	35	12,322	12,294	13,216	14,525	11,541	16,037 [4]	3.5 x ADWF
First Nations	43	35,160	35,160	48,052	48,052	38,573	44,457	5.1 x ADWF

[1] Based on peak 24-hour flows. The rates are generally based on data from multiple flow meters, which are interpolated into a weighted average over each particular municipality. A 5-year storm event I&I flow rate is used, since the Municipal Sewage Regulation stipulates that a sewer system must be able to convey flow under this condition without an overflow.

[2] Excludes the combined sewer in the Uplands (which has I&I rates over 200,000 l/ha/day). Also excludes overflows from the rest of Oak Bay's sewer system because the overflow volumes aren't currently measured.

[3] Oak Bay's rate was not updated due to routine sub-5-year overflows. It's expected that these overflows will be eliminated (except in the Uplands) due to the treatment plant project conveyance system upgrades (early 2022) and that future storms will be suitable for updating Oak Bay's overall I&I rate.

[4] View Royal's increased rate is the result of changes in how the rate was calculated.

5. SEWER ALLOCATIONS

CRD Bylaw No. 4304 (2020) includes maximum allowable sewer flows for each input into the core area trunk sewer system. Each input has an allocated average dry weather flow and an allocated peak daily flow.

Table 5.1 compares measured peak 24-hour flows to the allocated flows from Bylaw No. 4304 and was prepared for information purposes only. Cells highlighted in grey note planned upgrades or known issues. Some of the known issues will be resolved now that the conveyance system upgrades related to the treatment plant project are complete (early 2022). Others are being addressed with current and planned future capital projects.

Table 5.1: Measured Flows (2022) versus Allocated Flows from Bylaw No. 4304

Allocation Point	Allocated Peak Daily Flow (ML/day)	Peak 24 Hr. Flow			
		Past Year (Mar 2022 to Mar 2023)		5-yr Rainfall Event (Statistical; based on multiple storms from recent years)	
		ML/day	% of Allocated Capacity	ML/day	% of Allocated Capacity
COLWOOD					
Total *(Calculated as Parson's minus Meaford. During large storm events, the Parson's meter is not reliable, and the storm flows are calculated. The Parson's meter is being replaced in late 2023 / early 2024).*	**18.8**	**5.6**	**29%**	**7.7**	**41%**
ESQUIMALT					
Esquimalt Panhandle	0.48	0.35	72%	0.44	91%
Lang Cove PS (DND)	0.50	0.27	53%	2.00	0.85
Lang Cove PS (Esquimalt)	0.78	0.36	46%	3.10	2.10
Dockyard	4.04	3.16	78%	3.52	87%
Kinver	1.76	1.72	98%	2.20	125%
Pooley Place *(Flows are based on a correlation with an adjacent catchment. Catchment is not suitable for metering due to small size and multiple connections to the CRD system.)*	0.24	0.17	69%	0.21	87%
Devonshire	7.40	7.36	99%	10.91	147%
Wilson	1.48	1.13	76%	1.48	100%
Head	6.72	5.34	79%	7.82	116%
Anson	0.97	0.48	49%	0.63	65%
Total	**28.36**	**21.77**	**77%**	**30.16**	**106%**
LANGFORD					
Total *(Meaford)*	**56.48**	**15.40**	**27%**	**17.01**	**30%**
OAK BAY					
Windsor	11.68	13.78	118%	16.24	139%

Allocation Point	Allocated Peak Daily Flow (ML/day)	Peak 24 Hr. Flow			
		Past Year (Mar 2022 to Mar 2023)		5-yr Rainfall Event (Statistical; based on multiple storms from recent years)	
		ML/day	% of Allocated Capacity	ML/day	% of Allocated Capacity
Humber *(This is catchment has combined sewers. It frequently overflows during moderate to large storm events but the overflow volumes aren't measured. The peak flow values noted to the right are less than actual as they do not include overflow volumes.)*	2.40	4.14	172%	4.29 [1]	177% [1]
Rutland *(This is catchment has combined sewers. It frequently overflows during moderate to large storm events but the overflow volumes aren't measured. The peak flow values noted to the right are less than actual as they do not include overflow volumes.)*	1.48	5.07	342%	5.92 [1]	400% [1]
Currie Net *(The data is based on storm events since February 2022 when the treatment plant conveyance system upgrades were completed; eliminating upstream overflows for sub 5-year rainfall events.)*	3.88	6.91	178%	>6.91 [1]	>178% [1]
Currie Lift Station	6.48	8.64	133%	12.29	190%
Harling Point PS	0.79	1.35	171%	1.86	236%
Total *(The peak flows noted to the right are lower than actual due to unmeasured upstream overflows at Humber and Rutland. Also, the data is only based on storms since the treatment plant conveyance system upgrades were completed in early 2022.*	26.48	37.957	143%	>37.957 [1]	>143% [1]
SAANICH					
Marigold PS	52.76	52.76	43%	35.32	67%
City Boundary	23.52	23.52	31%	10.97	47%
Harriet	13.08	13.08	55%	9.37	72%
Townley	2.44	2.44	49%	1.97	81%
Haultain	2.27	2.27	29%	1.14	50%
Arbutus	28.31	28.31	33%	20.95	74%
Haro - UVic	3.17	3.17	26%	0.81	26%
Penrhyn LS	3.73	3.73	52%	2.99	80%
Total	**131.56**	**131.56**	**38%**	**83.52**	**63%**
VICTORIA					
Cecelia	12.57	9.65	77%	14.76	117%
Chapman & Gorge *(Flows are based on a correlation with an adjacent catchment. Plans are in place to install a meter in 2024)*	1.43	4.11	294%	4.98	356%
Selkirk *(Flows are based on a correlation with an adjacent catchment. Plans are in place to install a meter in late 2023 / 2024)*	1.11	0.22	20%	0.39	35%
Langford - Vic West	0.77	0.77	100%	1.32	171%
Hereward	7.65	4.04	53%	6.52	85%
Sea Terrace *(The flume appears to surcharge during large storms. Options are being explored to address this issue.)*	1.32	2.96	224%	2.96	224%
Trent Net	29.25	24.75	84%	43.06	147%
Hollywood	2.16	5.07	235%	7.43	344%

APPENDIX A

Allocation Point	Allocated Peak Daily Flow (ML/day)	Peak 24 Hr. Flow			
		Past Year (Mar 2022 to Mar 2023)		5-yr Rainfall Event (Statistical; based on multiple storms from recent years)	
		ML/day	% of Allocated Capacity	ML/day	% of Allocated Capacity
Olive	92.24	34.48	37%	63.00	68%
Clover Net *(Flows are calculated using data from other cost sharing meters.)*	100.71	49.15	49%		
Total	**153.19**	**99.07**	**65%**	**150.64**	**98%**
VIEW ROYAL					
Craigflower Pump Station *(Flows for this catchment are substantially impacted by the Parson's mag meter, which is being replaced in late 2023 / 2024 to improve accuracy during storm events.)*	14.16	3.5	25%	7.1	50%
Shoreline Trunk	0.55	0.4	71%	0.50	91%
Total	**14.17**	**3.9**	**27%**	**7.1**	**50%**
ESQUIMALT NATION					
Esquimalt Nation *(Flows are calculated. Plans are in place to install a meter in late 2023 / early 2024)*	**0.28**	**0.21**	**74%**	**0.35**	**126%**
SONGHEES NATION					
Songhees Nation	2.36	1.82	77%	2.49	106%
Maplebank	0.04	0.010	24%	0.005	13%
Total	**2.52**	**1.82**	**72%**	**3.09**	**106%**

[1] *Value is lower than actual because there are unmeasured upstream overflows.*

6. CLOSING

The purpose of this report is to provide an update on work related to I&I in the core area from 2022 to mid-2023. The work supports commitments located in Section 5 of the CALWMP, which addresses the *Management of Infiltration and Inflow and Control of Wastewater Overflows.* The report included:

- summary of special projects carried out by the core area I&I program
- I&I related updates from each of the core area municipalities
- overflow statistics
- current I&I rates
- comparisons of wet weather flows to the sewer flow allocations in Bylaw No. 4304

Appendix A:
Core Area LWMP Commitments Related to I&I

CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN
(Consolidated Version incorporating all applicable amendments, February 2019)

SECTION 5
MANAGEMENT OF INFILTRATION AND INFLOW AND CONTROL OF WASTEWATER OVERFLOWS

GOAL

Condition 17(1)(a) of Schedule 1 of the Municipal Sewage Regulation (MSR) requires that if infiltration and inflow (I&I) causes daily flows to be greater than 2 times the average dry weather flow (ADWF), the discharger must address "how I&I can be reduced as part of a Liquid Waste Management Plan" and condition 17(2) outlines the treatment and discharge requirements for such flows.

The goal of the I&I program is therefore to comply with this requirement of the MSR by developing and implementing a strategy aimed at reducing the amount of rainwater and groundwater entering the core area's sanitary sewer system from both the publicly owned and privately owned parts of the system in order to reduce and eventually eliminate overflows from the system.

How the Capital Regional District (CRD) proposes to substantially meet the requirements of Condition 17(2) is addressed in Sections 4 and 6 and in the draft operational certificate in Section 12.

COMMITMENTS

The CRD and the participating municipalities commit to the following actions to reduce I&I sufficiently to reduce maximum daily wet weather flows to less than four times the average dry weather flow by 2030:

1. Continue flow monitoring in each municipality to further refine priority areas for remediation.

2. Develop, by the end of 2011, and submit to the Ministry of Environment, comprehensive inflow and infiltration management plans for the core area that will:
   a) Identify and evaluate options and opportunities that promote the minimization of groundwater and rainwater I&I into municipal sanitary sewer systems, including I&I originating from service laterals (private and public sections of sewer connections).
   b) Identify needed changes to legislation and legal authority to enable options and strategies.
   c) Identify opportunities for the inspection of private sewers connected to municipal sewers:
      (i) as part of the municipal process in evaluating and issuing renovation and building permits for serviced properties; and/or
      (ii) at the time of property transfer; and/or
      (iii) targeted inspections.
   d) Require the repair or replacement of private sewers that have cross-connections between storm sewers and sanitary sewer or are identified as being in poor condition.

3. Update, by the end of 2011, and enforce sewer use bylaws to prohibit the construction of rainwater and groundwater connections to sanitary sewers.

4. Implement the overflow reduction plans contained in the sanitary sewer overflow management plan, which was submitted to the Ministry of Environment in June 2008. These plans are summarized as follows:

Table 5.1
Prioritized Order of CRD Overflow Reduction Plan
(Updated based on current information)

Priority No.	O/F Name	Action Plan	Estimated Year of Completion	Estimated Cost ($2008) to Complete
1.	Monterey Avenue MH0130	Complete and commission Trent pump station	2008 (Complete)	$500,000
2.	Macaulay Point Pump Station	Complete installation of standby power	2008 (Complete)	$800,000
3.	Harling Pump Station	Install a screen on the overflow pipe	2008 (Complete)	$10,000
4.	Shoreline Drive MH0340	Commence with capacity deficiency study and identify upgrade options	2010	$50,000
5.	Penrhyn Lift Station	Investigate pump and genset capacity	2010	$600,000
6.	Humber Combined Sewers	Oak Bay plans to separate the sewers in the Uplands area	2015	To be determined (Oak Bay cost)
7.	Rutland Combined Sewers	Oak Bay plans to separate the sewers in the Uplands area	2015	To be determined (Oak Bay cost)
8.	Head Street MH0040	Twin the NWT from Macaulay Point to MH0055	2015	$20,000,000
9.	Sea Terrace MH0055	Twin the NWT from Macaulay Point to MH0055	2015	as above
10.	Broom Road	Extend Trent forcemain down to Clover Point	2017	as above

Table 5.2
Prioritized Order of Colwood Overflow Reduction Plan

Item No.	Work Name	Description	Estimated Year of Completion	Estimated Cost ($2008) to Complete
1.	SCADA Upgrade	Upgrade the SCADA system to collect flow data from all pump stations.	2008 (Complete)	$10,000
2.	CCTV Inspection	Continue to inspect all new sewers that are installed to ensure they are well constructed	Annually	$15,000
3.	Sewer System Maintenance	Continue to clean all mains and manholes, and repair as necessary.	Annually	$50,000
4.	Lift Station Maintenance	Continue to maintain all lift station components to ensure that they run efficiently.	Annually	$72,500

Table 5.3
Prioritized Order of Esquimalt Overflow Reduction Plan

Item No.	Work Name	Description	Estimated Year of Completion	Estimated Cost ($2008) to Complete
1.	Sewer Relining	Relining and repairs to sewer mains rated poor and poorest	Completed	n/a
2.	Combination Manhole Separation	• 148 manholes remain to be separated • 29 manholes to be separated in 2008 • Five manholes separated per year from 2009 to 2025	2025	$950,000
3.	Grafton Pump Station Upgrade	New electrical power supply, kiosk and controls	2008 (Complete)	$38,000
4.	Grafton Pump Station Upgrade	Pump replacement	2012	$40,000
5.	Sewer Main Replacement	Replacement of undersize sewer main on Craigflower Road between Tillicum Road and Lampson Street	2009 (Complete)	$250,000
6.	Municipal Wide Smoke and Dye Testing	Smoke and dye testing underway to identify cross connections in attempts to reduce I&I in the future. The full scope of the project has not yet been determined.	2010	unknown

Table 5.4
Prioritized Order of Langford Overflow Reduction Plan

Item No.	Work Name	Description	Estimated Year of Completion	Estimated Cost ($2008) to Complete
1.	Sewer Master Plan Upgrades	Continue with infrastructure upgrades as identified in the Sewer Master Plan.	Ongoing	$0.2-0.5 Million
2.	CCTV Inspection	Continue to video inspect all new sewers that are installed to ensure that they are well constructed.	Annually	$15,000
3.	Manhole Inspection	Continue to visually inspect manholes to ensure that they do not leak.	Annually	$15,000
4.	Pump Station Maintenance	Continue to maintain all pump station components to ensure that they run efficiently.	Annually	$200,000
5.	Sewer System Maintenance	Continue to keep the sewers clean and free from defects.	Annually	$25,000

Table 5.5
Prioritized Order of Oak Bay Overflow Reduction Plan

Item No.	Work Name	Description	Estimated Year of Completion	Estimated Cost ($2008) to Complete
1a.	Uplands Sewer Separation Humber Catchment	Construction of new storm sewer	To be confirmed by December 31/2019	$5,285,000
1b.	Uplands Sewer Separation Rutland Catchment	Construction of new storm sewer	To be confirmed by December 31/2019	$9,815,000
1c.	Uplands sanitary sewer pipeline rehabilitation	Rehabilitation of the former combined sewer pipeline to address infiltration	To be confirmed by December 31/2019	$3,000,000
2.	Oak Bay Inflow and Infiltration Rehabilitation Project	Continue with phased rehabilitation projects in various catchments	Annually	$500,000
3.	CCTV Inspection	Video inspection of sewer mains	Annually	$25,000
4.	Sewer System Maintenance Program	Maintenance to keep sewers clean and free from defects.	Annually	$240,000

Table 5.6
Prioritized Order of Saanich Overflow Reduction Plan

Item No.	Work Name	Description	Estimated Year of Completion	Estimated Cost ($2008) to Complete
1.	Dysart Pump Station	Complete construction of the new Dysart pump station.	2008 (Complete)	$2,500,000 (est.)
2.	The following pump stations will be upgraded: Vantreight Lift Station Murray #1 Pump Station Murray #2 Pump Station Arundel Pump Station Glenwood Pump Station Ashley Pump Station Dunkirk Pump Station Colquitz Pump Station Gorge Pump Station	Rebuild pump station and add a new standby generator.	2009-2015	$500,000 Annually

Table 5.7
Prioritized Order of Victoria Overflow Reduction Plan

Item No.	Work Name	Description	Estimated Year of Completion	Estimated Cost ($2008) to Complete
1.	James Bay I&I Pilot Project	Commence with the rehabilitation of sewer mains, laterals and manholes in James Bay.	2010	$3,000,000
2.	Hydraulic Model	Continue to complete a hydraulic model of the City's entire sanitary sewer collection system.	2009	$100,000
3.	Overflow Elimination	Investigate, monitor and abandon, if possible, existing known overflow locations.	2010	$100,000
4.	Combined Manhole Separation	Investigate, monitor and initiate a program to separate combined manholes.	2015	$400,000

Table 5.8
Prioritized Order of View Royal Overflow Reduction Plan

Item No.	Work Name	Description	Estimated Year of Completion	Estimated Cost ($2008) to Complete
1.	Upgrade Pump Stations	Upgrade pump stations where required to improve pump performance, provide standby power and collect better data.	2017	$140,000
2.	CCTV Inspection	Continue to video inspect all new sewers that are installed to ensure that they are well constructed.	Annually	$20,000
3.	Manhole Inspection	Continue to visually inspect manholes to ensure that they do not leak.	Annually	$5,000
4.	Pump Station Maintenance	Continue to maintain all pump station components to ensure that they run efficiently.	Annually	$120,000
5.	Sewer System Maintenance	Continue to keep the sewers clean and free from defects.	Annually	$40,000

APPENDIX C

Excerpt from the Capital Regional District Core Area Liquid Waste Management Plan – Sanitary Sewer Overflow Management Plan, June 2008.

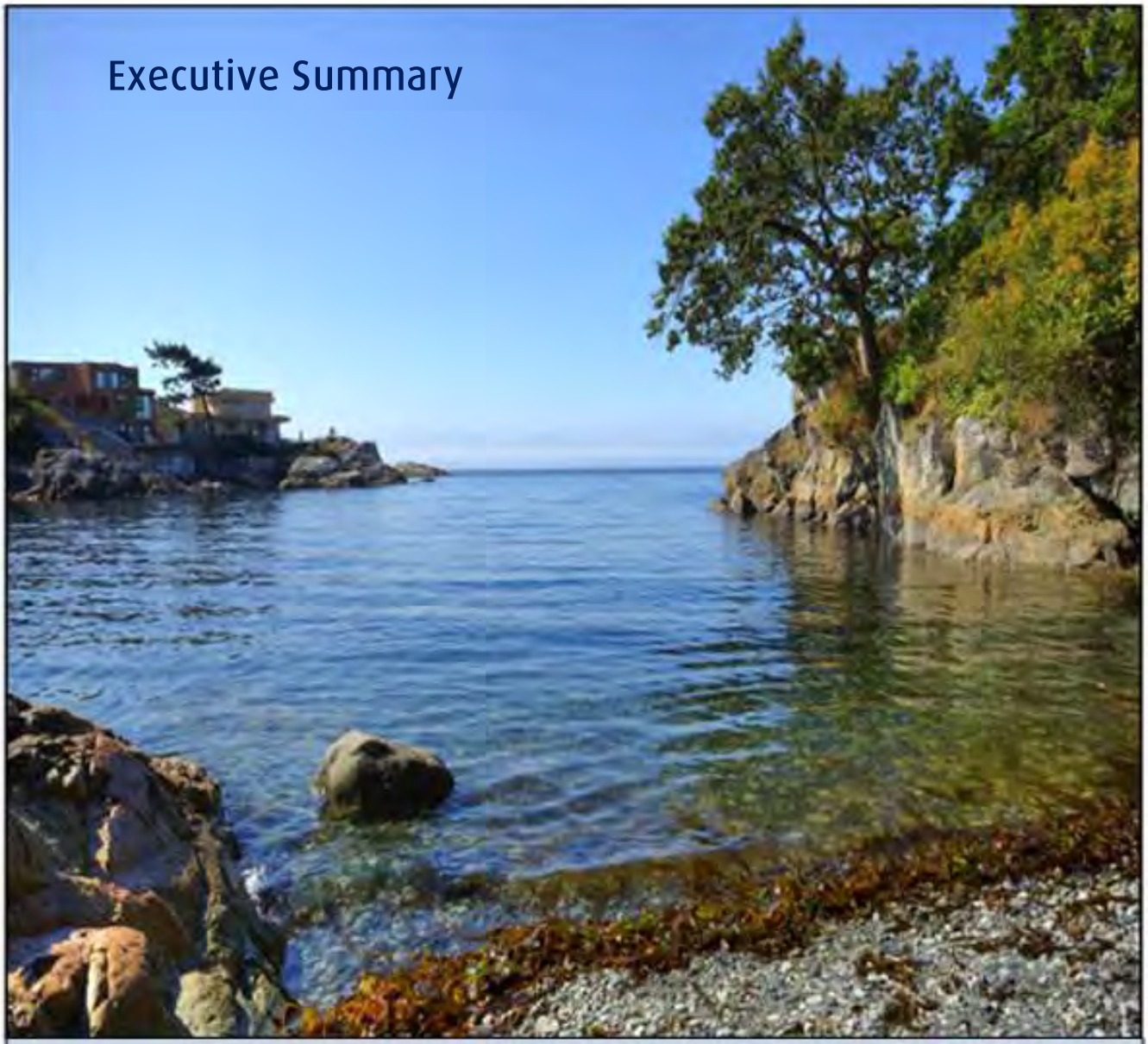
Appendix B:

EXCEUTIVE SUMMARY: CORE AREA I&I MANAGEMENT PLAN: 2017 UPDATE

Capital Regional District

Core Area Inflow & Infiltration Management Plan

2017 Update



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CORE AREA INFLOW & INFILTRATION MANAGEMENT PLAN

EXECUTIVE SUMMARY

Purpose

The purpose of the plan is to guide the Capital Regional District (CRD) and its municipal partners towards Inflow and Infiltration (I&I) reduction in a responsible, cost effective, integrated and well-planned manner. The primary objective of the plan is to reduce overflows and I&I to less than four times average dry weather flow (4xADWF), based on a five year return period, at Clover Point and the Core Area Wastewater Treatment Plant at McLoughlin Point by 2031.

Background

The core area municipalities are actively managing inflow and infiltration (I&I), a term that describes rainwater and groundwater that mistakenly gets into the sanitary sewer system. Inflow refers to rainwater that enters the sewer through plumbing cross connections and infiltration refers to groundwater that seeps into the sewer through cracks, faulty joints, etc. A certain amount of I&I is unavoidable and is accounted for in routine sewer design. However, too much I&I results in excessive sewer flows which can lead to:

- leaking sewers and overflows that can contaminate the environment and create public health concerns;
- backing up of sewage into buildings and homes that can destroy belongings and require expensive restoration;
- increasing operation and maintenance costs to convey and treat the increased flows; and
- consuming sewer capacity which could require expensive premature upgrades to the system.

The content of the Core Area I&I Management Plan is organized in the following sections: 1) Overview; 2) Overflows; 3) Asset Management; 4) Climate Change; 5) Public Property I&I; 6) Private Property I&I; 7 to 17) Municipal Plans; and 18) Monitoring & Verification.

Regulatory Context

The core area wastewater system is governed by the Core Area Liquid Waste Management Plan (LWMP). This plan was first approved by the Ministry of Environment in 2003. Since that time, there have been a number of amendments to the plan, the most recent being Amendment No. 11 (approved in 2016).

Section 5 of the plan relates to I&I and overflows and includes the following commitments:

> *The CRD and the participating municipalities commit to the following actions to reduce I&I sufficiently to reduce maximum daily wet weather flows to less than four times the average dry weather flow by 2030:*
>
> 1. *Continue flow monitoring in each municipality to further refine priority areas for remediation.*
>
> 2. *Develop, by the end of 2011, and submit to the Ministry of Environment, comprehensive inflow and infiltration management plans for the core area that will:*
>   - *Identify and evaluate options and opportunities that promote the minimization of groundwater and rainwater I&I into municipal sanitary sewers, including I&I originating from service laterals (private and public sections of sewer connections)*
>   - *Identify needed changes to legislation and legal authority to enable options and strategies*
>   - *Identify opportunities for the inspection of private sewers connected to municipal sewers:*
>   i. *as part of the municipal process in evaluating and issuing renovation and building permits for serviced properties; and/or*

   ii. *at the time of property transfer, and/or*
   iii. *targeted inspections*
- *Require the repair or replacement of private sewers that have cross-connections between storm sewers and sanitary sewers or are identified as being in poor condition.*

3. *Update by the end of 2011, and enforce sewer use bylaws to prohibit the construction of rainwater and groundwater connections to sanitary sewers.*

4. *Implement the overflow reduction plans contained in the sanitary sewer overflow management plan, which was submitted to the Ministry of Environment in June 2008.*

Overflows

In 2014, the CRD submitted an updated core area overflow management plan to the Province. The plan documents the CRD's overflow related commitments and summarizes the significant work carried out related to overflows.

Asset Management

Asset management programs for sewer collection systems generally focus on the planned replacement of infrastructure based on remaining service life. Municipalities need to demonstrate that they are following the Asset Management BC Framework to qualify for federal gas tax funding.

Climate Change

Over the next five years, the CRD will carry out actions supporting a vulnerability assessment of CRD sewer infrastructure due to climate change. The actions include updating the core area sewer model, running the sewer model using climate change scenarios, and providing recommendations based on the results.

Public Property Inflow and Infiltration

I&I and overflow quantification helps municipalities to understand the condition and/or performance of their sewer systems. Quantified measurements can be compared to benchmarking standards and allow municipalities to track I&I performance. The most useful quantification methods are repeatable and follow a standardized approach. Examples of I&I quantification methods proposed in this plan include: statistical analysis of sewer flow data to calculate I&I rates, quantifying overflows based on given storm events, ranking structural integrity of sewer pipes based on closed circuit television (CCTV) inspections, counting cross-connections through smoke testing, documenting manhole condition and calibrating system performance using hydraulic models.

The public property I&I reduction plans are consistent with the systematic approach noted in the Infraguide for "Infiltration/Inflow Control/Reduction for Wastewater Collection Systems". Infraguide was a partnership between the Federation of Canadian Municipalities, the National Resource Council and Infrastructure Canada. It created best practice reports for municipal infrastructure. The guide proposes that I&I reduction programs be divided into the following three phases:

- Phase 1 - involves flow monitoring and data collection. The data is used to identify catchments that should be targeted for sewer investigation work.
- Phase 2 - involves sewer investigation work to identify specific sources of I&I. The data is used to create rehabilitation plans and to prioritize I&I rehabilitation work.
- Phase 3 - involves sewer rehabilitation work. The rehabilitation work is based on investigation data from Phase 2. If investigation data is not yet available, then archetype I&I rehabilitation programs should be used.

Archetype I&I rehabilitation programs were developed to provide a framework under which any given sewer catchment can be evaluated and related to an actionable plan to move forward with I&I assessments and

sewer rehabilitation. These programs are to be used as planning tools. They should be interpreted from a strategic planning level and are suitable for establishing long-range budgets and for steering the development of targeted I&I reduction programs.

Private Property Inflow and Infiltration

The I&I Management Plan (2012) contained a five-year plan for implementing a common private property I&I approach for the core area. The plan was to consult with stakeholders and the public from 2012 to 2014, recommend an approach in 2015 and implement that approach in 2016. Significant effort was made to come up with a common approach. By 2014, it was clear that a common approach wasn't appropriate as the core area municipalities have different I&I rates, different issues and require different solutions. Three of the core area municipalities have older sewers and elevated I&I and they would benefit from strong programs to reduce I&I. The other four municipalities have newer sewers and have low I&I. These municipalities would prefer to focus on I&I prevention activities. The I&I Subcommittee agreed that each municipality should implement their own custom approach to suit their needs and should draw on the significant research and support that the CRD has provided.

In late 2014, the CRD Board directed that a sample model bylaw related to the inspection of private sewer laterals connected to municipal sewers be prepared. The sample bylaw was built using past I&I Subcommittee feedback and content from the Pinna Report (2014) which documented the best I&I related language from existing Canadian and American bylaws. It underwent legal review and I&I Subcommittee review for general acceptability. The sample model bylaw was presented to the Core Area Liquid Waste Management Committee on May 13, 2015. The Core Area Liquid Waste Management Committee recommended that the sample bylaw be discussed with the I&I Subcommittee to determine how best to move it forward. The I&I Subcommittee decided that it would be best to incorporate the powers from the sample model bylaw into the existing municipal sewer use bylaws. Subsequently, a gap analysis was carried out comparing the powers from existing municipal sewer bylaws to the draft sample model bylaw and presented to the member municipalities through the I&I Subcommittee.

The next steps for addressing private property I&I include:

- assisting municipalities with the further development of private property I&I reduction plans;
- supporting the implementation of the powers from the sample model bylaw for private property I&I into existing or new municipal sewer bylaws;
- developing common public education materials for use by key industry stakeholders (i.e. plumbers, realtors and home owners);
- updating the general education approach to focus on homeowner protection (i.e. basement flooding) and environmental protection and how I&I plays an integral role; and
- continued collaboration with Metro Vancouver and the National Water and Wastewater Benchmarking Initiative's I&I Task Force.

Municipal Inflow and Infiltration Plans

Each of the core area municipalities has participated in the development of their own individual municipal I&I plans. The municipal plans are organized into eight sections:

1. *Overview*
2. *Catchments* - A list and map of the long-term flow monitoring catchments that will form the basis for evaluation of I&I rates and I&I management planning
3. *Inflow & Infiltration Data* – Summary of historical data collected, current data collected, summary of I&I analyses results, and flow data analyses
4. *Sewer Infrastructure Maintenance & Capital Work* – summary of routine sewer work, notable work completed between 2012 and 2015, and notable work planned for 2016 to 2020
5. *Asset Management* – high level municipal tools, approaches, etc.
6. *Bylaws* – Contains a comparison of the key powers suggested by the CRD Private Property I&I Model Bylaw to those found in each of the municipality's existing sewer bylaws

7. *Budget* – Summary I&I budget related information
8. *Summary* - A high level summary and a graph showing projected peak wet-weather flow (PWWF) relative to 4xADWF for the entire municipality from 2011 to 2031

Monitoring and Verification

Monitoring and verification of I&I Management Plan objectives will be achieved by using the following metrics:

1. Comparison of peak wet weather flow (PWWF) with 4xADWF at Clover Point and the proposed wastewater treatment plant. This will include graphs comparing projected PWWF and ADWF verses actual rates recorded over time.
2. Flow monitoring of all catchments to track I&I rates paying extra attention to measuring flows before and after targeted I&I reduction work to verify results.
3. Tracking overflows by location, frequency, duration and receiving environment sensitivity rating to monitor trends and verify results.
4. Completion of detailed and specific I&I management strategies for each catchment to replace the archetype plans.
5. Reporting of efforts and costs applied towards I&I management on a regular basis.

The CRD will continue to provide annual reports on the I&I program to the Core Area Liquid Waste Management Committee. Every second year the I&I analyses results will be updated, as is the current practice, and an I&I benchmarking template will be filled out for each of the core municipalities. The benchmarking template is currently in development and will include a number of performance measure criteria to help gauge the level of effort each municipality is applying to I&I management.

Forecasted Inflow and Infiltration Reduction

Additional work will be needed to meet the LWMP commitment of reducing wet weather flows below 4xADWF at Clover Point and the McLoughlin Point Treatment Plant by 2031. However, the gap between 4xADWF and peak wet-weather flow (PWWF) is decreasing, which is significant as it takes a substantial investment of time and resources to reverse the natural trend of I&I increasing with sewer age.

Colwood, Langford, Saanich and View Royal already meet the 4xADWF performance target. This is largely due to having young sewers built with modern materials and good installation practices. These municipalities will need to focus on I&I prevention in order to continue to meet the performance target.

Esquimalt, Oak Bay, and Victoria have older sewers which tend to have elevated I&I rates. If we extrapolate out current I&I rates, it is evident that these municipalities will need to focus on I&I reduction to meet their commitments not to exceed the 4xADWF performance target. This will require increased focus and funding on I&I reduction to achieve their reduction targets. Financial support (i.e. grants) from senior government would help to accelerate the I&I reductions. It is worth noting that:

- Esquimalt rehabilitated all of its sewers and manholes that required structural repairs in the early 2000's. It has also separated almost all of its combined manholes. Esquimalt's next steps for addressing I&I will involve actions related to I&I from sewer laterals and stormwater sewer upgrades.
- Oak Bay's I&I reduction work focused on developing a plan for the separation of the combined sewers in the Uplands area. Oak Bay finalized the separation plan in 2017. This was Oak Bay's highest I&I related priority and was required as part of a LWMP commitment. Oak Bay also completed the significant task of collecting sewer flow data for each of its outstanding catchments using portable meters. Oak Bay's next steps for I&I reduction will be to implement the Uplands' separation project, to complete the collection of sewer camera inspection data for the municipality and to update its sewer master plan based on the results of the camera inspections.
- Victoria has collected sewer flow data for its outstanding catchments, and has also performed camera inspections and smoke testing throughout the entire municipality. The data will be analyzed and actions put into Victoria's sewer master plan. Updating a sewer master plan is a substantial project. Victoria

had to delay the update of its sewer master plan until the location of the core area treatment plant was finalized because some of the locations considered for the plant would have resulted in dramatic changes to the plan. Work on the sewer master plan commenced in late 2016 after the regional treatment plant location was finalized.

The CRD is committed to assisting individual municipalities in the development of suitable private property I&I initiatives. Such initiatives could accelerate a municipality towards meeting its performance targets as it is estimated that 50% of I&I enters the sewer system on private property. Currently, there are no significant private property I&I initiatives in the core area; however, the research needed to develop such commitments is complete.

In addition, it is anticipated that significant progress will be made through the continuation and further development of I&I related education, stakeholder engagement, regulatory mechanisms, permit requirements, time of home sale options and through targeted pilot programs.

Key Future Actions

The next steps for addressing private property I&I include:

- supporting the implementation of the powers from the sample model bylaw for private property I&I into existing sewer municipal bylaws or into a new bylaw;
- assisting municipalities with the development and implementation of municipality specific private property I&I reduction plans;
- developing common public education materials for use by key industry stakeholders (i.e. plumbers, realtors and home owners);
- updating the general education approach to focus on homeowner protection (i.e. basement flooding) and environmental protection and how I&I plays an integral role; and
- continued collaboration with Metro Vancouver and the National Water and Wastewater Benchmarking Initiative's I&I Task Force.

The next steps for addressing public property I&I include:

- identifying "semi-combined" sewers in the core area and developing plans to address them;
- taking leadership on I&I benchmarking and taking action to introduce nationally;
- updating the core area sewer model, running the sewer model using climate change scenarios, and providing recommendations based on the results; and
- ongoing I&I metering, analyses and program development.

Conclusion

The Ministry of Environment reviewed and approved Amendment No. 11 of the Core Area LWMP. The LWMP included four commitments related to I&I and overflow management which are fulfilled by the I&I Management Plan.

The plan is purposeful and guided by a number of federal, provincial, regional and municipal regulatory documents and best practices. It provides the framework for how I&I can be quantified and establishes priority programs and approaches for each municipality and the CRD to follow. A strategy has been developed for moving the issue of private property I&I forward and the whole program will be monitored, verified and reported out using standard metrics and templates.

All core area municipalities assisted in the preparation of the plan and the specific actions and programs were developed based on current CRD and municipal funding levels for I&I and sewer service budgets. Modelling the results of implementing this plan show that the goal of reducing I&I to 4xADWF at Clover Point and the wastewater treatment plant is achievable but will require additional effort.

Appendix C:

EXAMPLE OF A MONTHLY SEWER REPORT FOR CORE AREA MUNICIPALITIES AND FIRST NATIONS

CRD IWS
Core Area Wastewater System

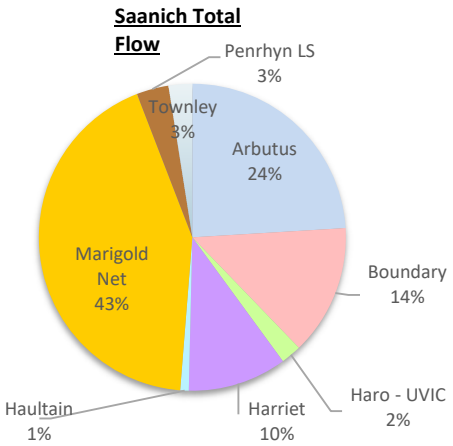
Monthly Wastewater Flow Report for Saanich - February 2023

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

1. Monthly Wastewater Flow Data: Feb 2023

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

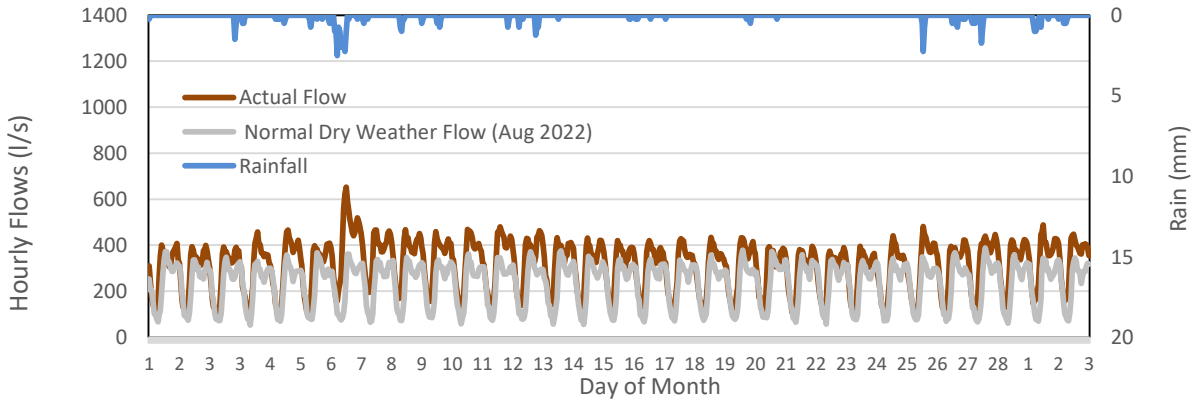
Flow Meter Name	Total Monthly Flow	
	m^3	%
Arbutus	180,593	24%
Boundary	103,437	14%
Haro - UVIC	16,285	2%
Harriet	78,052	10%
Haultain	6,763	1%
Marigold Net	322,223	43%
Marigold PS	*415,348*	
(Minus Hartland Leachate)	*41,520*	
(Minus Hartland Centrate)	*51,605*	
Penrhyn LS	25,193	3%
Townley	18,892	3%
Monthly Flow	**751,440**	**100%**



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

2. Saanich Hourly Sewer Flows Feb 2023

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



3. Key Wastewater Flow Stats: Feb 2023

Metric	Flow (m^3) [1]
Total Monthly Flow	751,440
Average Daily Flow	26,837
Minimum Daily Flow	23,169
Peak 24hr Flow (PWWF) [2]	37,318
Peak 1hr Flow [3]	56,372
Average Dry Weather Flow (ADWF) [4]	21,396
Estimated Daily Domestic Flow [5]	17,163

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

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

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

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

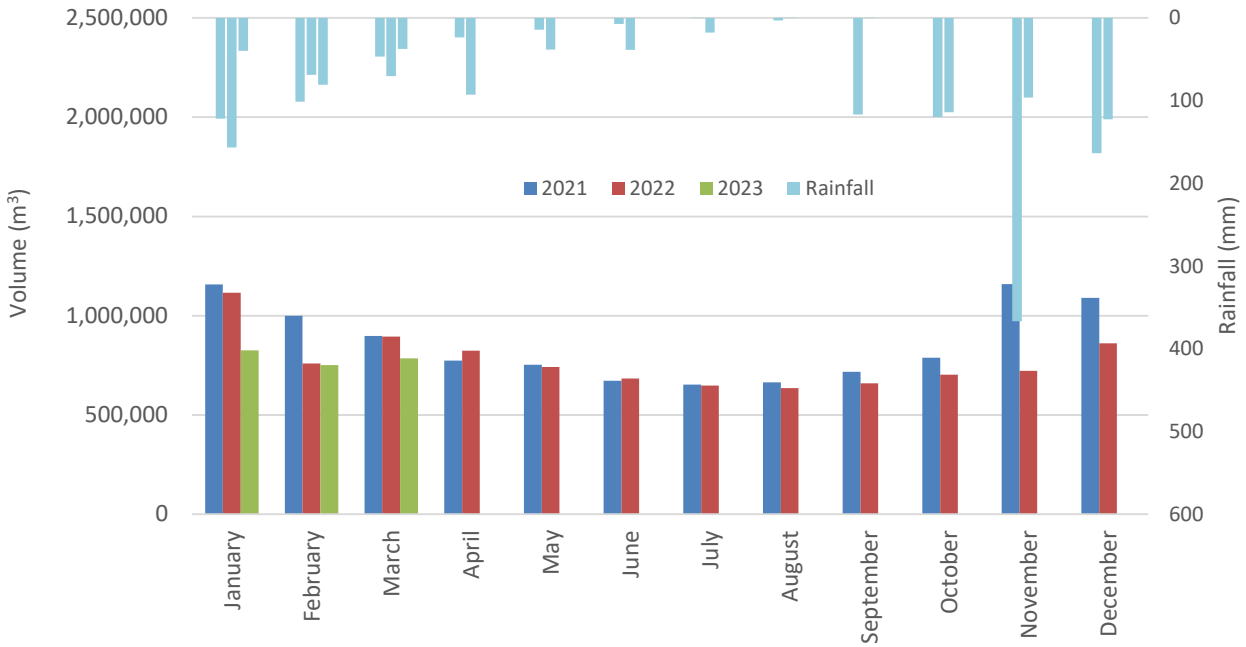
[5] Calculated as ADWF minus summer groundwater (70% of minimum hourly flow x 24 hours).

Overflows (monitored by CRD): Feb 2023

Location	Date
Finnerty Outfall	None

4. Monthly Wastewater Flow: Historical vs. Current

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



5. Inflow & Infiltration Flow Summary: Feb 2023

Key I&I Metrics	Value [1]
Total Monthly Flow (m^3)	751,440
Estimated Domestic Flow for Month (m^3) [2]	480,555
I&I Volume for Month (m^3) [3]	270,885
I&I Volume for Month (% total flow)	36%
Peak 24hr Flow (PWWF) [4]	1.7 x ADWF
Peak 1hr Flow [5]	2.6 x ADWF

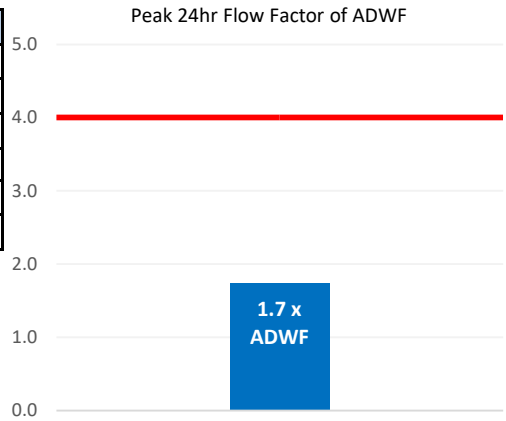
[1] Excludes overflow volume

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

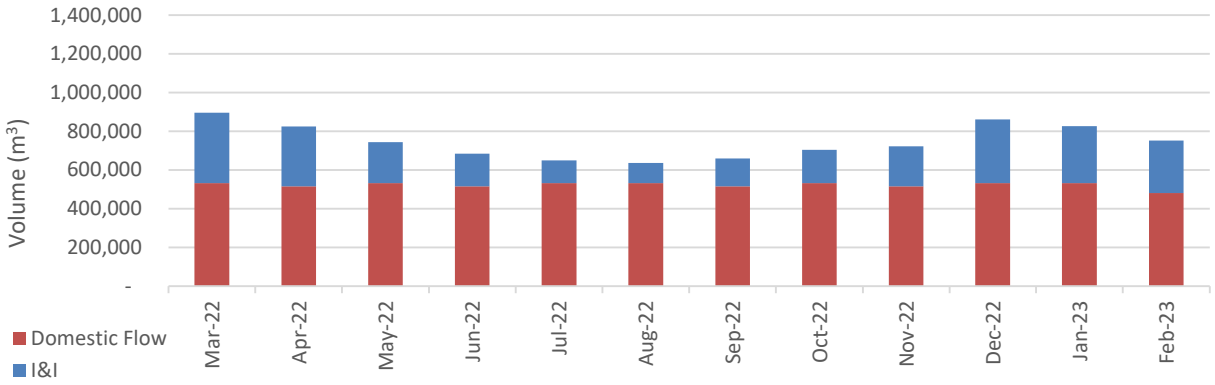
[3] Determined by subtracting Estimated Domestic Flow from Total Monthly Flow

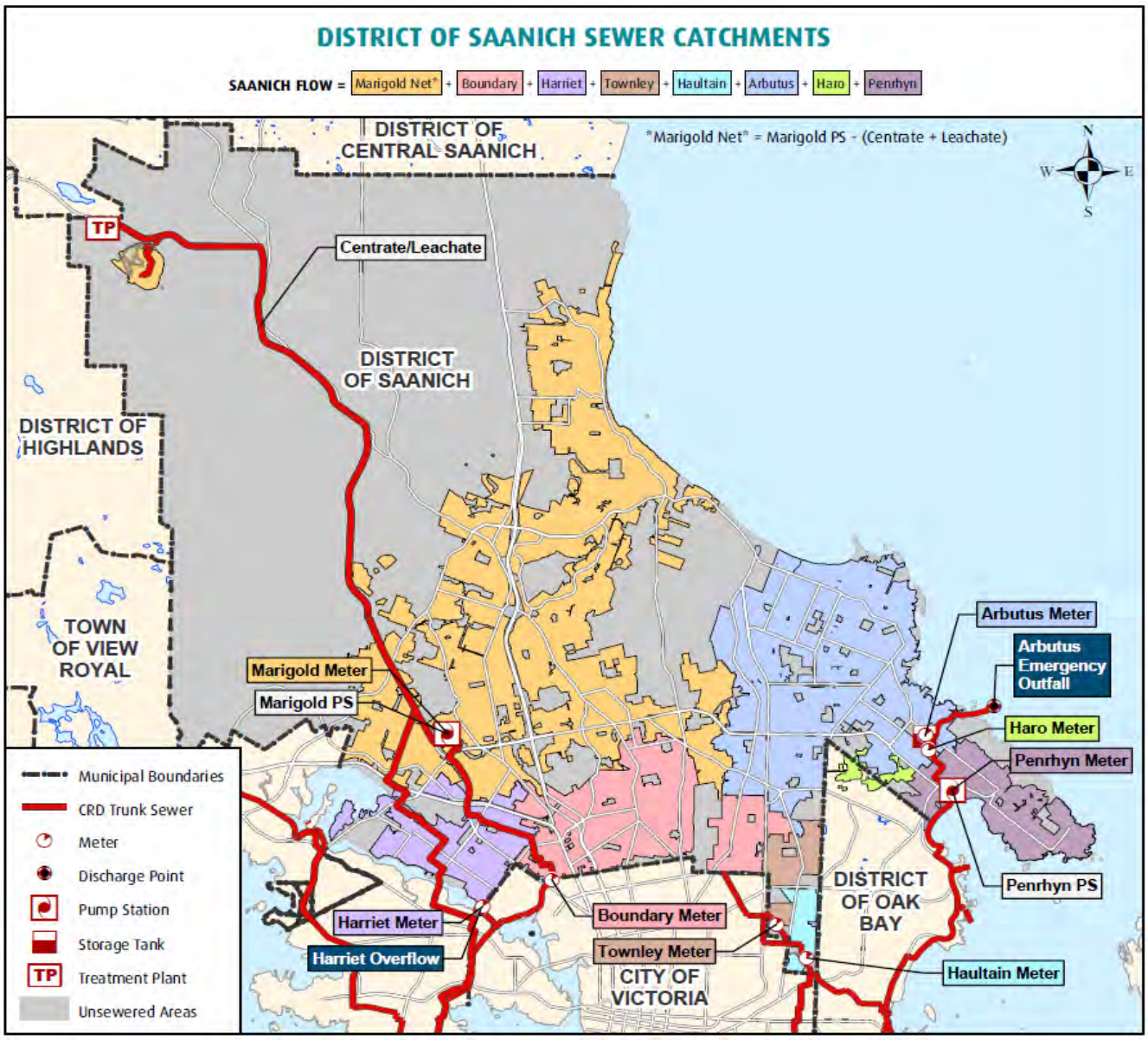
[4] Determined by dividing Peak 24hr Flow from section 3. by ADWF

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



6. Monthly Flows: I&I and Domestic Flow

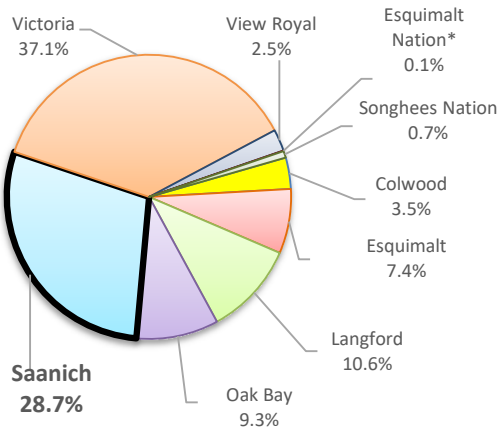




7. Regional Flow Data: Feb 2023

Participant Area	Total Monthly Flow	
	m^3	%
Colwood	92,787	3.5%
Esquimalt	192,347	7.4%
Langford	277,742	10.6%
Oak Bay	243,798	9.3%
Saanich	**751,440**	**28.7%**
Victoria	969,856	37.1%
View Royal	64,802	2.5%
Esquimalt Nation*	2,236	0.1%
Songhees Nation	19,527	0.7%
Total	**2,614,535**	**100.0%**

*Flows are calculated based on engineering estimates



Appendix D:

SUMMARY OF CRD PRIVATE PROPERTY I&I WORK AND EDUCATION WORK TO DATE

Summary of CRD Private Property Inflow & Infiltration Actions to Date

Timeline	Action
Ongoing	• CRD: - review case studies of jurisdictions taking steps to deal with private property I&I - meet with various experts and share information - work with and share information with Metro Vancouver, which is also working to establish programs to address private property I&I - are members of the National Water and Wastewater Benchmarking Initiatives I&I Task Force - provide I&I education to the public • Two municipalities within the core area (Oak Bay and Esquimalt) require that laterals be inspected and fixed if required, when applications are made for major building permits. • Each of the core area municipalities have sewer bylaws or council policies that relate to private property I&I.
2022 to mid-2023	• Updated a CRD report that documented private property I&I programs from around North America to better understand programs options, costs, uptake, etc.
2020 to mid-2022	• Completing a study looking at downspout disconnection programs and best practices from across Canada.
2019 to 2020	The CRD has developed the following items to support the updated I&I education approach: • a brochure and banner that fully aligns with the Generally Accepted Principles document, • updated website content to align with the new approach, • attendance at a list of key regional events to interface with the public, including annual home show events, municipal events and key stakeholder events, and • a slideshow for presenting to realtors.
2018 to 2019	The educational approach for addressing private property I&I was updated. The approach has the same desired outcomes as the existing approach: to promote the inspection and maintenance of sewer laterals. However, the approach focuses on preventing basement flooding which is more relevant to homeowners. The central document for the approach is the "Generally Accepted Principles" document, which: • has full acceptance from the key stakeholder groups, • aligns the various stakeholder groups on the topic, • is designed to answer questions that the public may have on the issue in a clearly communicated fashion, • establishes relationships with the various I&I related stakeholders, • was developed in partnership with over 20 key stakeholder groups (local, provincial and national). Through consensus, the focus was extended to all private property underground pipes, including foundation drains and stormwater laterals, and • can be used by stakeholder to educate the public. In late 2018, the CRD completed a report documenting how each of the key stakeholder groups preferred to be engaged on the I&I topic. The report also documented the level of outreach effort deemed appropriate for each of these groups.

Timeline	Action
2017	The following is a list of private property I&I work carried out in 2017 and the first half of 2018, details of which are located in Section 2: • completed a background report to better understand I&I-related stakeholders, • a report showing how to identify semi-combined sewers using GIS, • collected additional private property I&I models bylaws from across Canada, and • Enforcement Approach for Addressing Cross Connections, as presented by the City of Burnaby to the Core Area I&I Subcommittee.
2016	• In general, the I&I Subcommittee agreed that the powers from the sample model bylaw should be incorporated into existing municipal sewer bylaws. To support this, the CRD retained consultants, Pinna Sustainability Inc., to compare the powers in the sample model bylaw to the powers in each municipality's existing sewer bylaws, and a gap analysis was completed. Based on the results, recommendations were made for updating each of the municipal sewer bylaws using language from the sample model bylaw. One municipality noted that they may include parts of the sample model bylaw as part of a new municipal bylaw. • On February 11, 2016 the CRD presented to the National Water and Wastewater Benchmarking Initiatives I&I Task Force on the topic of "Implementation of a Private Property I&I Management Program". The CRD is considered a frontrunner in Canadian municipalities regarding private property I&I efforts, and staff shared the CRD's experiences and plans for moving forward.
2015	• In late 2014, the Core Area Liquid Waste Management Committee (CALWMC) asked the CRD to prepare a sample model bylaw related to private property I&I. The sample bylaw was built using past I&I Subcommittee feedback and the best parts of existing bylaws from across Canada and the US, as documented in the report by Pinna Sustainability Inc. in 2014. The draft bylaw was reviewed by a lawyer and by the I&I Subcommittee for general acceptability. The sample model bylaw was prepared and presented to the CALWMC on May 13, 2015. The committee recommended the sample bylaw be discussed with the I&I Subcommittee to determine how best to move it forward. The I&I Subcommittee decided it would be best to incorporate the powers from the sample model bylaw into the existing municipal sewer use bylaws. One municipality (Esquimalt) may customize the sample model bylaw into a stand-alone bylaw suitable for Esquimalt.
2014	• On May 22, 2014, the I&I Subcommittee unanimously recommended that each municipality be able to customize their approach for meeting agreed-upon targets. This could involve a model bylaw that could be altered, as required, to meet the needs of individual municipalities. Overall, it was understood that municipalities with elevated I&I need a different approach than municipalities with low I&I. • In 2014, the CRD commissioned a study by Pinna Sustainability Inc. to prepare a memo entitled Update on Private Property I&I Programs. It contains supplementary research for the Stantec Report (2010). Notably it: - summarizes effective "drivers" for private property I&I programs, - details private property I&I programs from across Canada by province,

Timeline	Action
	- contains updates on private property I&I programs from the US, - documents potential problems related to implementing private property I&I programs and includes North American examples, and - summarizes "good practices" that should apply to all private property I&I programs. For each "good practice" there is example bylaw language taken from existing Canadian sewer bylaws. • In late 2014, the CALWMC asked the I&I program staff to make a presentation to it in early 2015 and to include a working "draft" model bylaw in the presentation.
2013	• Staff shortlisted private property I&I options and refined the options. • The I&I Subcommittee reviewed the shortlist and provided feedback on multiple occasions. • Options were discussed with representatives from stakeholder groups (i.e., real estate, building association, building inspection and insurance industry, etc.)
2012	• Staff prepared private property I&I specific education materials related to the program options noted in the Stantec report, including: - handouts summarizing each of the program option categories, - a detailed comparison table of the options, and - a reference guide covering frequently asked questions. • In June 2012, CRD staff hosted a workshop focused on private property I&I for elected representatives. The purpose of the meeting was to present background information, options for moving forward, and to open dialogue on the topic. New ideas were discussed and those who were present endorsed the implementation of the consultation portion of the private property I&I plan. • On November 30, 2012, CRD staff put on a workshop for members of the Victoria Real Estate Board. The workshop was a collaborative effort between the Core Area I&I Program, Onsite Program (i.e., septic systems) and Cross Connection Program. The purpose of the workshop was to provide education and to promote the use of infrastructure inspection in the real estate industry.
2011	• CRD staff provided an overview of the 2010 Stantec report to elected representatives and recommended a full workshop in 2012. • CRD staff initiated an I&I-related educational program that included new educational materials and education outreach events including: an I&I brochure for residents, a comprehensive website, a survey used in 2012 to 2014, and educational videos. Public education regarding I&I will now be ongoing.
2010	• CRD staff commissioned a report, completed by Stantec Inc., showing potential management options for addressing private property I&I. The report included a summary of private property I&I programs used throughout North America, costs/effectiveness of these programs, and legal options for implementing programs in the region. A copy of this report is on the CRD website. • A workshop was held with municipal and regional staff to initiate discussion about options for implementing private property I&I programs, objectives, and potential barriers. It was agreed that the key objectives for a private property I&I program would be to: protect the environment, create system capacity, minimize costs, increase ownership responsibility and awareness, and minimize liability issues. A summary of this workshop is located in the Stantec report.

Summary of CRD Private Property Inflow & Infiltration Education Work to Date

Action	Description
2020 to 2023	Private Property I&I: • As a result of the pandemic, a number of planned education actions had to be put on hold. • The PPI&I education brochures were available for display at municipal halls, etc. • Efforts to set up "lunch and learns" with realtor offices were postponed until in-person presentations could be made. • On February 28, 2023, the CRD presented a 1.5 hour webinar to the Canadian Association of Home and Property Inspectors regarding the CRD's educational materials related to "inspecting and maintaining underground pipes to reduce the risk of basement flooding". Public Property I&I: • Integrated Water Services and the Core Area I&I Program continue to produce monthly sewer use reports for each of the core area municipalities and First Nations (Section 2.2).
2019 and 2020	**Private Property Inflow & Infiltration** On January 23, the CRD had a booth at the 2020 Vision Victoria Real Estate Board conference and debuted the new I&I education approach to key stakeholders. The reception to the approach was exceptional. Of key significance: • Many realtors visited the booth and were interested in both the brochures and the detailed Generally Accepted Principals document. In general, they noted that the materials were both useful and relevant to them. • Five realtor offices invited the CRD to present at their "Lunch n Learns" or "Coffee Talks", which realtor offices typically have each month. It is believed that the CRD could schedule similar talks for most real estate offices in the region as they are always looking for relevant content for these talks. • Tony Joe, a local radio personality, invited the CRD to have an extended interview related to the I&I education approach on "The Whole Home Show with Tony Joe", a radio show on CFAX 1070 that focusses on real estate issues. It is a great sign that Tony Joe sees the value in the updated education approach because not only is he a realtor, he is a past president of the Victoria Real Estate Board and an Instructor for the British Columbia Real Estate Association. As a result of COVID-19, a number of planned education actions had to be put on hold. To move things forward, efforts will be made to target the key stakeholder groups (i.e., plumbers, home inspectors, realtors) potentially through targeted video's, webinars, etc.
	Public Property I&I Integrated Water Services and the Core Area I&I Program worked together to develop monthly wastewater flow reports for the core area municipalities and First Nations.
2018 and 2019	Developed an updated education approach making it more relevant to home owners and related stakeholders, as summarized in Section 2.2. The rollout of the updated approach was initiated in the fourth quarter of 2019.

Action	Description
2011 to Present	I&I was added to CRD outreach events where I&I materials were displayed along with those other CRD programs. In general, I&I was "featured" at 4 key events (e.g., home shows) per year and the materials made available upon request at an additional 10 events. From talking to CRD outreach staff, attending outreach events and talking to stakeholder groups, it is clear that I&I knowledge is low with the general public. Most people have little interest in the topic and say that they will deal with issues if they come up.
2010	The I&I program, in collaboration with the core area municipalities, created a brochure, two sets of videos to help explain I&I, and developed an I&I website. This information is valuable when staff are providing notification to neighborhoods of upcoming video inspection, smoke testing, sewer rehabilitation or other work related to I&I management. The overall approach was consistent with other municipalities around North America.

Key I&I Stats for the Core Area Municipalities and First Nations

Jurisdiction	Ave. Pipe Age [1] *(years)*	Contributes to Overflows *(for sub 5yr. storms)*	Peak 24hr Flow *(for a statistical 5yr. storm)*	
			Compared to ADWF [2]	Compared to CRD Bylaw Flow Allocation [3]
Colwood	20	No	2.3 x ADWF	41% Allocated Flow
Esquimalt	87	No	6.9 x ADWF	106% Allocated Flow
Langford	17	No	2.0 x ADWF	30% Allocated Flow
Oak Bay	76	Yes	~9.0 x ADWF	>143% Allocated Flow
Saanich	48	No	3.4 x ADWF	63% Allocated Flow
Victoria	95	Yes	5.4x ADWF	98% Allocated Flow
View Royal	35	No	3.5 x ADWF	~50% Allocated Flow
Esquimalt First Nation [4]	43	No	5.1x ADWF	101% Allocated Flow
Songhees First Nation	43	No	5.1x ADWF	106% Allocated Flow

[1] Average pipe age directly correlates to I&I as pipes deteriorate over time. Additionally, pipe materials and installation practices have improved greatly over time.
[2] The key I&I commitment in the Liquid Waste Management Plan is to be under 4x ADWF by 2030.
[3] The peak 24-hour flow allocations in CRD Bylaw 4304 were setup based on requests from each municipality/First Nation, review of the core area sewer model and consultant expertise.
[4] This jurisdiction is not flow metered. The flows are based on a correlation with a nearby catchment as recommended by a consultant.

Appendix C

Comparison of Measured Flows to Allocated Flows in Bylaw 4304

Allocation Point	Allocated Peak Daily Flow (ML/day)	Peak 24 Hr. Flow			
		Past Year (Mar 2022 to Mar 2023)		5-yr Rainfall Event (Statistical; based on multiple storms from recent years)	
		ML/day	% of Allocated Capacity	ML/day	% of Allocated Capacity
COLWOOD					
Total *(Calculated as Parson's minus Meaford. During large storm events, the Parson's meter is not reliable, and the storm flows are calculated. The Parson's meter is being replaced in late 2023 / early 2024).*	**18.8**	**5.6**	**29%**	**7.7**	**41%**
ESQUIMALT					
Esquimalt Panhandle	0.48	0.35	72%	0.44	91%
Lang Cove PS (DND)	0.50	0.27	53%	2.00	0.85
Lang Cove PS (Esquimalt)	0.78	0.36	46%	3.10	2.10
Dockyard	4.04	3.16	78%	3.52	87%
Kinver	1.76	1.72	98%	2.20	125%
Pooley Place *(Flows are based on a correlation with an adjacent catchment. Catchment is not suitable for metering due to small size and multiple connections to the CRD system.)*	0.24	0.17	69%	0.21	87%
Devonshire	7.40	7.36	99%	10.91	147%
Wilson	1.48	1.13	76%	1.48	100%
Head	6.72	5.34	79%	7.82	116%
Anson	0.97	0.48	49%	0.63	65%
Total	**28.36**	**21.77**	**77%**	**30.16**	**106%**
LANGFORD					
Total *(Meaford)*	**56.48**	**15.40**	**27%**	**17.01**	**30%**
OAK BAY					
Windsor	11.68	13.78	118%	16.24	139%
Humber *(This catchment has combined sewers. It frequently overflows during moderate to large storm events but the overflow volumes aren't measured. The peak flow values noted to the right are less than actual as they do not include overflow volumes.)*	2.40	4.14	172%	4.29 [1]	177% [1]
Rutland *(This catchment has combined sewers. It frequently overflows during moderate to large storm events but the overflow volumes aren't measured. The peak flow values noted to the right are less than actual as they do not include overflow volumes.)*	1.48	5.07	342%	5.92 [1]	400% [1]

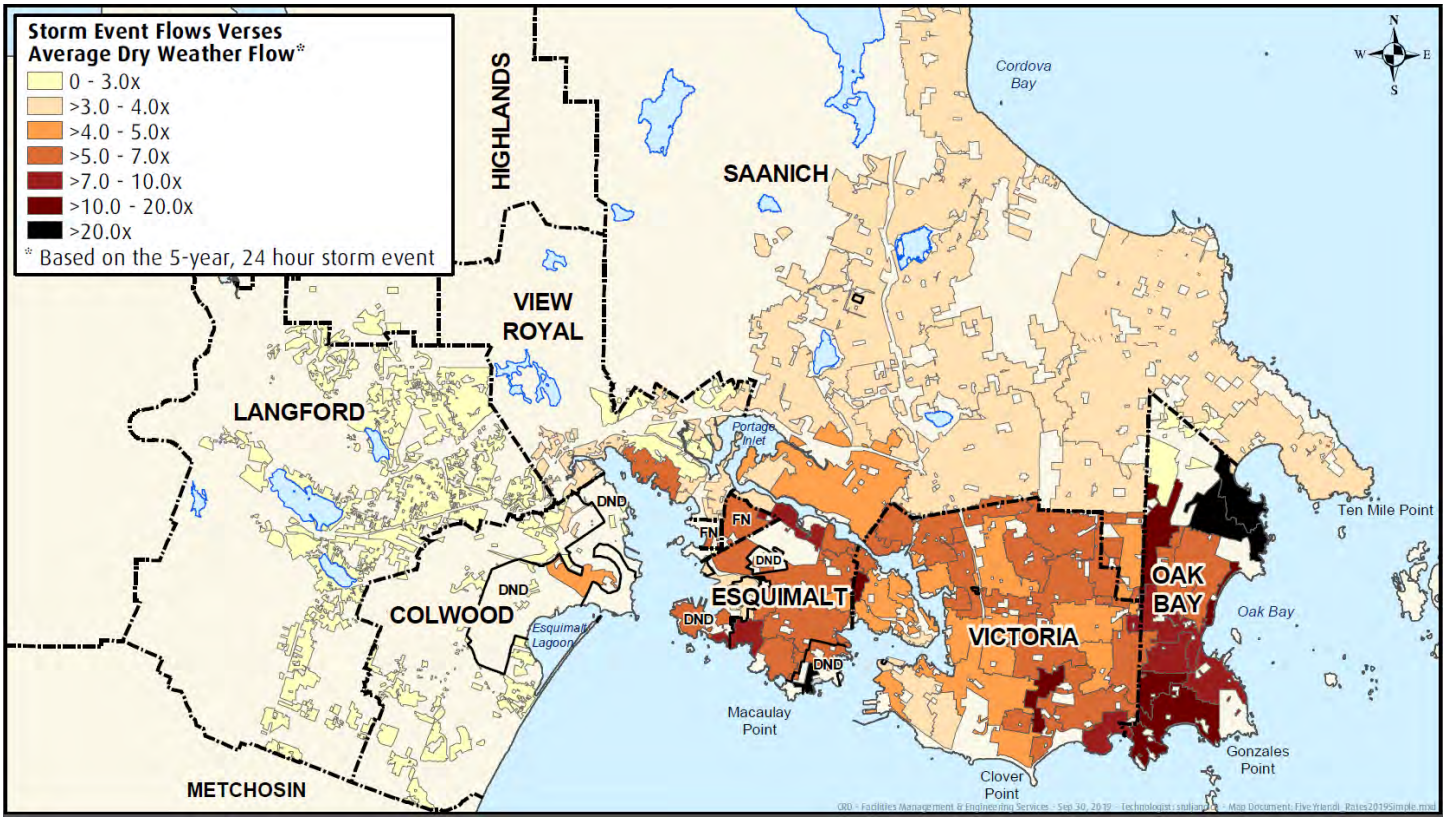
Allocation Point	Allocated Peak Daily Flow (ML/day)	Peak 24 Hr. Flow			
		Past Year (Mar 2022 to Mar 2023)		5-yr Rainfall Event (Statistical; based on multiple storms from recent years)	
		ML/day	% of Allocated Capacity	ML/day	% of Allocated Capacity
Currie Net *(The data is based on storm events since February 2022 when the treatment plant conveyance system upgrades were completed; eliminating upstream overflows for sub 5-year rainfall events.)*	3.88	6.91	178%	>6.91 [1]	>178% [1]
Currie Lift Station	6.48	8.64	133%	12.29	190%
Harling Point PS	0.79	1.35	171%	1.86	236%
Total *(The peak flows noted to the right are lower than actual due to unmeasured upstream overflows at Humber and Rutland. Also, the data is only based on storms since the treatment plant conveyance system upgrades were completed in early 2022.*	26.48	37.957	143%	>37.957 [1]	>143% [1]
SAANICH					
Marigold PS	52.76	52.76	43%	35.32	67%
City Boundary	23.52	23.52	31%	10.97	47%
Harriet	13.08	13.08	55%	9.37	72%
Townley	2.44	2.44	49%	1.97	81%
Haultain	2.27	2.27	29%	1.14	50%
Arbutus	28.31	28.31	33%	20.95	74%
Haro - UVic	3.17	3.17	26%	0.81	26%
Penrhyn LS	3.73	3.73	52%	2.99	80%
Total	**131.56**	**131.56**	**38%**	**83.52**	**63%**
VICTORIA					
Cecelia	12.57	9.65	77%	14.76	117%
Chapman & Gorge *(Flows are based on a correlation with an adjacent catchment. Plans are in place to install a meter in 2024)*	1.43	4.11	294%	4.98	356%
Selkirk *(Flows are based on a correlation with an adjacent catchment. Plans are in place to install a meter in late 2023 / 2024)*	1.11	0.22	20%	0.39	35%
Langford - Vic West	0.77	0.77	100%	1.32	171%
Hereward	7.65	4.04	53%	6.52	85%
Sea Terrace *(The flume appears to surcharge during large storms. Options are being explored to address this issue.)*	1.32	2.96	224%	2.96	224%
Trent Net	29.25	24.75	84%	43.06	147%
Hollywood	2.16	5.07	235%	7.43	344%
Olive	92.24	34.48	37%	63.00	68%
Clover Net *(Flows are calculated using data from other cost sharing meters.)*	100.71	49.15	49%		
Total	**153.19**	**99.07**	**65%**	**150.64**	**98%**

Allocation Point	Allocated Peak Daily Flow (ML/day)	Peak 24 Hr. Flow			
		Past Year (Mar 2022 to Mar 2023)		5-yr Rainfall Event (Statistical; based on multiple storms from recent years)	
		ML/day	% of Allocated Capacity	ML/day	% of Allocated Capacity
VIEW ROYAL					
Craigflower PS *(Flows for this catchment are substantially impacted by the Parson's mag meter, which is being replaced in late 2023 / 2024 to improve accuracy during storm events.)*	14.16	3.5	25%	7.1	50%
Shoreline Trunk	0.55	0.4	71%	0.50	91%
Total	**14.17**	**3.9**	**27%**	**7.1**	**50%**
ESQUIMALT NATION					
Esquimalt Nation *(Flows are calculated. Plans are in place to install a meter in late 2023 / early 2024)*	**0.28**	**0.21**	**74%**	**0.35**	**126%**
SONGHEES NATION					
Songhees Nation	2.36	1.82	77%	2.49	106%
Maplebank	0.04	0.010	24%	0.005	13%
Total	**2.52**	**1.82**	**72%**	**3.09**	**106%**

[1] *Value is lower than actual because there are unmeasured upstream overflows.*

APPENDIX D

Inflow and Infiltration Rates Map for the CRD Core Area (2023)



Making a difference...together

IWS 24-02

REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, FEBRUARY 28, 2024

SUBJECT **Core Area Wastewater Treatment Plant Odour Mitigation Strategy**

ISSUE SUMMARY

To provide the Core Area Liquid Waste Management Committee (Committee) with an update on the Core Area Odour Mitigation Strategy and a summary of actions taken and planned projects moving forward.

BACKGROUND

The McLoughlin Point Wastewater Treatment Plant (MPWWTP) was designed in accordance with the Project Agreement to treat all odour-laden air before discharge. All exhausted air at, and beyond, the Plant boundary property line and the shoreline should have a maximum odour concentration of five odour units per cubic meter (OU/m^3). MPWWTP has a sophisticated air collection and handling system, with carbon treatment to manage odour-laden air from the process systems. Despite the state-of-the-art odour control systems, MPWWTP has generated complaints from neighbouring communities since commissioning. As a result, the Capital Regional District (CRD) committed to continued monitoring of the odour control system performance and discharges, and to work directly with equipment suppliers to seek opportunities to further increase potential odour removal.

An internal audit of the odour collection and treatment systems, as well as an analysis of the previous odour complaints, was completed at the end of 2022 outlining the odour mitigation steps for future years. These tasks included an odour assessment using dispersion modelling, odour collection upgrades, revisions to plant maintenance procedures, and a recommendation for further review of findings to validate the approach.

Results from the odour modelling work completed by WSP Canada Inc. confirmed the maximum odour concentration at the Plant property boundary remains below five OU/m^3 during normal plant operations. During plant maintenance work, when tank covers are removed, odour concentrations at the Plant property boundary and within the surrounding community were observed to exceed the maximum five OU/m^3.

Staff also log and investigate all odour complaints from the community. This information is used to further inform the modelling and understanding of the impact of maintenance activities on odour dispersion.

To reduce the impact to neighbouring communities the odour mitigation strategy proposed by both Integrated Water Services staff and WSP includes a combination of administrative solutions and system upgrades to reduce odours released due to Plant maintenance.

Odour Complaints and Public Engagement

In 2023, there were 149 odour complaints received, each odour complaint was investigated to establish the nature of the odour. Staff met to review all odour complaints, address potential odour events, and discuss odour system upgrades.

Table 1: Summary of Wastewater Odour Complaints Received

Year	Total Odour Incidents	Number of unique complaints
2018	11	11
2019	19	19
2020	29	27
2021	222	69
2022	101	29
2023	149	46

Investigation of odour complaint data collected through 2023 continues to suggest other potential odour sources may be contributing to the impacts in the surrounding communities. CRD staff will continue to engage the City of Victoria to understand the timeframe to rectify the 16 identified cross connections.

In 2017, in accordance with the Community Impact Mitigation & Operating Agreement between the Township of Esquimalt and the CRD, the Wastewater Treatment Project (WTP) established a liaison committee to provide a forum for the discussion of issues relating to the wastewater infrastructure. The Esquimalt Liaison Committee (ELC) includes delegates from the Township of Esquimalt, the West Bay Neighbourhood Association, the Lyall Street Neigbourhood Association, and the Macaulay Elementary School Parent Advisory Council. The ELC has been engaged to provide feedback on the odour mitigation strategy and ongoing odour concerns. In addition, ELC is proactively informed of potentially odour generating maintenance work.

In 2023, ELC met and reviewed the following:

- Community Inquires
- Core Area Liquid Waste Management Committee Staff Reports
- Odour Investigation, Management Plan and Commitments Update

In 2024 quarterly meetings are planned with this committee, including the upcoming meeting on February 29, 2024.

Administrative Improvements

Certain factors such as wind, temperature, and tide patterns impact and increase the risk of odour emissions beyond the facility boundary during maintenance activities. Standard operating procedures now require a review of these factors to align maintenance activities that could produce offsite odours with favorable conditions.

Staff have also identified procedural efficiencies over the past two years to reduce the required time covers are removed, these efficiencies have now been built into standard operating procedures.

When covers must be removed, operators track odour conditions and increase the application of an odour neutralizing compound (Ecosorb), as needed.

Activities Completed in 2023

Odour mitigation projects in 2023 studied the MPWWTP Odour Control system and odour emissions, collecting valuable information to guide system improvements and upgrades for the coming years.

The following activities were undertaken in 2023 with the goals of informing or reducing air emissions:

- Installation of new H2S Sensors for both primary and secondary odour control systems (improved data collection);
- An odour assessment for MPWWTP using atmospheric dispersion modelling for odour and H2S (WSP);
- An odour collection study, including an option review and preliminary design (Associated Engineering); and,
- Updating of Plant maintenance procedures to reduce odour impacts through administrative processes.

2024 System Upgrades

Infrastructure work scheduled for 2024, to improve the system performance and reduce odour emissions, include:

- Secondary Odour Control System Upgrades: reduced moisture through the pre-filter improves odour elimination and extends the lifespan of the product and reduces maintenance activities.
- Densadeg No. 1 scum removal system: improved scum removal eliminates an odour source and reduces the required frequency of Plant Maintenance.
- Tank Cover Upgrades: a new design for tank covers will reduce maintenance project timelines and odour impacts by allowing more efficient access.

Future 2025 Improvements

- Dirty backwash tank upgrade.
- Upgrades to the primary odour control system mist eliminator.
- Additional odour extraction points for plate settlers and Densadegs.
- Improved secondary odour control system and Moving Bed Biofilm Reactor (MBBR) duct sizing.

CONCLUSION

The Capital Regional District recognizes that while operating under normal conditions the McLoughlin Point Wastewater Treatment Plant odour control system is fully functional and operating as per design specifications, however further system improvements are needed to reduce odours during required plant maintenance.

Following completion of the 2023 McLoughlin Point Wastewater Treatment Plan (MPWWTP),

Odour Control System Review and the MPWWTP Odour Assessment planned odour mitigation project work for 2024 and 2025 focuses on infrastructure upgrades to reduce the community impact from plant maintenance.

RECOMMENDATION

There is no recommendation, this report is for information only.

Submitted by:	Jason Dales, B.SC., WD IV, Senior Manager, Wastewater Infrastructure Operations
Concurrence:	Alicia Fraser, P. Eng., General Manager, Integrated Water Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

ATTACHMENT(S)

Appendix A: Odour Investigation Action Plan

	Summarize and analysis of previous odour complaints (last two years and background)		STATUS UPDATE
1	Summary of odour regulations in other jurisdictions	Nov-04	Complete
2	Analyze complaints' trends as well as geographical and seasonal distribution	Nov-11	Complete
3	Correlate complaints with operating conditions (wet weather, DensaDeg vs. plate settler tanks in use, etc.) or maintenance activities (cleaning tanks, scrubber media replacement, etc.)	Nov-18	Complete
4	Summarize all finding in a TM	Dec-02	Complete

	Confirm the performance of the odour control systems		STATUS UPDATE
Audit of the odour collection system:			
1	Field investigation to confirm the integrity of the tank covers, note deficiencies and document recommendations	Nov-04	Complete
2	Review existing H2S data and create a detail scope of future field investigation as highlighted below	Nov-18	Complete
3	Field investigation to measure negative air pressure under all covers	Jan-31	Complete
4	Field investigation to measure H2S under all covers and at some untreated sources (HVAC units, vents, etc.)	Jan-31	Complete
5	Field investigation to measure the velocity of foul air extraction from each tank	Q2-2023	Complete
6	Confirm 6 CFM air extraction from each tank is met	Jan-31	Complete
7	Identify "possible" improvements to the foul air collection system - Recommendations will need to be further assessed	Oct-30	Complete
Audit of the treatment system:			
1	Confirm the design parameters identified for all units are met	Nov-04	Complete
2	Review water quality and quantity in the BTF	Nov-04	Complete
3	Review all operating variables for treatment systems (differential pressures, online H2S, air flow rate data, runtime, etc.)	Nov-11	Complete
4	Confirm the performance of mist eliminators	Nov-11	Complete
5	Assess the condition of carbon media in ACFs	Jan-31	Complete
6	Review maintenance records and summarize findings	Nov-18	Complete
7	Collect samples for odour and air quality analysis at the inlet and outlet of each online scrubber (BTF or ACF) to confirm the performance of the units comply with the design objectives		
	a. Develop the scope of sampling, including sample locations and required analysis	Oct-28	Complete
	b. Schedule, budget, resources, and procurement for sample collection and analysis	Q2-2023	Complete
	c. Analysis of results, if necessary	Q4-2023	Complete
8	Identify "possible" improvements to the foul air treatment system - Recommendations will need to be further assessed	Nov-25	Complete
9	Summarize all findings in a TM	Dec-02	Complete

	Measure odour at the fenceline and beyond.		STATUS UPDATE
1	Install a weather station at MPWWTP	Nov-28	Complete
2	Collect samples for odour analysis at the fence line to confirm MPWWTP does not exceed 5 odour units / m3		
	a. Develop the scope of sampling, including sample locations	Oct-28	Complete
	b. Schedule, budget, resources and procurement for sample collection and analysis	Q 2 - 2023	Complete
	c. Analysis of results, if necessary	Q 4- 2023	Planned
3	Finalize and complete the VIU project to measure a large number of emitted chemicals associated with MPWWP in the community	On going	On going Support
4	Update the odor and H2S dispersion model based on the updated plant emission data and the new weather station installed at the plant	Q 4 - 2023	Complete

TECHNICAL AND COMMUNITY ADVISORY COMMITTEE
CORE AREA WASTEWATER TREATMENT
Meeting Minutes

Friday, October 27, 2023
1:00 pm

City Hall, City of Victoria
Songhees Nation Meeting Room (second floor)
1 Centennial Square
Victoria, BC V8W 1P6

PRESENT: B. Donald, D. Kobayashi (Vice Chair), J. Clary, C. Valeo (EP), J. Roe, C. Coleman (Chair), G. Gillespie, J. Andrews, M. Engelsjord, C. Remington, J. Paul, K. Wilson, D. Monsour, L. Hatch, W. Pugh

STAFF: G. Harris, P. Kickham, D. Green, J. McAloon, L. Maslen (EP), L. Nickerson (Recorder)

GUESTS: K. Hamilton, R. Beise, T. Urquhart, J. Beatty (EP)

REGRETS: I. Leung

(EP) = Electronic Participation

The meeting was called to order at 1:02 pm.

1. Territorial Acknowledgement

2. Welcome and description of TCAC purpose (Chair)

Chair Coleman welcomed everyone and informed the group that this committee is a technical and advisory committee made up of technical and community representatives. This group will provide recommendations to the CRD Board.

3. Introductions (all)

G. Harris introduced himself and CRD staff. Chair Coleman introduced himself and Vice Chair Kobayashi. Other attendees introduced themselves and gave a brief history of their experience and interests relating to this committee. Chair Coleman advised this group will be together for about six months with the first few meetings relating to I&I and the last few meetings relating to biosolids. Chair Coleman advised as the Chair he follows “Robert’s Rules of Order” – he is a fan of Robert’s Rules being relaxed at first to allow more conversations, but once recommendations are being made, there is a need to have a more formal approach to any recommendations or advice we wish to give because the words that make sense to this committee may not make sense to others.

4. Presentations

a. TCAC process and Liquid Waste Management Plan background (D. Green)

D. Green provided a brief overview of liquid waste management plans (LWMPs) and the process for the TCAC group. LWMPs are tools that allow regional districts and local governments to develop community-specific solutions for the management of liquid waste and environmental protection under the Province of BC Environmental Management Act. TCAC will meet approximately monthly, which will include a combination of presentations, group discussion and some reading work. The output from this group will be reported back to the Core Area Liquid Waste Management Committee.

b. Inflow & Infiltration (I&I) background and Q&A (J. McAloon)

J. McAloon provided a brief overview of I&I and advised inflow and infiltration refers to "leaky sewers" which can result in overflows to beaches and health concerns. I&I is a capacity issue and will get worse over time if not addressed. The older municipalities (Victoria, Esquimalt and Oak Bay, especially Uplands) have higher I&I rates due to deterioration and/or the types of sewer lines, and the newer municipalities have lower I&I rates. The current LWMP I&I commitment needs to be reviewed and possibly amended.

c. Biosolids background and Q&A (P. Kickham)

P. Kickham provided some background on the process of how the wastewater is managed and treated in the region since the initiation of the new wastewater treatment plant and Residuals Treatment Facility (RTF) in 2021. The process of creating biosolids at the RTF was introduced and discussed. The RTF is already one of the most sophisticated biosolids processing facilities in Canada. To be consistent with provincial requirements, wastewater utilities must not view these biosolids as a waste product but rather as a resource to be beneficially re-used.

LaFarge was contracted to receive the biosolids for beneficial re-use and a contingency plan was put into place allowing the biosolids to be landfilled during LaFarge maintenance periods (anticipated to be 35 days/year). However, due to operational and logistical challenges, LaFarge has only been able to accept a very small amount (5½ days worth in 2023) and the majority of the biosolids have been landfilled. An additional contingency plan was established in the summer of 2023 for reclamation of an aggregate quarry in Cassidy BC, however current space is limited at this location. The province has required broad public consultation on all available beneficial re-use options and a long term biosolids management strategy to be submitted by June 2024 with the expectation that it will be implemented by January 2025. Thermal options and land application options for biosolids were introduced. The CRD requires redundance and resiliency to ensure service delivery and compliance with legislation, and therefore numerous options (e.g., a preferred option, a support option, and contingency options) are required.

d. Biosolids Public Consultation (K. Hamilton)

K. Hamilton presented a public consultation process for long term management of biosolids and sought feedback from the TCAC. TCAC was supportive of the general approach. K. Hamilton's role is to ensure a wide range of audiences have access to complete, educational, quality information on this complex issue. They foresee a multi-month engagement process from November 2023 – February 2024. Their communication and consultation objectives are to raise awareness, provide multiple channels and opportunities for the community to provide input and seek to understand public awareness, perceptions and concerns for how biosolids should be managed in the region. They will provide a detailed consultation summary report in March 2024 which will include what input was collected and how that informed or influenced decisions.

5. Action Items

a. **Chair Coleman** advised he will follow up with Tourism Victoria, the Greater Victoria Chamber of Commerce, Esquimalt Chamber of Commerce and the West Shore Chamber of Commerce regarding the TCAC.
b. **K. Hamilton** will provide an update to the TCAC on the public consultation process prior to launch (mid-November).
c. **CRD staff** will determine if virtual or in-person tours of the RTF are possible for TCAC members and/or the public

6. Next meeting

The next TCAC meeting will be held on November 24, 2023 at 1:00 pm.

7. Adjournment

The meeting was adjourned at 3:01 pm.

TECHNICAL AND COMMUNITY ADVISORY COMMITTEE
CORE AREA WASTEWATER TREATMENT
Meeting Minutes

Friday, November 24, 2023 **1:00 pm** **CRD Boardroom**
625 Fisgard Street
Victoria, BC V8W 2S6

PRESENT: B. Donald, C. Remington, C. Valeo (EP), D. Kobayashi (Vice-Chair), D. Monsour (EP), G. Gillespie, I. Leung, J. Clary, J. Andrews, K. Wilson, L. Hatch, M. Engelsjord, R. Ding, W. Pugh

STAFF: B. Rudolph (EP), D. Green, G. Harris, J. McAloon, L. Nickerson (Recorder), P. Kickham

GUESTS: C. Caunce (EP), C. Johnston, K. Hamilton (EP), R. Beise

REGRETS: C. Coleman (Chair), E. Brown, J. Paul, J. Roe

(EP) = Electronic Participation

Acting Chair D. Kobayashi called the meeting to order at 1:02 pm.

1. Territorial Acknowledgement

2. Introduction of New Members

G. Harris welcomed new committee members Richard Ding and Edward Brown, and shared that Chair Coleman reached out to the Chamber of Commerce's to discuss representation for them.

3. Committee Confidentiality

Committee members signed a non-disclosure agreement (NDA) to maintain confidentiality and internal TCAC discussions need to remain confidential.

Information for public conversations is available on the TCAC page.

Requests for information should be directed to Dale Green, Supervisor, Source Control Programs at dgreen@crd.bc.ca.

The meeting is being recorded for internal use only and recordings will not be posted or distributed.

4. Approval of Agenda

Agenda for the November 24, 2023 Technical and Community Advisory Committee.

MOVED by Greg Gillespie and SECONDED
That the agenda be approved as circulated.
CARRIED

5. Adoption of Minutes of October 27, 2023

Minutes from the October 27, 2023 Technical and Community Advisory Committee.

Corrections:

Item 8 on the October 27, 2023 Agenda "Reading request prior to next meeting" - no documents were sent to the members for review.

Item 4d on the October 27, 2023 Minutes - there is a date error in the presentation by K. Hamilton on page 9 of the "Long Term Biosolids Management Public Engagement Strategy October 2023". The Public Consultation dates should read "November 2023 - February 2024".

MOVED by Brenda Donald and SECONDED
That the minutes of the October 27, 2023 Technical and Community Advisory Committee be adopted as circulated.
CARRIED

6. Chair's Remarks

In the future, CRD staff will endeavor to share information earlier (1 week prior to meeting).

There is a lot of information being shared with members who have a wide range of knowledge on these topics. The aim is to get all members up to speed and at the same level for future discussions. Chair Kobayashi suggested members ask a lot of questions to assist them in making informed decisions and recommendations about these topics.

7. I&I LWMP Commitments – Peter Kickham, CRD

P. Kickham, CRD Manager of Regulatory Services, gave a presentation and discussed the regulatory requirements for Inflow and Infiltration (I&I) and overflows, the current liquid waste management plan (LWMP) commitments, and the current scenario.

8. Environmental Protection Goals for Overflows – Dale Green, CRD

Dale Green, CRD Supervisor, Regional Source Control Programs, gave a presentation on the environmental context for I&I and the environmental protection goals for overflows, and discussed the CRD marine monitoring program and how it relates to I&I.

9. I&I Review – Chris Johnston, Kerr Wood Leidal

C. Johnston, I&I Consultant for the CRD, gave a presentation discussing the objectives and commitments to be made to the Province as part of the BC municipal wastewater regulation relating to I&I and overflows. Changes to the liquid waste management plan are required in order to demonstrate how the CRD and core area municipalities will meet Provincial regulatory requirements in the future.

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10. Update of Biosolids Public Outreach – Katie Hamilton, Tavola Strategy Group

K. Hamilton, Communications Consultant for the CRD, discussed the public engagement strategy will begin in early January 2024 with focus groups in February. A virtual tour of the Residuals Treatment Facility (RTF) is being created and will be made publicly available. She will provide reading materials to the TCAC for review.

11. Other Business

See Item 12 below.

12. Next meeting: December 11, 2023

The December 11, 2023 meeting has been cancelled and instead the TCAC will meet at the RTF for a tour from 1:30-3:30 pm.

13. Closing Comments

Automatic notifications are not working on the TCAC page where agendas and minutes are posted. CRD staff will work to correct this issue as soon as possible.

Presentations for Agenda items 7, 8 and 9 are included in the November 24, 2023 Agenda.

14. Adjournment

The meeting was adjourned at 3:11 pm.

TECHNICAL AND COMMUNITY ADVISORY COMMITTEE
CORE AREA WASTEWATER TREATMENT
Meeting Minutes

Friday, January 19, 2024
1:00 pm

City Hall, City of Victoria
Songhees Nation Meeting Room (second floor)
1 Centennial Square
Victoria, BC V8W 1P6

PRESENT: B. Donald (EP), C. Coleman (Chair), C. Valeo (EP), D. Kobayashi (Vice Chair) (EP), I. Leung, J. Andrews, J. Clary, J. Paul, J. Roe (EP), K. Wilson (EP), L. Hatch (EP), M. Engelsjord, R. Ding, W. Pugh (EP)

STAFF: D. Green, G. Harris, J. McAloon, L. Nickerson (Recorder), P. Kickham, Z. Gray (EP)

GUESTS: C. Caunce (EP), C. Johnston, K. Hamilton (EP), R. Beise

REGRETS: C. Remington, D. Monsour, G. Gillespie

(EP) = Electronic Participation

Chair Coleman called the meeting to order at 1:03 pm.

1. Territorial Acknowledgement

Chair Coleman provided a Territorial Acknowledgement.

2. Chair's Remarks

Chair Coleman informed the group that the Technical and Community Advisory Committee (TCAC) will continue to report on Inflow and Infiltration (I&I) to the CRD Core Area Liquid Waste Management Committee but will be reporting on long-term biosolids management planning to the CRD Environmental Services Committee.

3. Approval of Agenda

Agenda for the January 19, 2024 Technical and Community Advisory Committee meeting:

MOVED by J. Andrews and SECONDED by R. Beise
That the agenda be approved as circulated.
CARRIED

4. December 11, 2023 RTF Tour Summary

P. Kickham spoke about the Residuals Treatment Facility (RTF) tour for TCAC members on December 11, 2023. Chair Coleman requested CRD staff organize a second tour if possible, for the members who were unable to attend.

Two tour handouts are available on the TCAC collaboration site. Questions regarding the RTF can be directed to Peter Kickham (pkickham@crd.bc.ca).

5. Collaboration Site

P. Kickham gave an overview of the TCAC collaboration site which contains a collection of materials for TCAC members to review including agendas, minutes, presentations and reports that have been discussed at prior meetings. More information will be provided on biosolids prior to the next TCAC meeting.

6. Review of Core Area LWMP Section 5: Management of I&I and Control of Wastewater Overflows by Kerr Wood Leidal (KWL) - Chris Johnston

C. Johnston presented to the group. The presentation is attached as Appendix A. He discussed the existing and proposed I&I reduction commitments in Section 5 of the current 2019 Consolidated Liquid Waste Management Plan (LWMP). In April 2022, CRD and municipal engineers developed an update of Section 5, and additional changes have been suggested by KWL to provide the current proposed update to Section 5 of the LWMP.

The draft report titled *Review of Core Area LWMP Section 5: Management of I&I and Control of Wastewater Overflows* is attached as Appendix B.

7. BREAK (14 minutes)

8. Municipal Asset Management Planning Update - Municipal Engineers

The municipal engineers each gave updates on their Municipal Asset Management Plans.

I. Leung - Town of View Royal
J. Paul - City of Victoria
J. Clary - Township of Esquimalt
J. Andrews - City of Colwood
L. Hatch - District of Saanich
R. Ding - District of Oak Bay

9. Biosolids Introduction – P. Kickham

P. Kickham introduced the "Get Involved" Long-Term Biosolids Management Plan public engagement website that was launched on January 11, 2024 to provide broad public consultation on all of the biosolids management options available that comply with provincial legislation. This site offers educational material, a survey and FAQs for public review and feedback.

10. Biosolids Engagement Update – K. Hamilton

K. Hamilton advised the "Get Involved" public engagement website will be active until March 6, 2024 and includes a dedicated email (biosolids@crd.bc.ca) to give the public an opportunity to ask questions and submit written feedback. Members of the public can also ask questions of the project team through the site and subscribe for project updates.

A public online information session is being planned offering information from the technical team and the technical advisor on biosolids management uses.

11. Other Business

P. Kickham and G. Harris discussed the use of biosolids in other parts of Canada and answered questions from the committee members.

12. Next meeting: February 13, 2024

The next meeting will be held at 1:00 pm on February 13, 2024.

13. Closing Comments

There were no closing comments.

14. Adjournment

MOVED and ALL IN FAVOR
That the January 19, 2024 Technical And Community Advisory Committee meeting be adjourned at 3:31 pm.
CARRIED.