



The Corporation of the District of Saanich

Report

To: Mayor and Council

From: Harley Machielse, Director of Engineering

Date: December 03, 2024

Subject: Cordova Bay Integrated Stormwater Management Plan

RECOMMENDATIONS

That Council receive the Cordova Bay Integrated Stormwater Management Plan (ISMP) for information.

PURPOSE

The purpose of this report is for Council to receive the Cordova Bay Integrated Stormwater Management Plan as the inaugural pilot project for the Integrated Stormwater Management program. This is the first in the series of baseline reports which are the foundation for providing resilient stormwater management services through drainage and natural asset management, policy, environmental protection, land use planning, and working in partnerships.

BACKGROUND

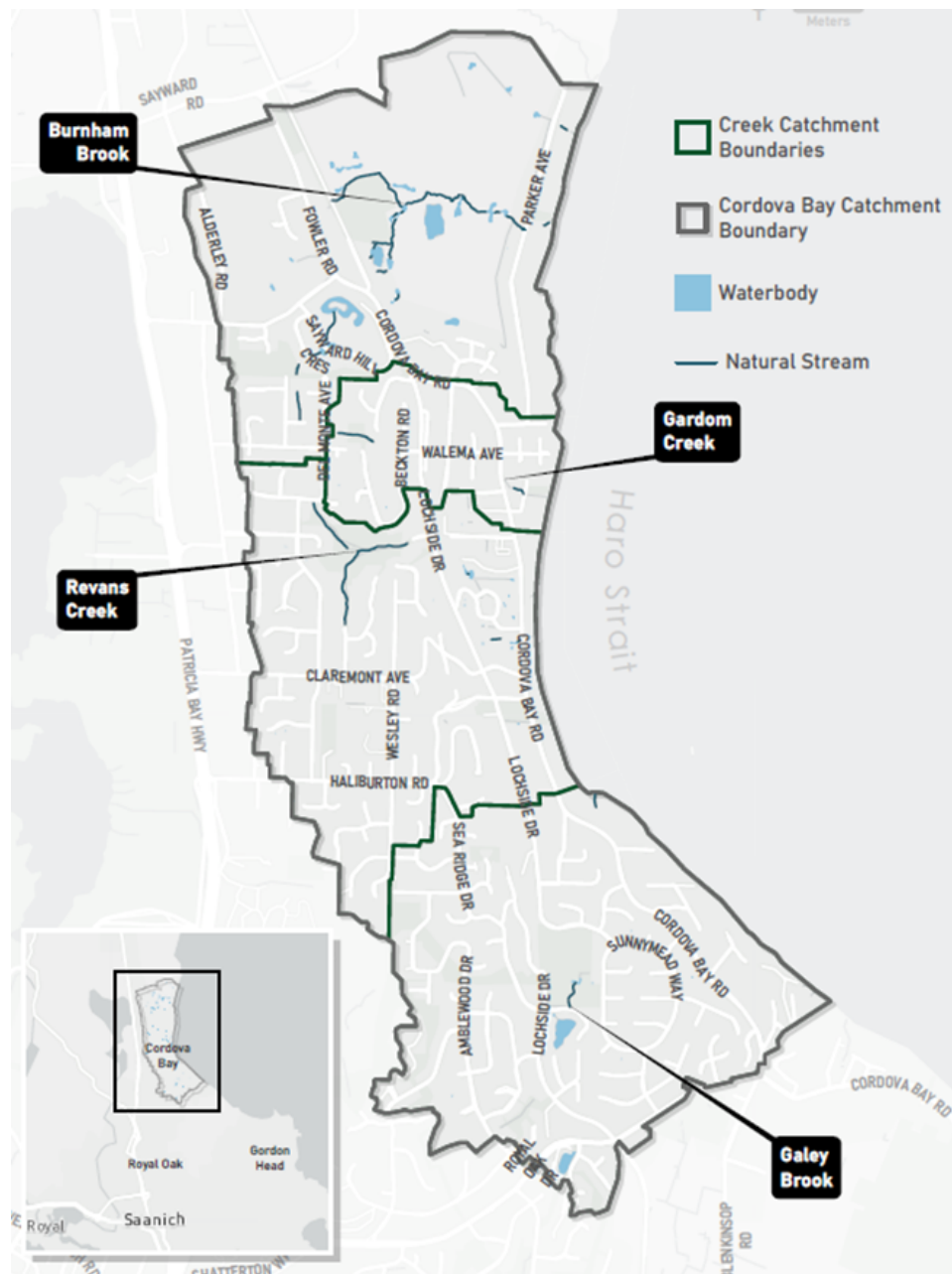
Stormwater management has traditionally been perceived as a pipe-capacity exercise but has evolved to become an approach that reflects water quality, water quantity, environmental services, and climate change resiliency, among other factors. This approach is reflected in Integrated Stormwater Management Plans (ISMPs) which examine the linkages between drainage services, land use planning, and environmental protection. These plans provide a roadmap to meet service objectives while helping communities maintain or improve overall catchment health. ISMPs integrate corporate-wide strategic goals, land context, and technical analysis to derive policy changes, projects, and programs for the betterment of the entire drainage system, from collection to downstream water bodies.

Saanich has developed a plan to complete four ISMPs: Cordova Bay ISMP, Douglas Creek ISMP, Colquitz Creek ISMP, and Boundary Streams ISMP (across several inter-boundary streams) and one Stormwater Plan: The Rural Areas Stormwater Plan. The Cordova Bay ISMP was chosen as the pilot project, as it is a relatively small area where the Local Area Plan (LAP) was recently completed. The LAP is critical information needed to support the future context of the land uses on the quantity of stormwater run-off as well as the quality of the water. The ISMP includes a recommended Implementation Plan with a list of prioritized actions.

DISCUSSION

Key Catchment Features

Figure 1 shows the study area for the Cordova Bay ISMP. The catchment is roughly 5.8 km² and includes four primary streams, along with a network of smaller streams. From north to south these primary streams include Burnham Brook, Gardom Creek, Revans Creek, and Galey Brook. Noble Creek lies to the north of the catchment, just outside of the developable areas of Cordova Bay and will be considered in the Rural Areas Stormwater Plan. The topography of the Cordova Bay catchment varies significantly, with rolling hills, low-lying areas, and a prominent ridge running along the center. Generally, rainfall runoff drains west to east by a gravity system made up of approximately 56 km of stormwater pipes and culverts, as well as other critical network components including catchbasins, ditches and streams.



Infrastructure and Drainage System

The performance of the infrastructure and drainage system in the Cordova Bay catchment was evaluated based on condition, capacity, and informed by staff experience through the systems operation and maintenance. The condition of the system was determined through the theoretical service life of the various pipe materials and the capacity was determined using a dual drainage model. The dual drainage digital model is an advanced hydrologic and hydraulic simulation tool, used to evaluate the performance of both minor (pipe) and major (overland flow) systems during various storm events with and without future climate change projections. The modeling was done using the updated Intensity Duration Frequency (IDF) curves, which is key information for modeling rainfall impacts on the drainage system.

The results of the evaluation show that a low number of stormwater assets are at or beyond their service life, and relatively few are capacity deficient. In addition, no linear stormwater assets in Cordova Bay are both condition and capacity deficient. The model results align with the generally high infiltration rates of soils in Cordova Bay that contribute to low runoff potential, minimizing flood risks and reducing strain on the local stormwater system. However, there are areas of the catchment, such as the Galey-Brook sub-catchment where runoff rates are incrementally higher due to the clay soils in the area.

Although there were few issues for the minor system infrastructure and drainage system needing immediate attention, there are some high priority actions included in the implementation plan for the major system and associated private and public natural assets. They include:

- Exploring opportunities for improved management of natural and engineered assets on Cordova Bay Golf Course that support stormwater systems in the area
- Examine predicted overflows and observed erosion in Doumac and Doris Page Parks and their impact on water quality.

Natural Assets

Cordova Bay includes a number of natural assets that provide stormwater management services including watercourses, forests, and riparian areas. These natural assets offer several opportunities for preservation and enhancement of stormwater quantity and quality management, as well as co-benefits for ecosystem health.

An inventory of natural assets focused on stormwater management services (e.g., rainwater conveyance, flood protection, storage/attenuation and water quality) was completed for the Cordova Bay catchment. It should be noted that in parallel to this ISMP study, a more global natural assets inventory was developed separately, as part of Saanich's Asset Management Strategy.

The recommendations in the ISMP Implementation Plan largely aim to build District-wide recognition of these services, including valuating, and reviewing the adequacy of funding for maintenance, enhancement, and renewal of these assets. Recommendations also focus on the stewardship of these assets, including developing a co-management framework between Engineering and Parks, and considerations to natural assets on private properties.

Water Quality

Saanich's commitment to the CRD's Core Area Liquid Waste Management Plan (CALWMP) includes working in partnership for the ongoing Stormwater Quality Program managed by the CRD. This Program works to identify and reduce contamination in stormwater, waterways and the ocean through monitoring, assessment, collaboration, and education, with the goal of protecting human health and the environment.

The ISMP includes an overview of water quality performance in Cordova Bay, based on the CRD's 2022 Stormwater Quality Program report. In addition to monitoring results from the CRD, a theoretical runoff Pollutant Loading Model, developed using data from the U.S. Environmental Protection Agency (EPA), was applied to Cordova Bay.

Although no major stormwater quality issues were identified, there were some notable results at the discharge outfalls located just east of Agate Park where moderate levels of E.coli counts were found. CRD will continue to monitor and start investigations if E.coli levels are reported high, as previous investigations did not point to a source of E.coli and elevated levels have been intermittent.

The theoretical Pollutant Loading Model helped identify the land uses in Cordova Bay that have the potential to contribute most significantly to water quality impacts, which include roads, public lands, and low-density residential lands. The correlation between the pollutant and highest contributing land use aligns with known contributing sources. The model indicates that single family land use zones are the core contributor of Total Suspended Solids (TSS) in Cordova Bay, which is consistent with the fact that the catchment is mostly comprised of such properties. This information was used to develop recommendations regarding BMPs and source control measures that could be considered as a way of being proactive, even though no major stormwater quality issues were identified in the study area.

Recommended Implementation Plan

The information and analysis presented in the report establishes the unique local conditions and challenges of Cordova Bay and includes recommended actions, which form the Implementation Plan.

An overview of these recommended actions includes:

- Field inspections at approximately 20 locations to assess and validate model predictions for overland flows during significant storm events.
- The exploration of 6 integrated opportunities to improve drainage conditions, and/or water quality while leveraging natural assets. The high priorities are Cordova Bay Golf Course and Doumac Park/Doris Page Park where site reviews are recommended to be done during an upcoming larger rainfall event, to review/confirm model predictions.

- Future flow monitoring of 6 or more locations to help improve model accuracy, assist feasibility projects and/or close information gaps (e.g., groundwater).
- Formalized strategies to enhance and protect natural assets such as completing natural asset valuations, reviewing the adequacy of natural asset funding and a strategy regarding private natural assets.
- New or updated bylaws/policies that collectively deliver on integrated stormwater elements including drainage, development, water quality protection and sustainable funding sources. This includes improving erosion and sediment control policies, and enhancing land use and zoning regulations, as well as securing dedicated stormwater funding to deliver the core community stormwater management service.
- The continued fostering of local partnerships to achieve common objectives and shared interests through combined resources. The focus is on developing or enhancing partnerships with First Nations, the Cordova Bay Golf Course, the CRD and School Districts.

The ISMP includes a table which summarizes and sets priorities for the recommended actions. These actions will be reviewed more globally in the context of the results of all the ISMPs once completed and the “high” priority projects will be advanced through the annual financial planning process.

Adaptive Management Approach

The ISMP includes a list of progress indicators, accompanying questions and recommended timelines that create the basis for an adaptive management approach. This entails applying learnings from ISMP results to assess and adjust initial recommendations, programs, and projects, informing future actions based on past outcomes.

Lessons Learned

Due to the pilot nature of the baseline ISMP study of Cordova Bay, there have been many lessons learned and much knowledge gained to apply to future work.

Staff have identified the following opportunities:

1. Creating a foundation for the study based on a technical analysis of the drainage system (minor and major) at the outset. Although this was completed in this report, this milestone needed to come sooner in the project schedule for staff’s basis of understanding any network constraints.
2. The scope for the water quality section of the study was limited to information available to staff through existing work by the CRD under the LWMP program. This was intentional to control project scope/budget. However, new discoveries on this topic had a limited outcome. Consideration for a desktop “stream health” review is planned for future reports where there are synergies with priorities from other strategic documents such as the Biodiversity Conservation Strategy, Urban Forest Strategy, Climate Plan and Natural Assets Asset Management Plan.

3. Many other relevant strategic projects were being completed at the same time as the analysis for this ISMP. This study assumed substantial completion of those projects at the end of 2023; however, several strategic documents were further updated or developed in 2024, such as the Official Community Plan, Urban Forest Strategy, Biodiversity Conservation Strategy, and Natural Assets Inventory. These updates were not able to be included in the analysis without significant re-work, additional cost and effort to change for this pilot study. Unfortunately, their content could not be embedded in this report, but will inform other reports.
4. Project stakeholders were primarily internal subject matter experts. Identification of and targeted consultation with key external stakeholder groups is under consideration for future reports.

Overall, the District has gained a substantial level of information from this project that it has never previously had which will support drainage asset management plans, development applications in the watershed area, help support new policy on stormwater management and enhance our management and response to system operations. The District is also better positioned in undertaking stream-enhancement projects for environmental sustainability with improved knowledge of the energy and velocities of water flowing in the channel to build sustainable improvements. Specifically, these gains include:

- A new dual drainage model for the watershed area that provides the technical basis required to support decision making.
- Direction on where capital investment is needed to sustain service delivery in this part of the system
- Knowledge of the current state of the system functionality from a quantity and quality perspective
- Knowledge that proposed changes to the land use identified in the Local Area Plan can be managed and where adjustments to the system are needed, and ought to be pursued, in development negotiations
- An understanding of how the system will manage (or not) changes from climate change, as currently predicted
- Technical information to bring forward for co-managing stormwater in future partnerships with stewardship groups and First Nations.
- Priority projects for environmental enhancements that can be coordinated with biodiversity priorities in this watershed.

Other ISMP Program Accomplishments and Next Steps

There are a number of components to the ISMP Development Strategy. Below is an overview of what has been accomplished and what it in progress:

Pre-ISMP Work: A substantial amount of work was done initially to provide a foundation of reliable information for developing the ISMPs, such as: GIS Review and Closing Data Gaps; Drainage Asset Management Investment Plan; Stormwater Flow Monitoring Program; Colquitz and Cordova Bay Rainfall and Flow Data Review; Environmental Monitoring Framework

Intensity Duration Frequency (IDF) Curves: Staff undertook an extensive technical study to update this data to help better to understand rainfall patterns across Saanich; this includes climate change implications.

Watercourse and Drainage Bylaw Review: To support the ISMP work, an extensive review of the bylaw was undertaken, and several amendments are recommended, such that a replacement bylaw is being prepared and is anticipated to go to Council in Q1 2025.

Douglas Creek ISMP: The Dual Drainage model almost complete and a Baseline ISMP report will begin in 2025

Colquitz River ISMP: The Data Baseline report is almost complete; a Dual Drainage and Flood Hazard Model is in progress as part of the district-wide model development; the Baseline ISMP report to follow

District-Wide Dual Drainage Model: Work is underway to be complete by the end of 2025.

COUNCIL OPTIONS

1. That Council receive the Cordova Bay Integrated Stormwater Management Plan (ISMP) for information.
2. That Council provide alternate direction to Staff.

FINANCIAL IMPLICATIONS

As the Cordova Bay baseline ISMP is complete, there is no additional funding needed for this project at this time. Funding needs for the Cordova Bay ISMP Implementation Plan will be determined as part of the annual financial planning process and review of other priorities, including the results of other ISMP reports.

STRATEGIC PLAN IMPLICATIONS

This work aligns with the District of Saanich Strategic Plan (2023 – 2027) initiative 1.1.5 to “Continue to advance the Integrated Stormwater Management Plans over the next four years, including completing baseline studies for Cordova Bay, Colquitz Creek and Douglas Creek”.

CONCLUSION

The baseline ISMP for Cordova Bay includes an analysis of drainage system performance both in the minor (piped) and major (overland, watercourses) components, a review of natural assets and an assessment of water quality. A recommended Implementation Plan was developed, including a list of prioritized actions and an adaptive management strategy.

Overall, the baseline ISMP demonstrates that the stormwater network in Cordova Bay is in good condition, with less than 10% of linear assets exceeding their theoretical service life. Similarly, there are few capacity exceedances in the minor and major system as predicted by the dual drainage model. An inventory of natural assets providing stormwater management services was completed and some recommendations were included regarding strategies to enhance and protect these assets. Although no major water quality concerns were identified in the catchment, there are opportunities to implement best practices and proactively deliver on Saanich's commitment to protect the environment.

In many ways, Cordova Bay was the ideal pilot ISMP. As not many issues were identified in the catchment, the ISMP was an opportunity to determine what critical information is needed in the baseline documents, and there were many lessons learned and updated approaches which will be brought forward for future work. The lessons learned include: the complexity of the integrated work; the amount of time needed to build the model; the importance of having the model available as a tool in the shorter term; the critical nature of partnerships in implementing the recommended actions; and needing baseline technical studies completed before going out for broad stakeholder consultation. Multiple other strategic documents being worked on at the same time also affected staff time and resources and pointed to the importance of the ISMPs being updated ongoingly as new information is available, and the necessity of ongoing work to verify model results.

A substantial amount of work has been completed in the ISMP strategy which provides foundational information which will contribute to the success and efficiency of the program moving forward. In meantime, other work on the Stormwater Program, is continuing to progress.

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Reviewed by: Lesley Hatch, Senior Manager of Water Resources

Approved by: Harley Machielse, Director of Engineering

Attachments: Cordova Bay Integrated Stormwater Management Plan

ADMINISTRATOR'S COMMENTS:

I endorse the recommendation from the Director of Engineering.

Brent Reems, Chief Administrative Officer