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Saanich Peninsula Stormwater Quality

2021 Program Report

INTRODUCTION

The Capital Regional District (CRD) Stormwater Monitoring Program works to identify and reduce contamination from the land into stormwater and surface water (creeks and the ocean). CRD staff, in cooperation with municipalities and First Nations, accomplish this through environmental monitoring, assessment, collaboration and education. This work meets commitments in the Saanich Peninsula Liquid Waste Management Plan (LWMP; CRD, 1996), described below.

CRD staff monitor stormwater discharges and creeks to identify contamination and impacts from stormwater due to various land use practices. Staff assess approximately 300 stormwater discharges on the Saanich Peninsula and assign priority ratings for mitigative action by the appropriate jurisdiction. When contamination is found, CRD staff conduct investigations and work with municipal staff to identify sources of contamination.

This report summarizes the results of work completed in 2021 (2022 data was considered when available). Data, sampling locations and details about the CRD stormwater discharge rating methods for public health and environmental concern are available in appendices A through G.

Regulatory Background

The CRD created the stormwater quality monitoring service to meet commitments in the Saanich Peninsula LWMP. The CRD commitments regarding stormwater quality and management are to:

1. *plan, promote and co-ordinate a program for management of stormwater quality and surface water resources in cooperation with the participating municipalities, communities and local governments to:*

    a. *limit the impacts of stormwater runoff on the environment and public health and well-being*
    b. *protect freshwater and near-shore marine ecosystems and resources*

2. *promote education about water quality issues and to develop educational material*

Municipalities own the stormwater infrastructure and have authority over stormwater under the *Community Charter*[*]. In the LWMP, participating municipalities make the following commitments:

1. *to act on priorities within their jurisdiction to protect stormwater quality, the physical environment and aquatic habitat, and to reduce the levels of contaminants in stormwater discharges to accepted government standards in watercourses and near-shore marine areas*
2. *to use resources available to municipal governments to achieve these reductions*
3. *to amend bylaws, as necessary, to ensure that new development takes place in accordance with appropriate best management practices*

PUBLIC HEALTH

Public Health Concern Ratings

Staff prioritize stormwater discharges annually to meet LWMP commitments and support local governments in directing funds where they will have the greatest benefit. Discharges are prioritized through public health concern ratings, based on the concentration of bacteria in the discharge and the potential for public contact.

[*] https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/03026_00

Each year, CRD staff sample a selection of stormwater discharges in the wet and dry seasons for laboratory analysis of *E. coli*, an indicator of sewage or animal waste. The CRD assigns discharges a high public health concern rating if the *E. coli* counts are over 200 colony forming units (CFU)/100 mL on a shoreline used by the public for swimming or diving, or greater than 5,000 CFU/100 mL on a shoreline used by the public for small boating (e.g., kayaking or paddle-boarding). A summary of the CRD rating system is in Appendix G.

In 2021, staff assessed 100 stormwater discharges of which 36 discharges had one or more *E. coli* counts greater than 200 CFU/100 mL, a level that indicates sources of sewage or animal waste with potential to cause adverse effects to members of the public engaging in recreational activities. However, many of these discharges have low flows or are located where there is little risk of public contact. Considering the likelihood for contact, CRD staff assigned the following public health concern ratings:

- 65 low ratings
- 29 moderate ratings, and
- 6 high ratings (Table A, Figure A)

These ratings and the associated bacterial data are listed in appendices B and C. Quality assurance and control data are located in Appendix D.

CRD source investigations indicate that malfunctioning on-site sewage treatment systems or agricultural practices are the sources of bacteria leading to high ratings in three North Saanich discharges and Tseycum Creek. Sources in Sidney are due to sewer cross-connections, illegal dumping and aging infrastructure. The recent repair of a cross-connection has reduced the number of high-rated discharges to two in Sidney. Sidney also recently reported illegal dumping of sewage that was entering into Reay Creek (one of North Saanich's high-rated discharges). CRD staff are working with the municipalities and the Island Health Authority (IHA) to mitigate these sources.

Ratings over Time

Overall, the high-rated discharges appear to be in a decreasing trend on the Saanich Peninsula. The number of high-rated discharges decreased by one in 2021, as staff removed three of the previously high-rated discharges from the list and added two new discharges (Table A).

Staff assigned a lower rating to one discharge that had been high-rated for more than six years. This discharge in Coles Bay (3118) now has lower bacterial levels, due to continued effort from CRD and IHA staff that resulted in on-site treatment system repairs in the catchment.

Four of the high-rated discharges have been of concern for several years. These contaminant sources are challenging to find, difficult to repair, or are the result of agricultural practices.

Table A. Number of Discharges Rated High for Public Health Concern Over Time

Jurisdiction	Number of Discharges Rated High											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Central Saanich	1	2	2	1	1	1	0	0	1	2	1	0
North Saanich	6	4	4	4	3	3	3	4	4	4	3	3
Sidney	4	5	4	5	6	3	2	1	2	2	2	2
Pauquachin First Nation	0	0	0	0	0	0	0	0	0	0	0	0
Tsartlip First Nation	0	0	1	1	0	0	0	0	0	0	0	0
Tsawout First Nation	0	0	1	0	0	0	0	0	0	0	0	0
Tseycum First Nation	1	1	1	1	1	1	1	1	1	1	1	1
Total	**12**	**12**	**13**	**12**	**11**	**8**	**6**	**6**	**8**	**9**	**7**	**6**

Bacterial Source Investigations

CRD, municipal and IHA staff continue to work together to identify bacterial sources in stormwater discharges of concern, so they can be addressed by the appropriate jurisdiction. The sources of contamination include malfunctioning on-site sewage treatment systems, agricultural practices, aging stormwater and sewage infrastructure, sewage-stormwater cross connections, and wild and domestic animals.

In 2021, CRD staff investigated the catchment areas of seven stormwater discharges on the Saanich Peninsula. CRD and Sidney staff found and repaired a cross-connection in discharge 450. CRD staff are currently investigating another source in that discharge. Two of the high-rated discharges (3118B in Coles Bay and 3078A in Deep Cove) drain areas that use on-site sewage treatment. CRD staff have narrowed down the sources and passed the information onto IHA for follow-up. Tseycum Creek (3095) has been rated high for more than 10 years, due to agricultural practices upstream in North Saanich.

Staff continued to narrow down the sources of bacteria in the other catchments using upstream sampling for parameters such as bacteria, caffeine and genetic analysis (to determine if the origin of the bacteria is animal or human. See Table B for status of investigations). Staff will continue investigations in many of these stormwater catchments, and others that are a concern, in 2022.

Table B. Status of 2021 Source Investigations

Stormwater Discharge #	Location/ Jurisdiction	# of Visits	Status	Next Steps
412	Tetayut Creek Central Saanich	1	Complete; conducted due to odour complaints following heat wave but no indication of sewage inputs to creek.	CRD to continue investigation if complaints arise again.
450	Sidney	3	Source found and repaired. Other sources exist.	CRD to continue investigations for other sources.
3005	Mermaid Canal	2	Inconclusive; elevated metals in water upstream but lower upon resampling.	CRD to continue investigations.
3118B	Coles Bay, North Saanich	1	Source narrowed and passed onto Island Health.	CRD to continue monitoring.
3145	Brentwood Bay, Central Saanich	1	Inconclusive; narrowed down to a couple blocks; discharge dry in summer Human bacteria measured from two directions.	CRD to continue investigation.
3079	Tatlow Creek, North Saanich	2	Narrowed, confirming source; human source confirmed but counts lower upon resampling.	CRD to continue investigation.
3133	Hagan Creek, Central Saanich	3	Main source identified; sampling for another source resulted in low counts.	Waiting for repairs to main source.

Coles Bay

CRD staff continues to work with Island Health, North Saanich and Pauquachin First Nation to find and eliminate sources of bacteria in stormwater going into the bay. Two sources have been identified in recent years and bacterial counts have decreased in both, however, other sources from malfunctioning onsite sewage treatment systems remain.

ENVIRONMENTAL CONCERN

The CRD assesses environmental concern in water and sediment from stormwater, pipes, ditches and streams, based on their potential to impact the marine receiving environment. Staff also assess watercourse health in seven freshwater streams through water quality and benthic invertebrate sampling. When contamination is found, the results are passed onto the appropriate jurisdiction and the CRD works in partnership to find and eliminate the source.

Chemical Contaminant Sampling

Sediment

The program evaluates sediment from within stormwater discharges (pipes, ditches and streams) for potential environmental impact due to contaminant levels. Sediment data and ratings are in Appendix E.

CRD staff assign contaminant ratings to stormwater discharges from sediment samples taken at the point of discharge into the marine environment. Ratings are determined by comparing the concentration of each contaminant [eight metals and high and low molecular weight polycyclic aromatic hydrocarbons (PAH)] to sediment quality guidelines protective of marine life. Methods are described in Appendix G.

2021 Monitoring Results

Staff collected 10 sediment samples on the Saanich Peninsula, 8 at the point of discharge (to measure potential contamination to the marine receiving environment), and 2 upstream in Reay Creek (to assess sediment contamination in the upper watershed).

Staff assigned the following contaminant ratings to the 8 discharges assessed in 2021:

- 4 low ratings,
- 4 moderate ratings, and
- 0 high ratings

Discharges Requiring Corrective Action

Remedial work resulted in decreased contamination in two of the three discharges that have been a concern for many years, allowing removal from the list of discharges requiring corrective action. The data indicates lower levels of contaminants in discharges 441 (Reay Creek) and 3138 (Tsartlip Boat Launch).

Only one discharge remains on the list of discharges requiring corrective action: Mermaid Creek (discharge 3005). Discharge 3005 has been of concern due to elevated metals and PAHs since 2005. Marine sampling results indicate that metals from stormwater may have impacted the marine receiving environment. CRD staff conducted numerous source investigations, however sediment is difficult to find within the infrastructure. Staff has been monitoring water quality instead in recent years.

Previous data has indicated that copper, iron and zinc can be elevated in this discharge, however, copper is the only contaminant elevated above water quality guidelines for protection of aquatic life in 2021. Staff will continue sampling the catchment and will work with the Town of Sidney to determine sources.

Locations of these discharges are shown in Figure A and Appendix A.

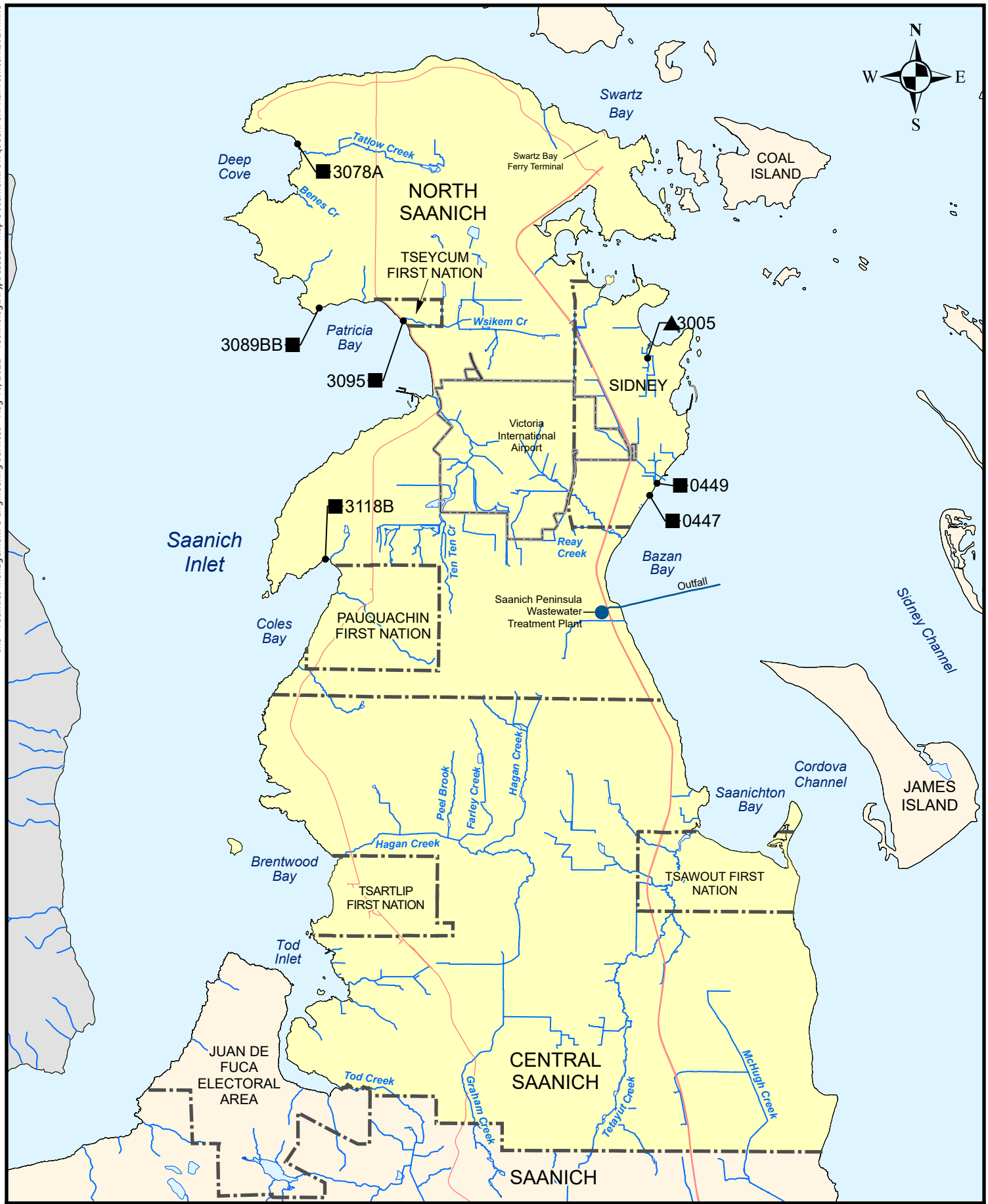

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Figure A- Saanich Peninsula - Stormwater Discharges Rated High for Public Health or Environmental Concern

- High Public Health Concern Rating in 2021
- High Environmental Concern Rating in 2021 or previous years (and recommended for corrective action)
- Sewage Treatment and Outfall
- Significant Ditches, Streams, Rivers, and Storm Drains
- Municipal and First Nations Boundary
- Major Roads
- Stormwater Monitoring Area

Watercourses

Staff continued to monitor Hagan/Graham, ḰEL,SET (Reay), Tetayut, Tatlow (Chalet), ȾEN̲TEN, Tod and Tseycum creeks in 2021, to provide information about creek and watershed health. Each year, staff collect water quality data twice at the discharge of each creek providing a snapshot of creek health in the wet and dry seasons. Approximately every second year, staff conduct more comprehensive monitoring throughout one of the watersheds. This comprehensive monitoring includes more locations within the watershed, additional water quality parameters and collection of benthic invertebrates. In 2021, the Tetayut watershed was sampled in this way. These data are presented in Appendix F.

Based on the CRD monitoring data, the parameters of most concern in Saanich Peninsula creeks are *E. coli*, phosphorus and turbidity, with some creeks also experiencing low dissolved oxygen and elevated metals. Poor water quality is likely the result of development, business waste (historical and ongoing), agricultural practices and malfunctioning on-site sewage treatment systems.

Tetayut Creek Watershed

Staff sampled three locations in Tetayut Creek in the summer and fall of 2021. Samples were collected 5 times in 30 days for both seasons except at Cooperidge Park (sampled during fall only as the creek was not flowing at this location in the summer of 2021).

CRD water quality data in Tetayut Creek indicated that the creek's water quality is somewhat poor and may be decreasing. Comparison to BC ENV water quality guidelines for aquatic life indicated that the levels of *E. coli*, turbidity and total suspended solids, nutrients (nitrate, nitrite and phosphorus) and metals (copper, iron and zinc) are a concern in the creek, particularly during the fall.

These results were similar to the 2015 results (when the creek was last sampled with the same frequency). Differences from 2015 include no exceedances of the cadmium guideline, more exceedances of turbidity and total suspended solids in 2021, and a marginal exceedance of the chronic nitrate guideline at the creek mouth for the first time. Furthermore, the 2021 benthic invertebrate community saw slight decreases in diversity, evenness, Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) abundance and diversity. The Hilsenhoff Biotic Index also increased from 3.83 (slight organic pollution possible) in 2015 to 5.85 (fairly significant organic pollution) in 2021 indicating an increase in organic pollution in the creek since 2015.

Of note, the region experienced record heat in early summer, a dry summer and then heavy rainfalls in the fall when several atmospheric rivers passed through the region from October to the end of November. The extreme rainfall with a reduction in tree cover in the watershed, may have contributed to the elevated turbidity, suspended solids and metals measured in the fall of 2021. The cause of changes measured in the benthic community are uncertain. Benthic communities can fluctuate from year to year, although the hot, dry summer, loss of tree cover, and increase in percent impervious area in the watershed are possible causes.

In 2022, CRD staff will continue to monitor these creeks and work with First Nations and municipal staff to locate sources of bacterial, physical and chemical contamination.

Quality Assurance

The 2021 data met quality assurance/quality control requirements for the program. For bacterial analysis, quality assurance includes annual establishment of a precision criterion based on a range of Saanich Peninsula stormwater sample triplicates. Staff collect blanks and field splits for 10% of the discharge and marine surface water samples collected. 5 of the 34 field splits exceeded the precision criterion; however, the bacterial counts in those samples were low (below 200 CFU/100 mL) and, therefore, not expected to meet the criterion.

Quality assurance for sediment analysis included field duplicates, laboratory triplicates and standard reference materials. Precision and accuracy of the laboratory analysis were estimated from the results of these replicate and standard reference materials samples. A detailed discussion on the quality assurance program is provided in Appendix D.

Saanich Peninsula Stormwater Source Control Service

The CRD established the Saanich Peninsula Stormwater Source Control Service in 2014, with the goal to prevent the release of contamination into the municipal drainage system through education and guidance, maintenance of catch basins, appropriate business practices, and the proper disposal of waste. Since then, staff have focused on creating a regulatory bylaw and its supporting framework. Regulatory bylaws (*Bylaw No. 4168* and amending *Bylaw No. 4229*) that set out the requirements for discharges to the municipal drainage system were finalized in December 2019. The CRD worked with municipalities, stakeholders and dischargers to implement the bylaw in 2019, and expanded implementation strategies in 2020.

Bylaw 4168 Inspections

In 2021, the CRD conducted in-person inspections at 153 businesses to provide education on stormwater source control and solutions for managing business waste on-site to prevent contamination of the stormwater system and the downstream freshwater or marine receiving environment. Inspections took place at 77 parking lot operations, 49 outdoor storage operations, and 27 general inspections.

In addition, staff have collected baseline data in three creeks that drain industrial areas, and sediment sampling continues to identify metal and PAH contamination from parking lots, roads, spills and business waste. Staff anticipate that the environmental monitoring program's sampling results will be used to assess the performance of the stormwater source control program over the coming years.

SAANICH PENINSULA HARBOURS AND WATER MONITORING AND COORDINATION SERVICE

In 2020, a new CRD service was established at the request of the Saanich Peninsula municipalities for the purpose of coordinating and implementing harbours, waterbodies and watercourses environmental protection and improvement initiatives on and surrounding the Saanich Peninsula. The service is to include monitoring, mapping, reporting and public education on issues relating to the marine and shore area environments; coordination and collaboration with public authorities and other persons on issues relating to the marine and shore area environments; and implementing programs related to rehabilitation and improvement of the marine and shore area environments. CRD staff are meeting with municipalities and engaging First Nations to determine next steps.

2022 PROGRAM

In 2022, CRD staff will continue to work with municipal partners, First Nations and the community to achieve LWMP goals to identify stormwater discharges of public health and environmental concern. CRD staff will continue to work with its partners to identify and reduce bacteria and contaminant concentrations in stormwater discharges, creeks and the marine receiving environment.

REFERENCES

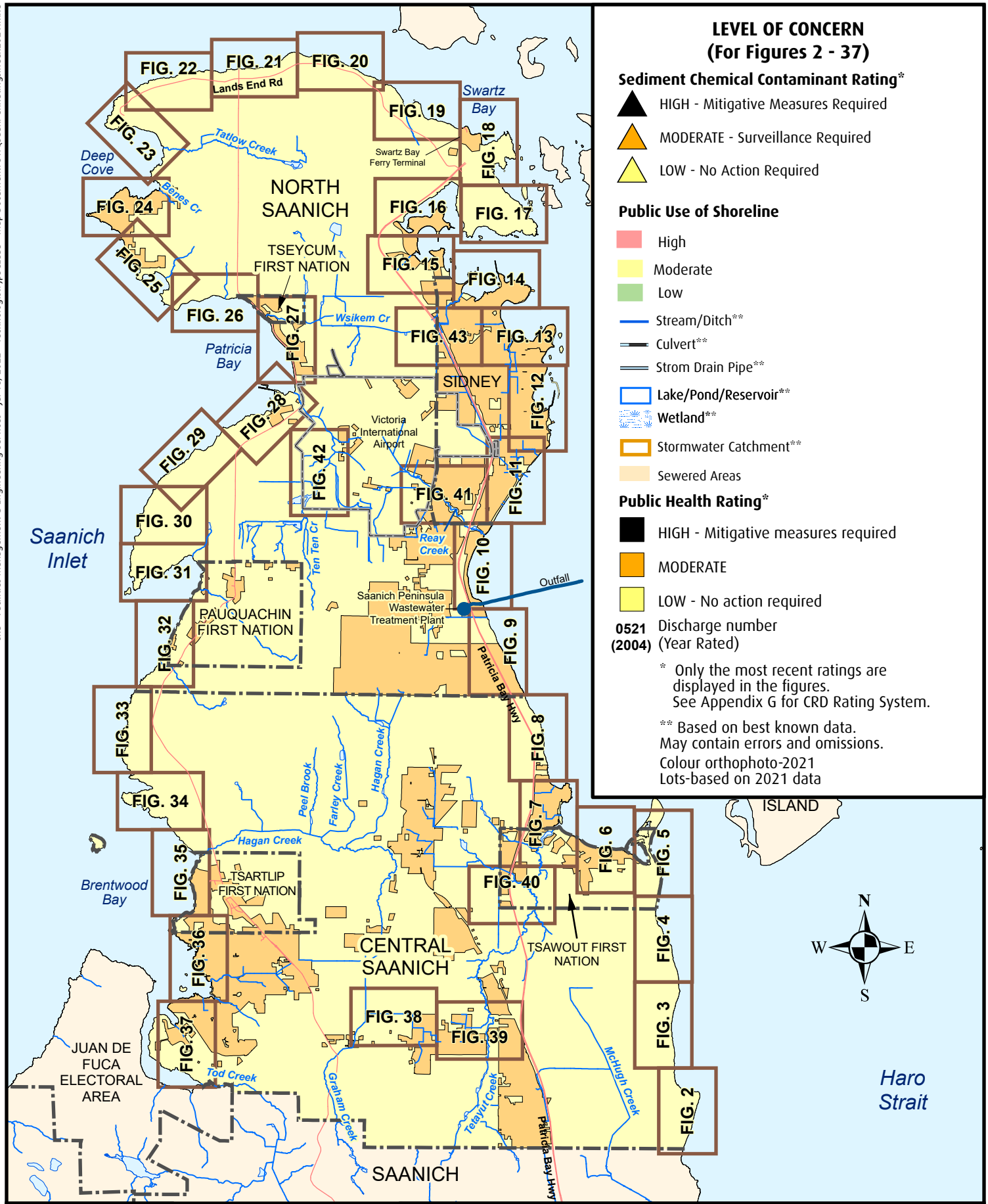
CRD, 2011. Saanich Peninsula Liquid Waste Management Plan.

Terms & Abbreviations

CCME	Canadian Council of Ministers of the Environment
CFU	Colony-forming unit
CRD	Capital Regional District
D/S	Downstream
DIS	Dissolved state
DND	Department of National Defence
E. coli	Escherichia coli
ENT	Enterococci
ENV	BC Ministry of Environment and Climate Change Strategy
EPT	Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)
FC	Fecal Coliform
HBI	Hilsenhoff Biotic Index
HMW	High molecular weight
HPAH	High molecular weight polycyclic aromatic hydrocarbon
IHA	Island Health Authority
ISQG	Interim Sediment Quality Guideline
LMW	Low molecular weight
LPAH	Low molecular weight polycyclic aromatic hydrocarbon
LWMP	Liquid Waste Management Program
MMAG	Marine Monitoring Advisory Group
MSQG	Marine Sediment Quality Guidelines
NTU	Nephelometric Turbidity Unit
PAH	Polycyclic aromatic hydrocarbon
PEL	Probable effects level
POD	Point of discharge
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
SPSO	Sewage Pump Station Overflow
SPTP	Saanich Peninsula Treatment Plant
SQG	Sediment quality guidelines
TEU	Toxic equivalent unit
TOC	Total organic carbon
TOT	Total state
TSS	Total Suspended Solids
U/S	Upstream
WQG	Water Quality Guidelines

APPENDIX A

LOCATION OF STORMWATER DISCHARGES
2021



LEVEL OF CONCERN
(For Figures 2 - 37)

Sediment Chemical Contaminant Rating*

- HIGH - Mitigative Measures Required
- MODERATE - Surveillance Required
- LOW - No Action Required

Public Use of Shoreline

- High
- Moderate
- Low
- Stream/Ditch**
- Culvert**
- Strom Drain Pipe**
- Lake/Pond/Reservoir**
- Wetland**
- Stormwater Catchment**
- Sewered Areas

Public Health Rating*

- HIGH - Mitigative measures required
- MODERATE
- LOW - No action required

0521 (2004) Discharge number (Year Rated)

* Only the most recent ratings are displayed in the figures. See Appendix G for CRD Rating System.

** Based on best known data. May contain errors and omissions.

Colour orthophoto-2021
Lots-based on 2021 data

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Figure 1
Key Index for Figures 2 - 37 and Legend

- Sewage Treatment Facility & Outfall
- Significant Ditches, Streams & Storm Drains
- Municipal and First Nations Boundary
- Major Roads
- FIG. 25 Map Tile with Figure Number
- Sewered Areas

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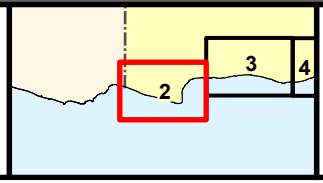

Figure 2
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

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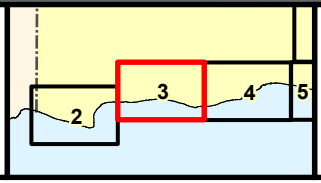

Figure 3
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

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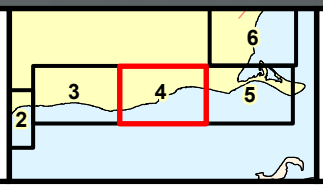

Figure 4
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

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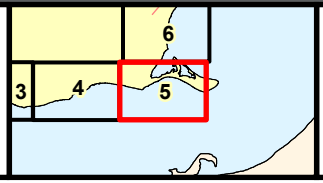
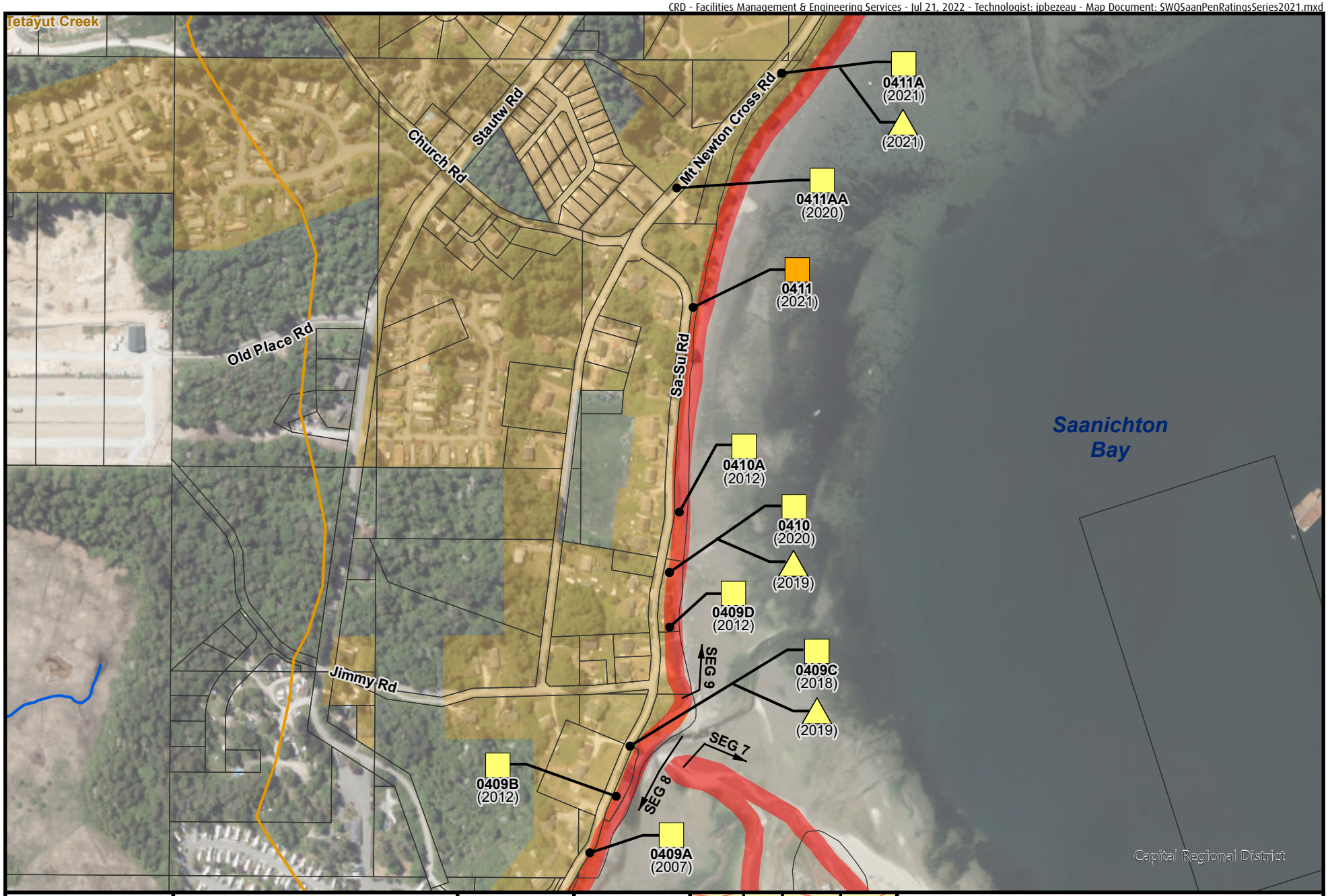


Figure 5
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



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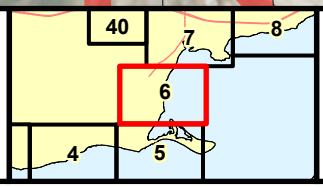
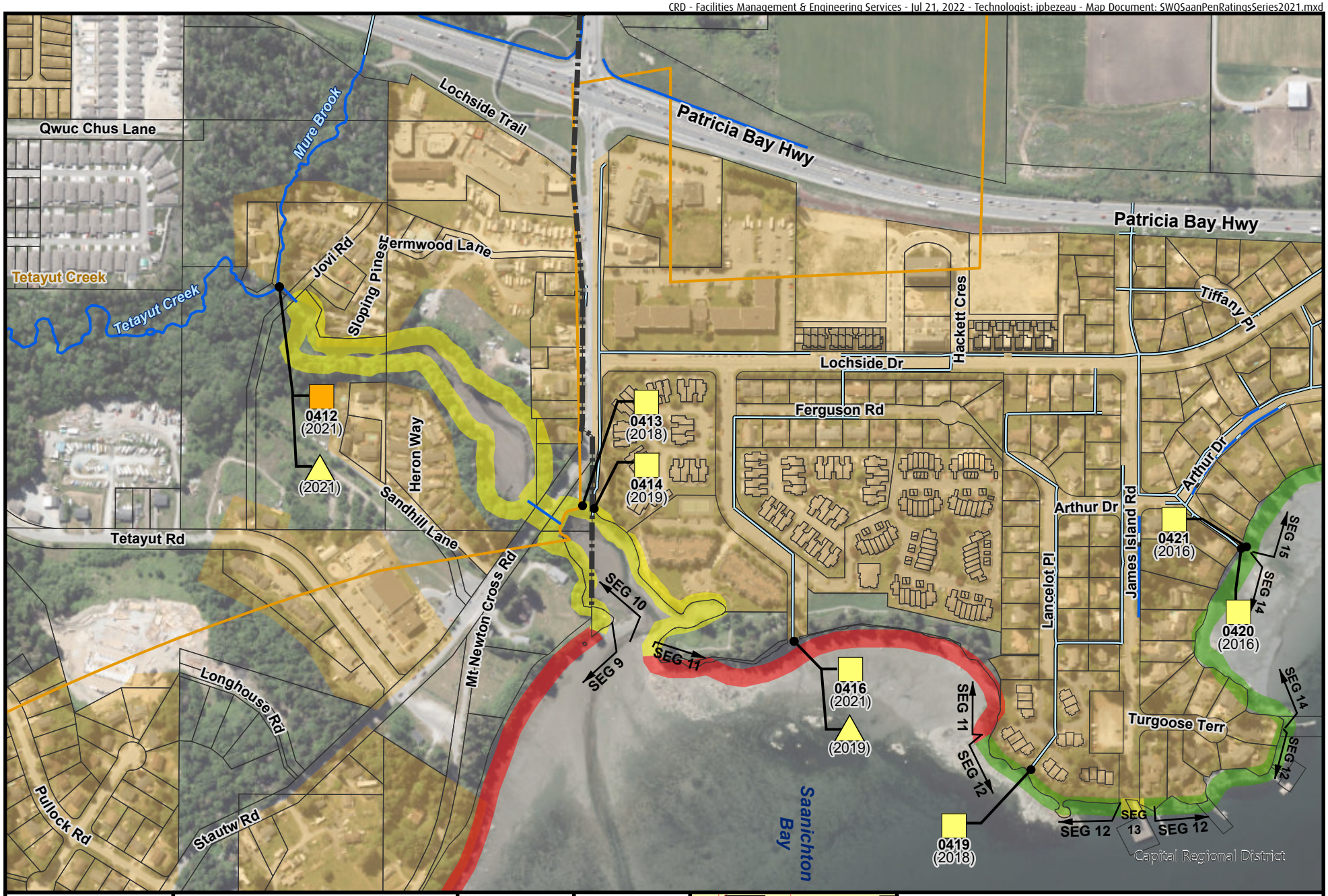


Figure 6
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



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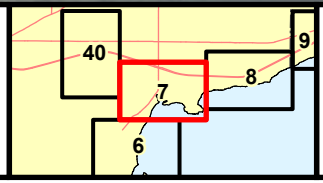
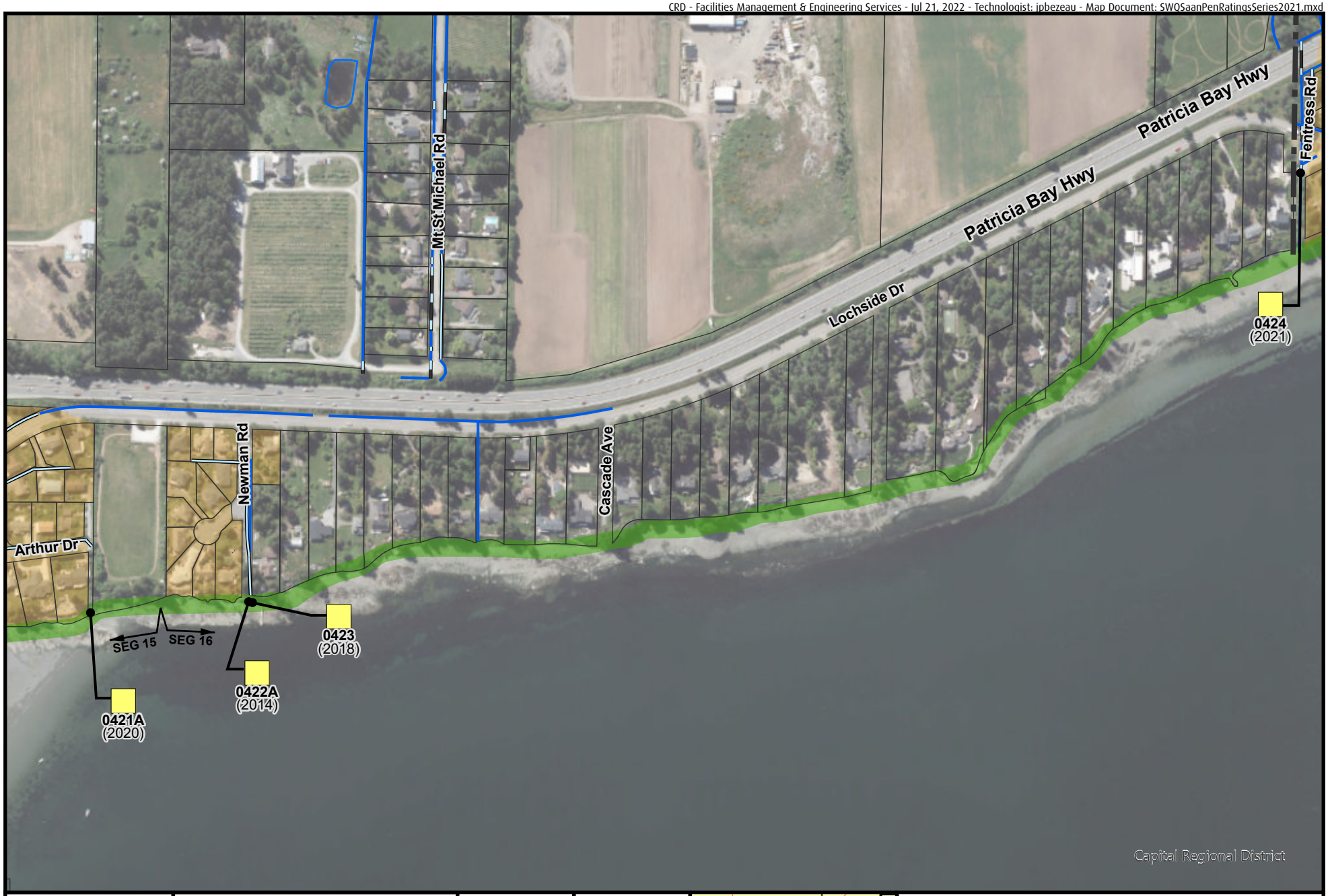


Figure 7
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



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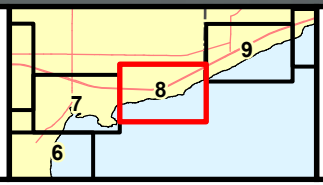

Figure 8

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

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0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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W S N E

For Key Index and Legend See Figure 1

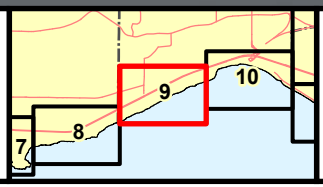
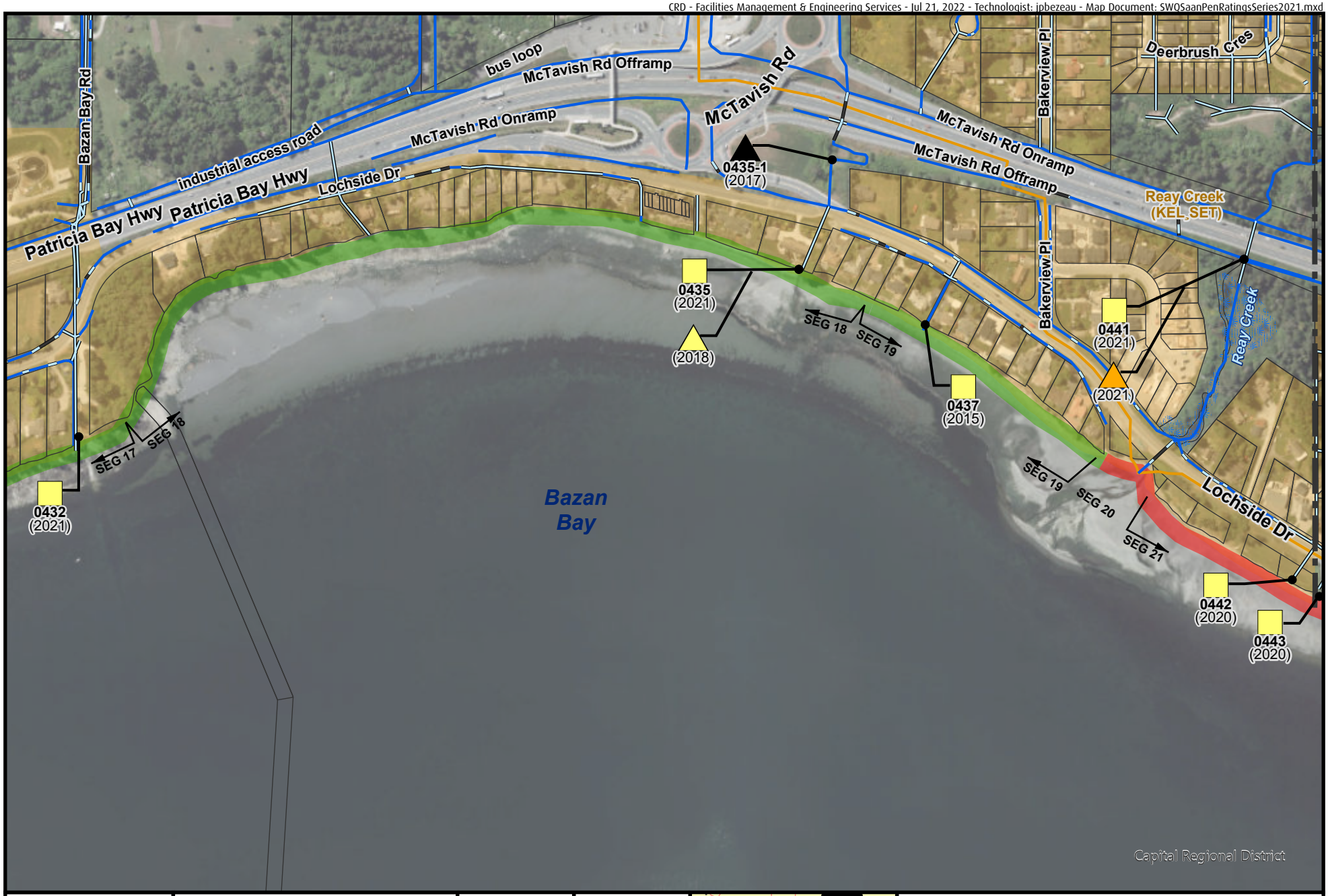


Figure 9
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

CRD - Facilities Management & Engineering Services - Jul 21, 2022 - Technologist: jpbezeau - Map Document: SWQSaanPenRatingsSeries2021.mxd



Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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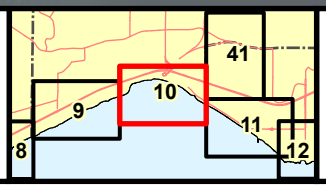
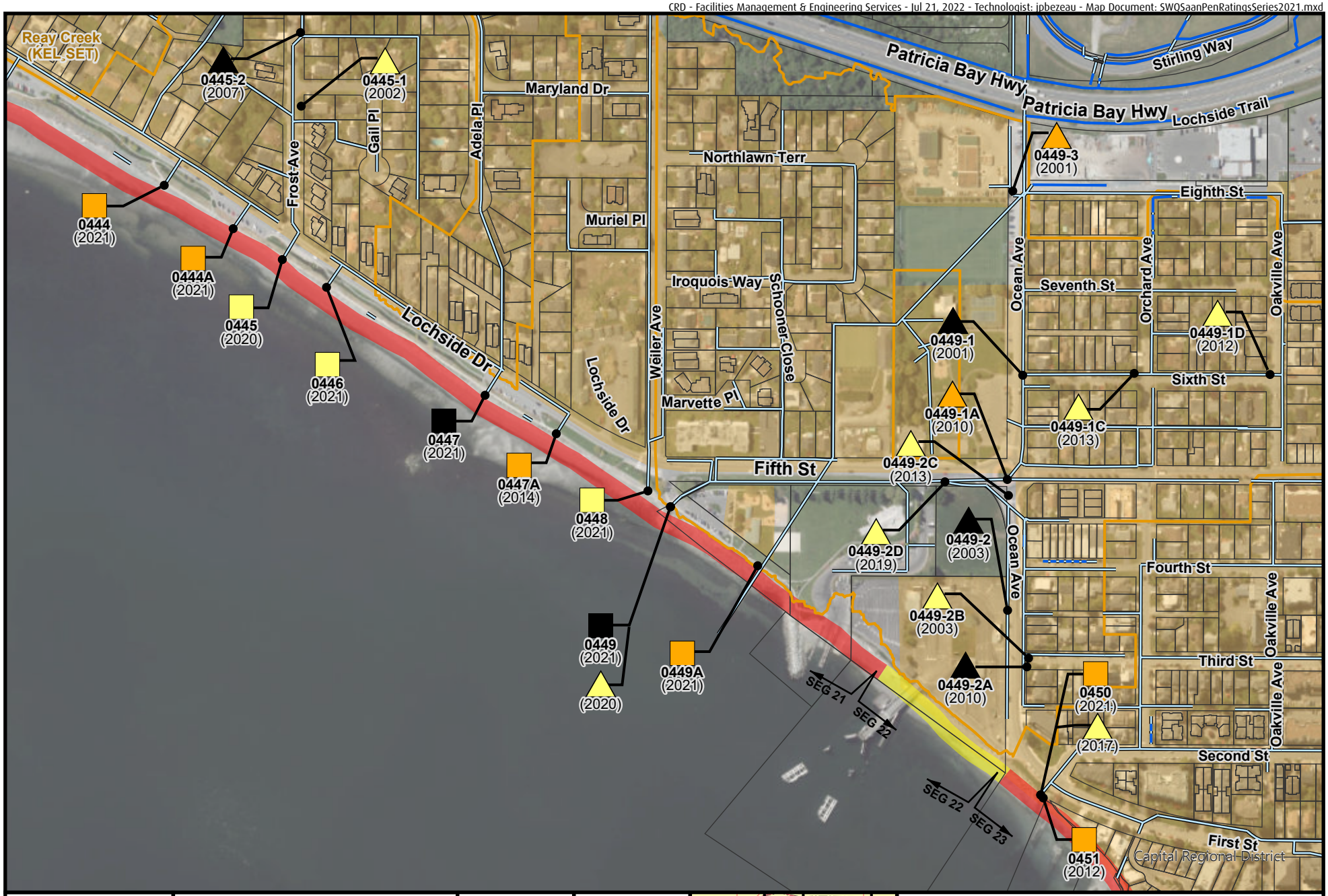


Figure 10
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



CRD
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Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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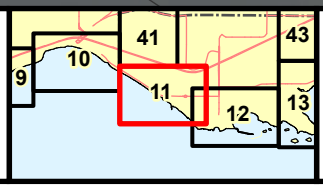

Figure 11
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

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Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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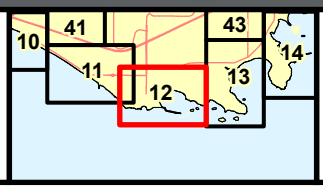

Figure 12

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

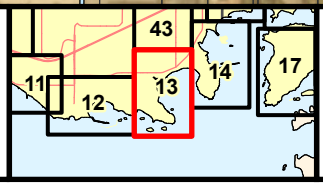
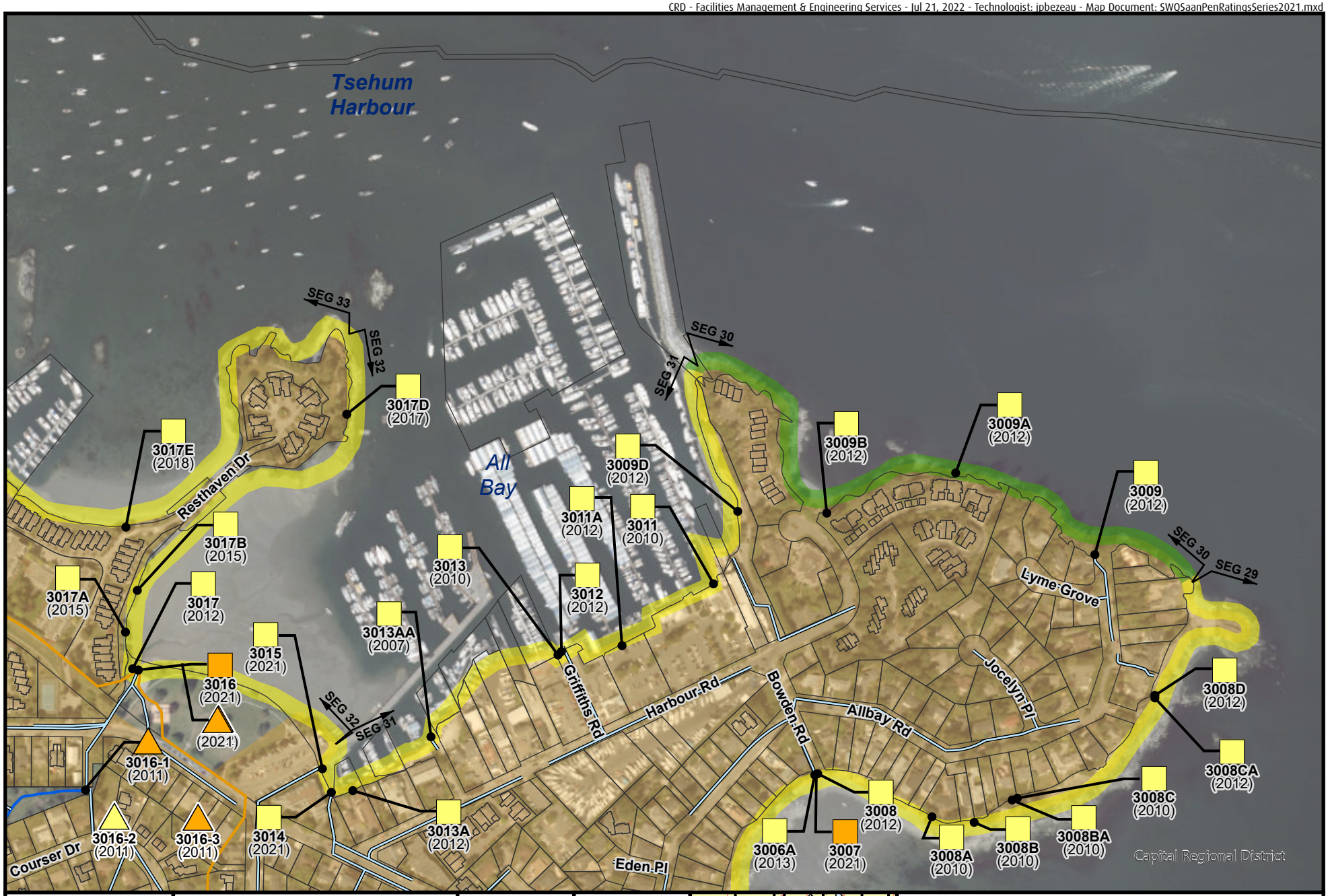


Figure 13
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



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Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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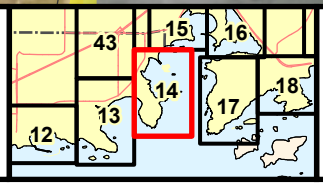
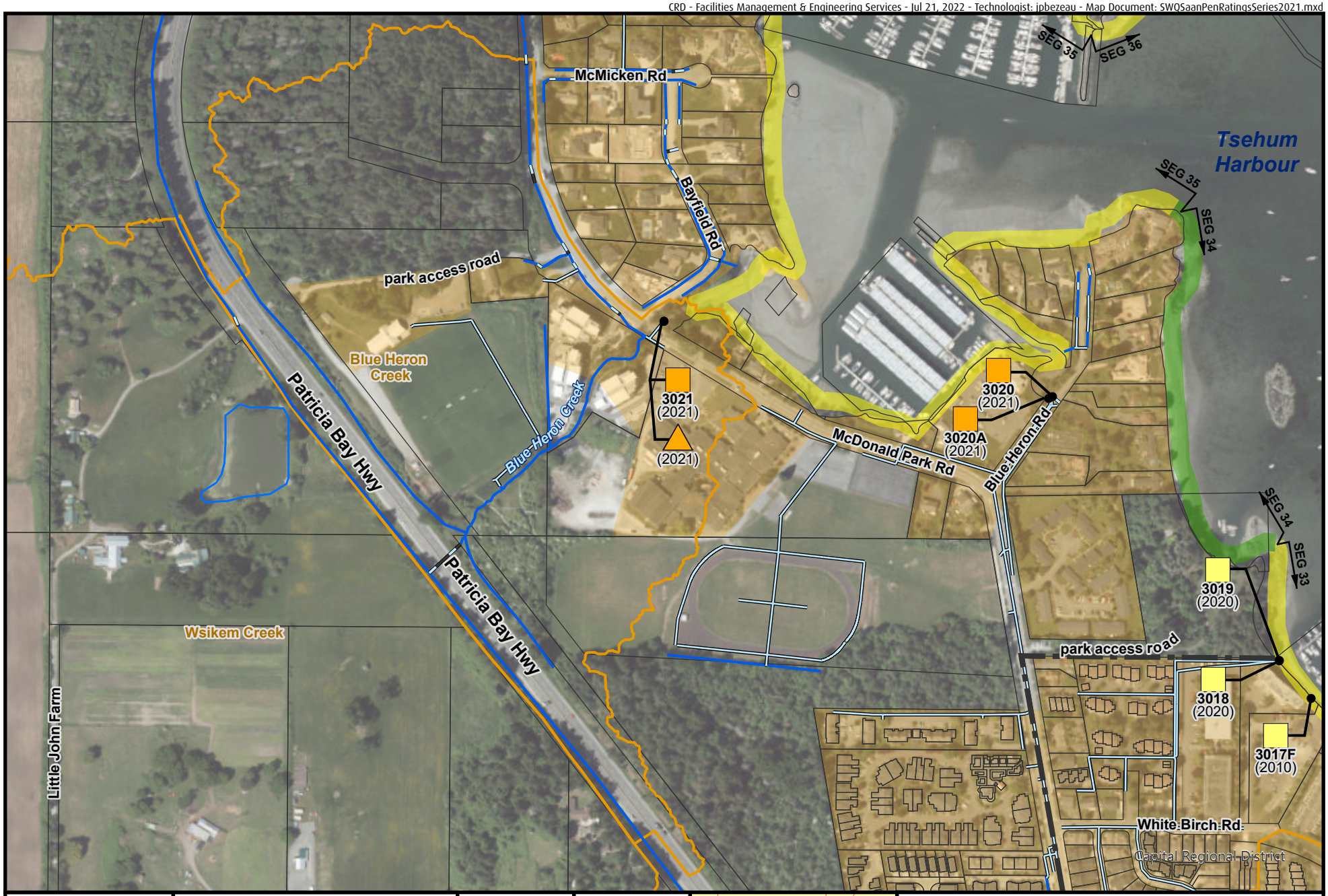


Figure 14

Saanich Peninsula 2021
Stormwater Discharge Location
and Level of Concern

CRD - Facilities Management & Engineering Services - Jul 21, 2022 - Technologist: jpbezeau - Map Document: SWQSaanPenRatingsSeries2021.mxd



CRD
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Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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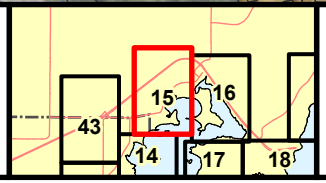

Figure 15
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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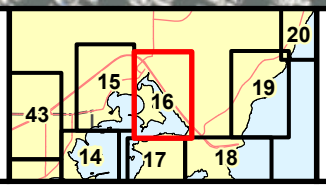

Figure 16

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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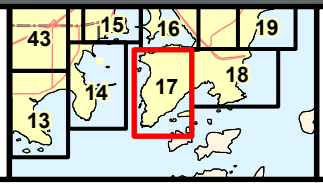

Figure 17

Saanich Peninsula 2021
Stormwater Discharge Location
and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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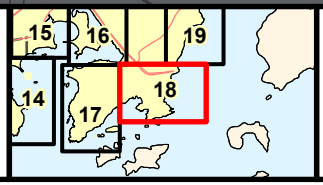
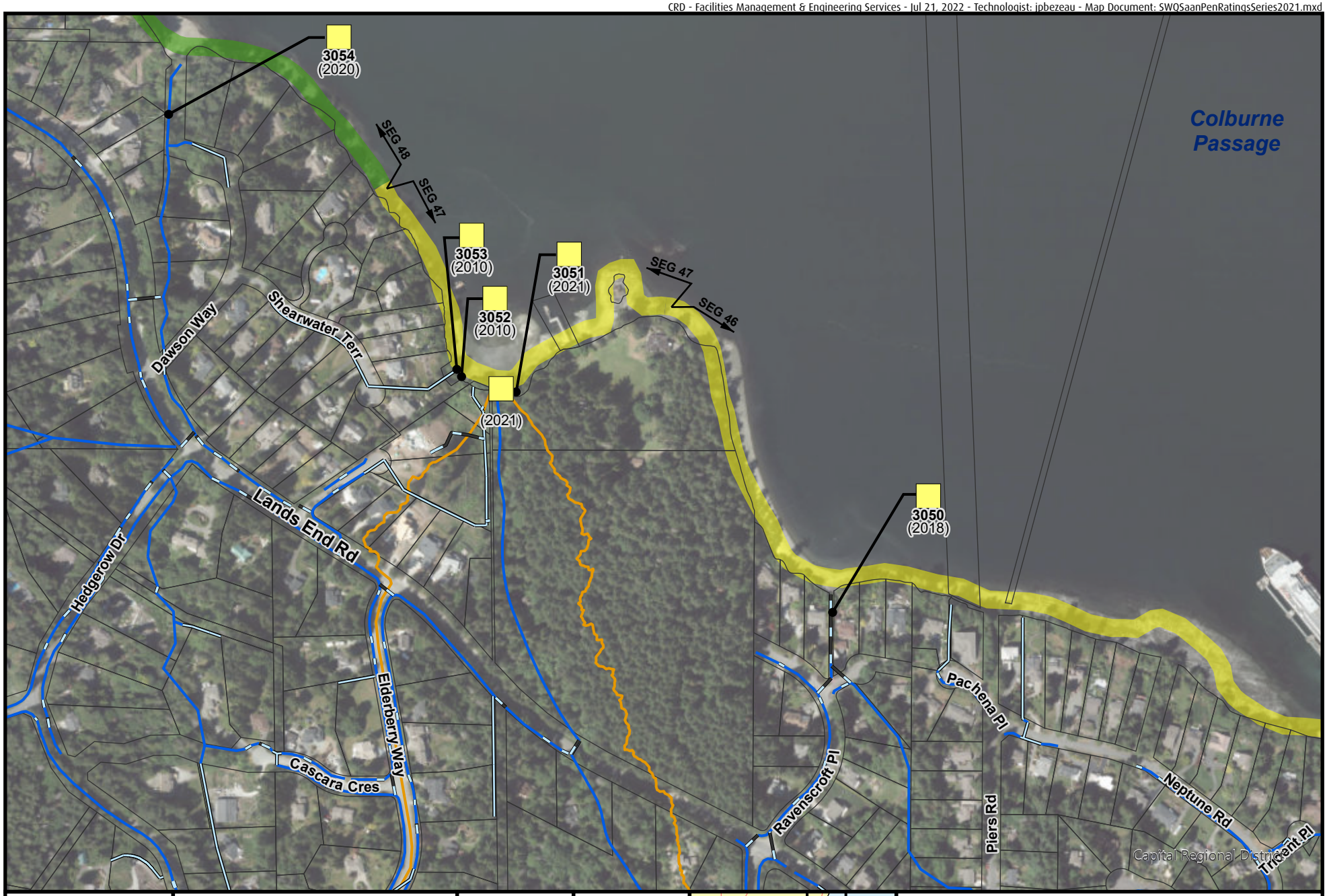


Figure 18

Saanich Peninsula 2021
Stormwater Discharge Location
and Level of Concern



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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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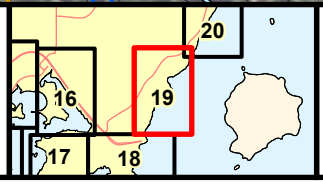
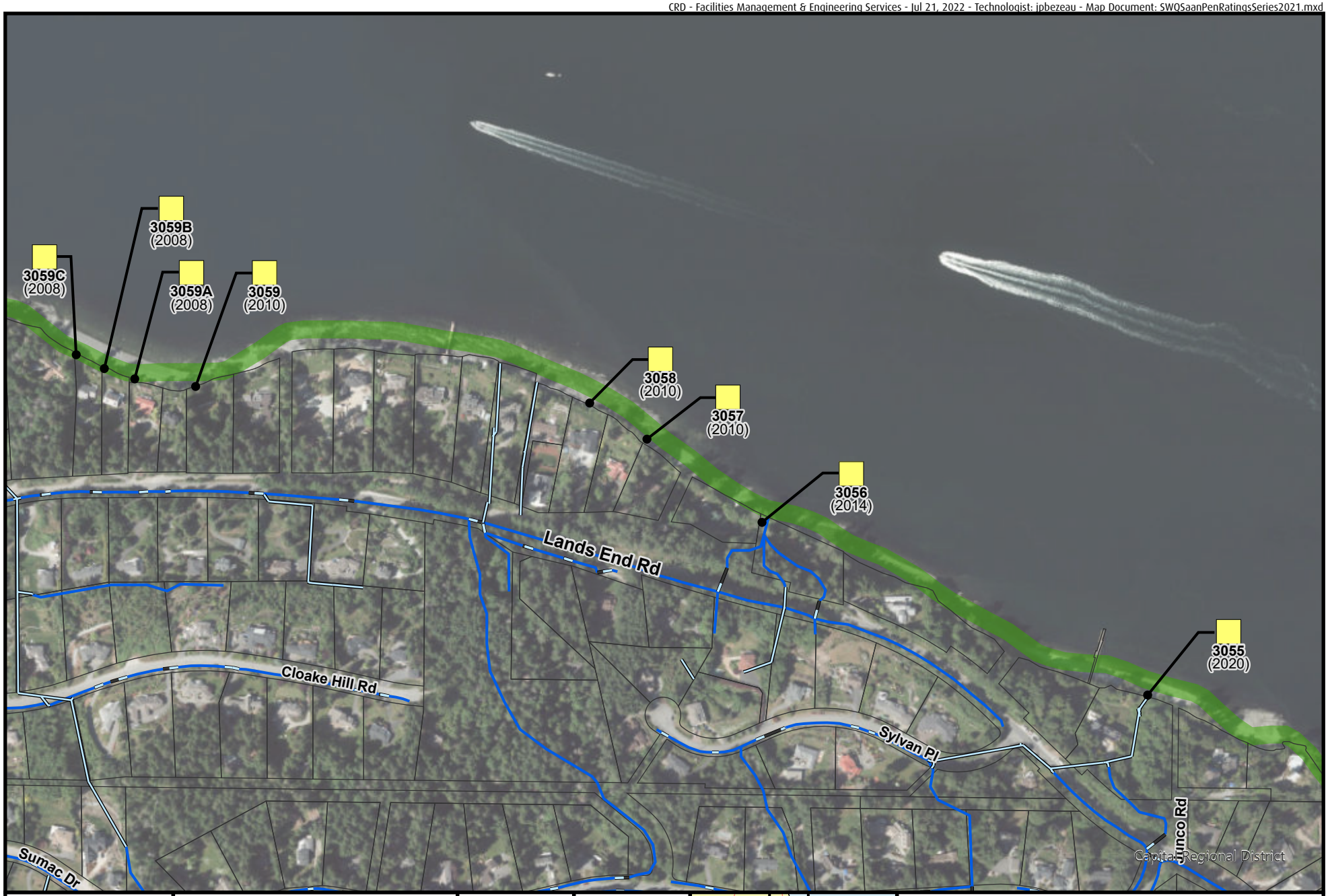


Figure 19

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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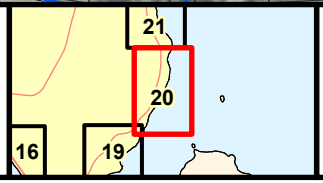
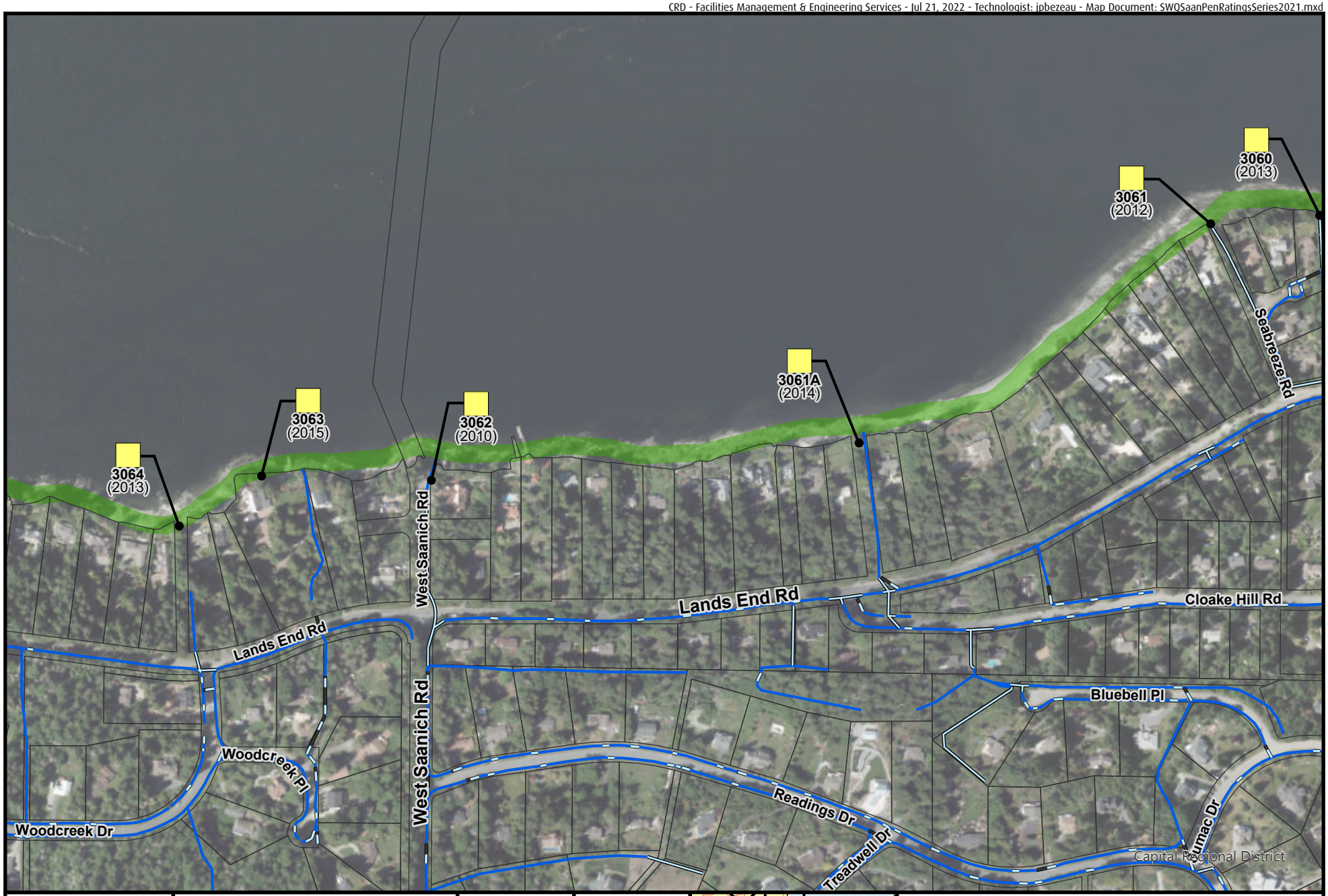


Figure 20

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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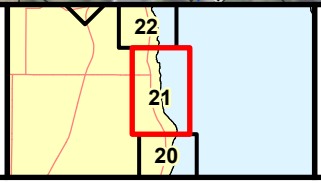
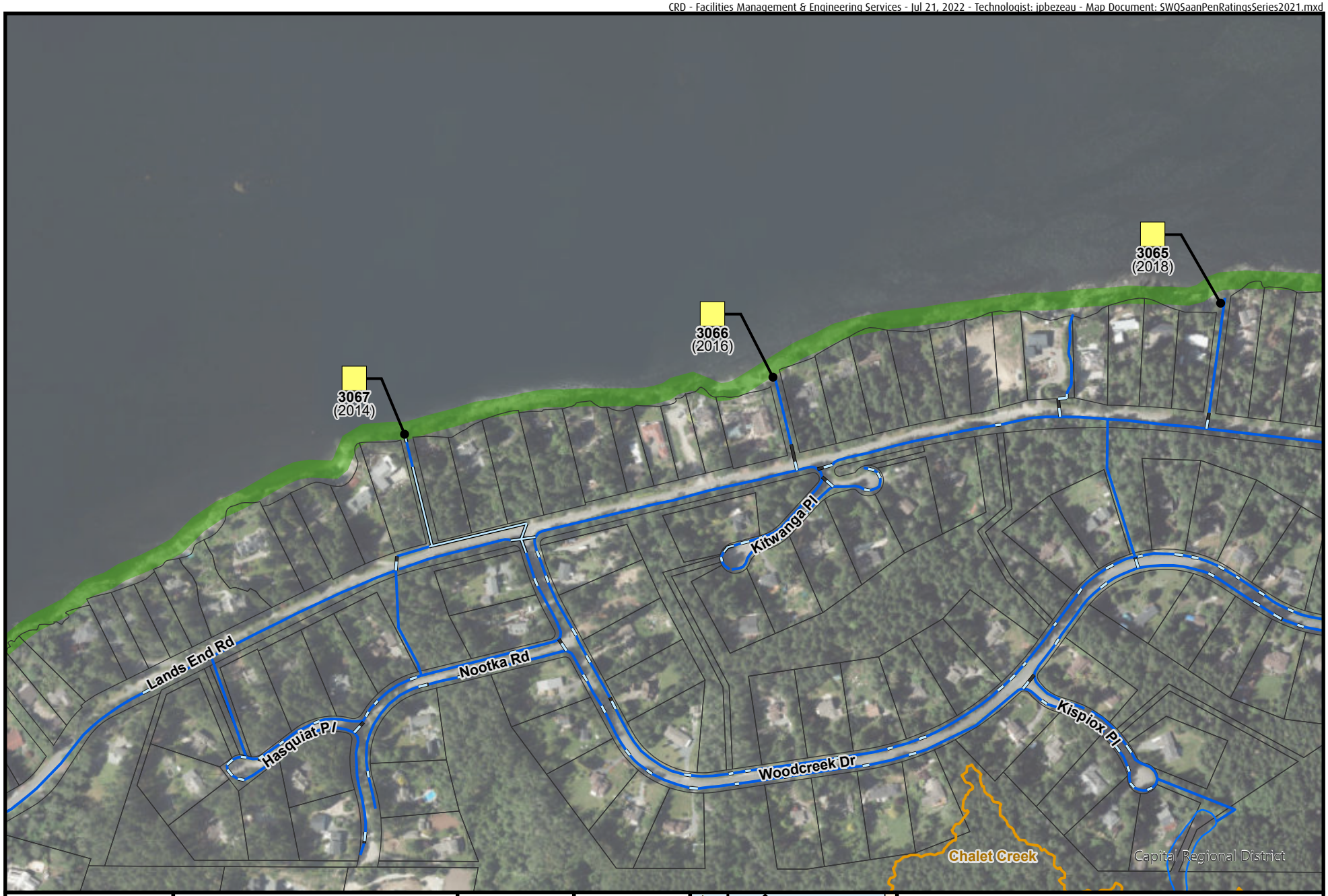


Figure 21

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

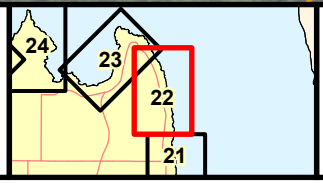

Figure 22

Saanich Peninsula 2021
Stormwater Discharge Location
and Level of Concern

CRD
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Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

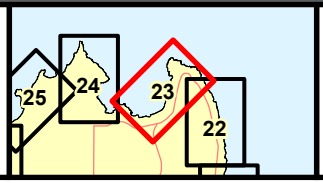

Figure 23
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

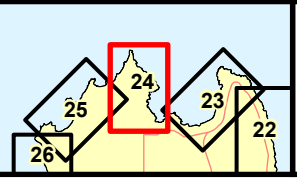
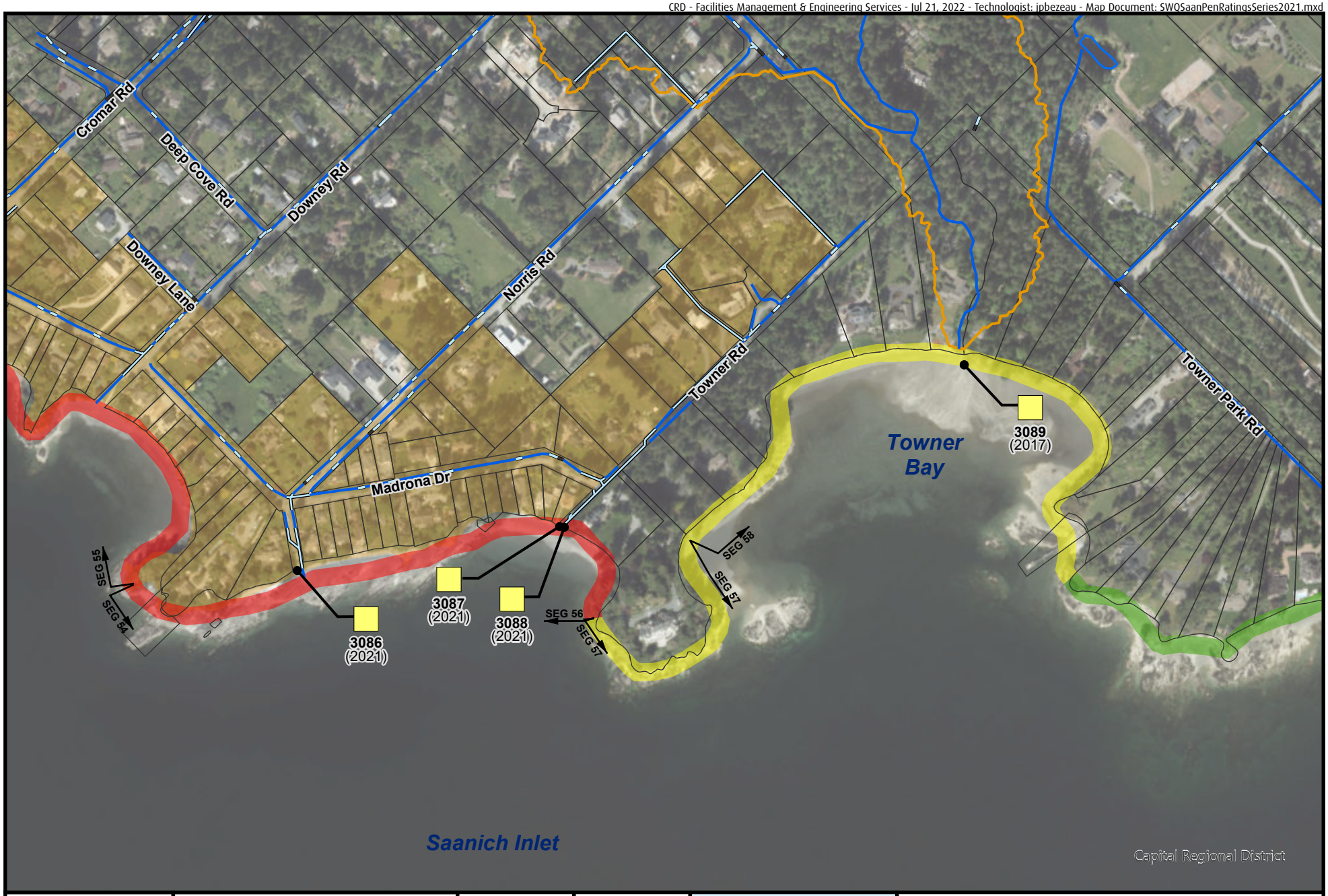


Figure 24
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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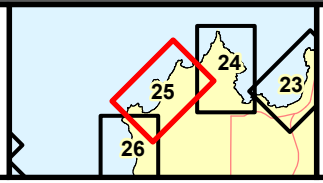

Figure 25
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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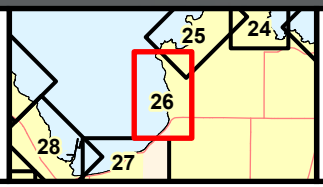
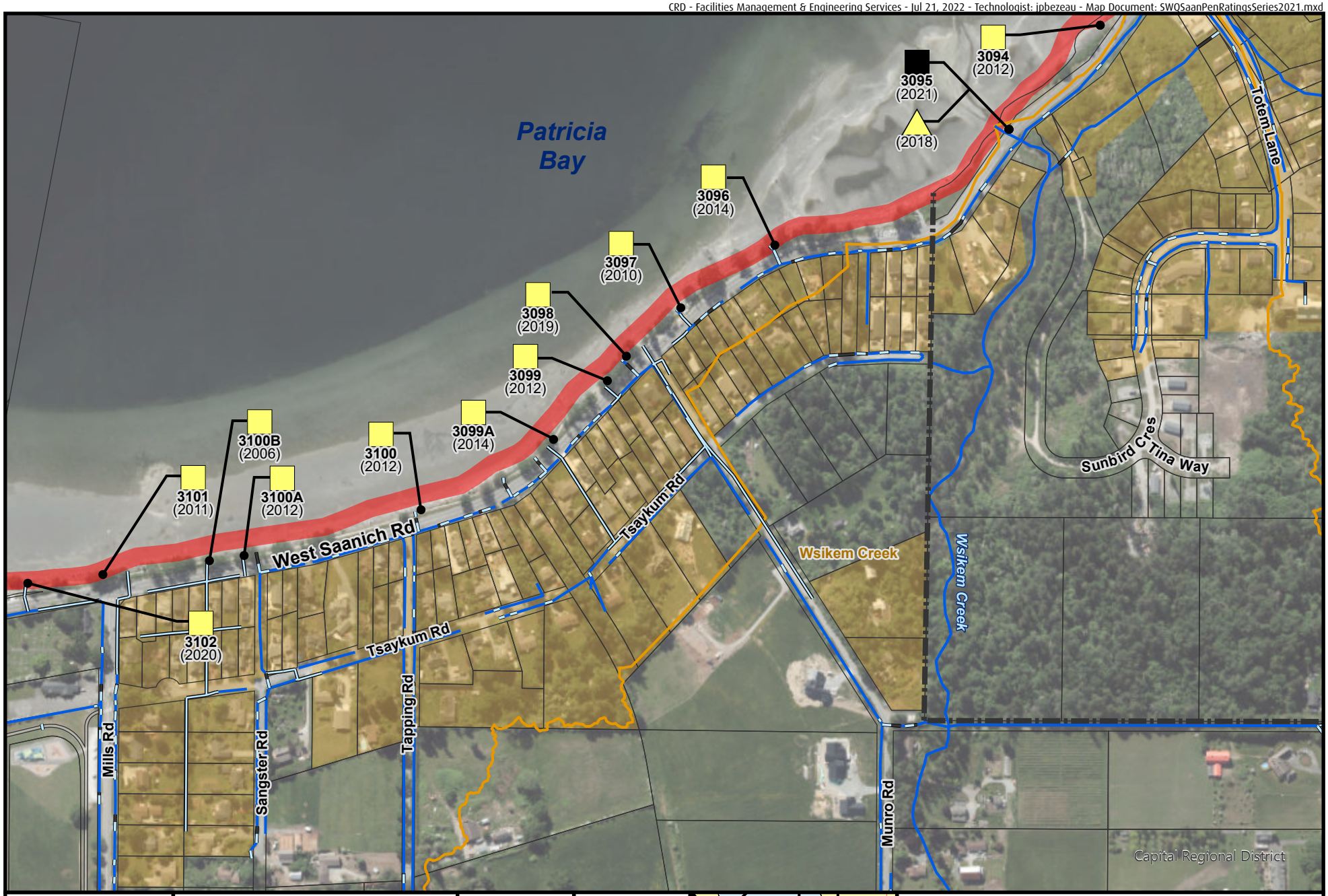


Figure 26

Saanich Peninsula 2021
Stormwater Discharge Location
and Level of Concern



Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

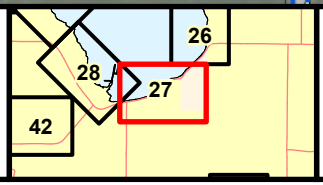

Figure 27
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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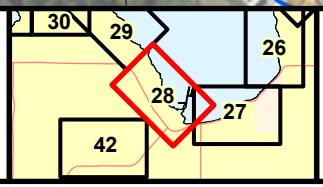
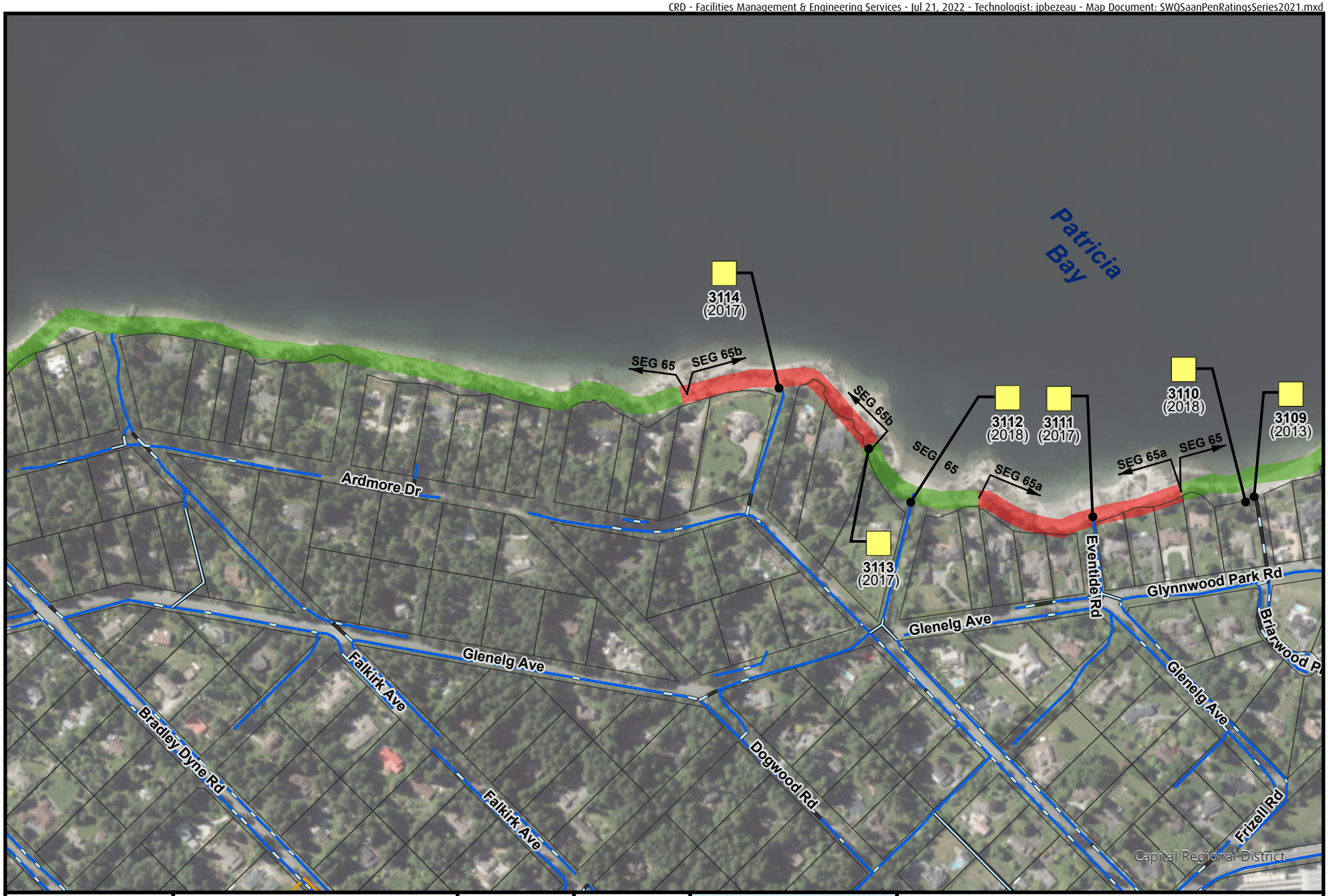


Figure 28

Saanich Peninsula 2021
Stormwater Discharge Location and Level of Concern



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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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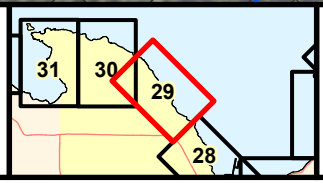

Figure 29
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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N W E S

For Key Index and Legend See Figure 1

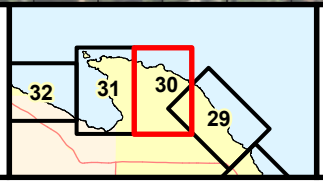
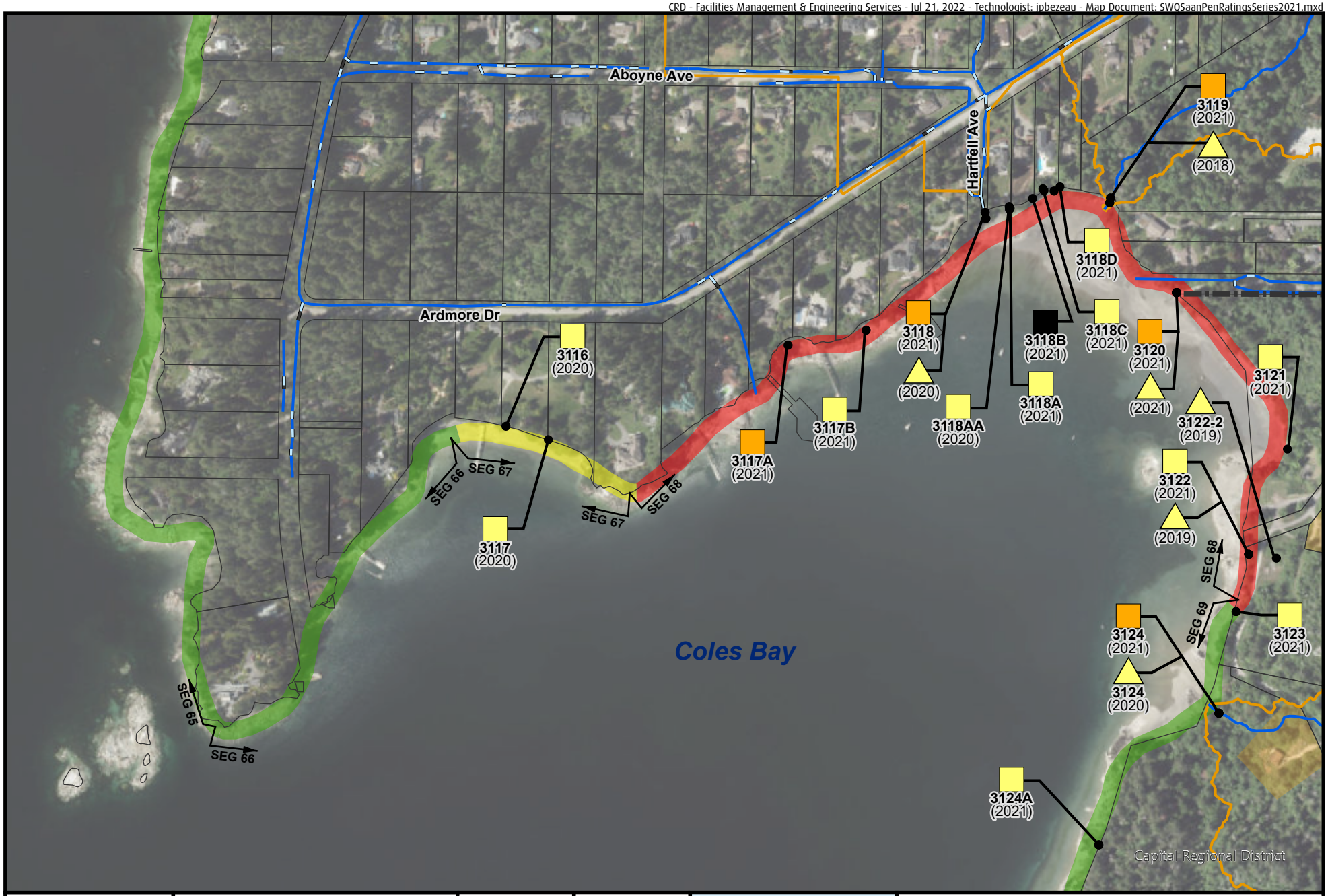


Figure 30

Saanich Peninsula 2021
Stormwater Discharge Location
and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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N W E S

For Key Index and Legend See Figure 1

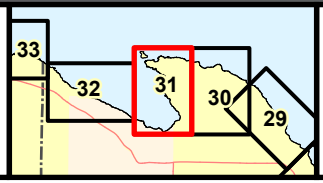

Figure 31
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

CRD
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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

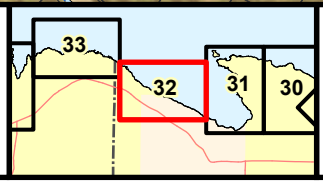
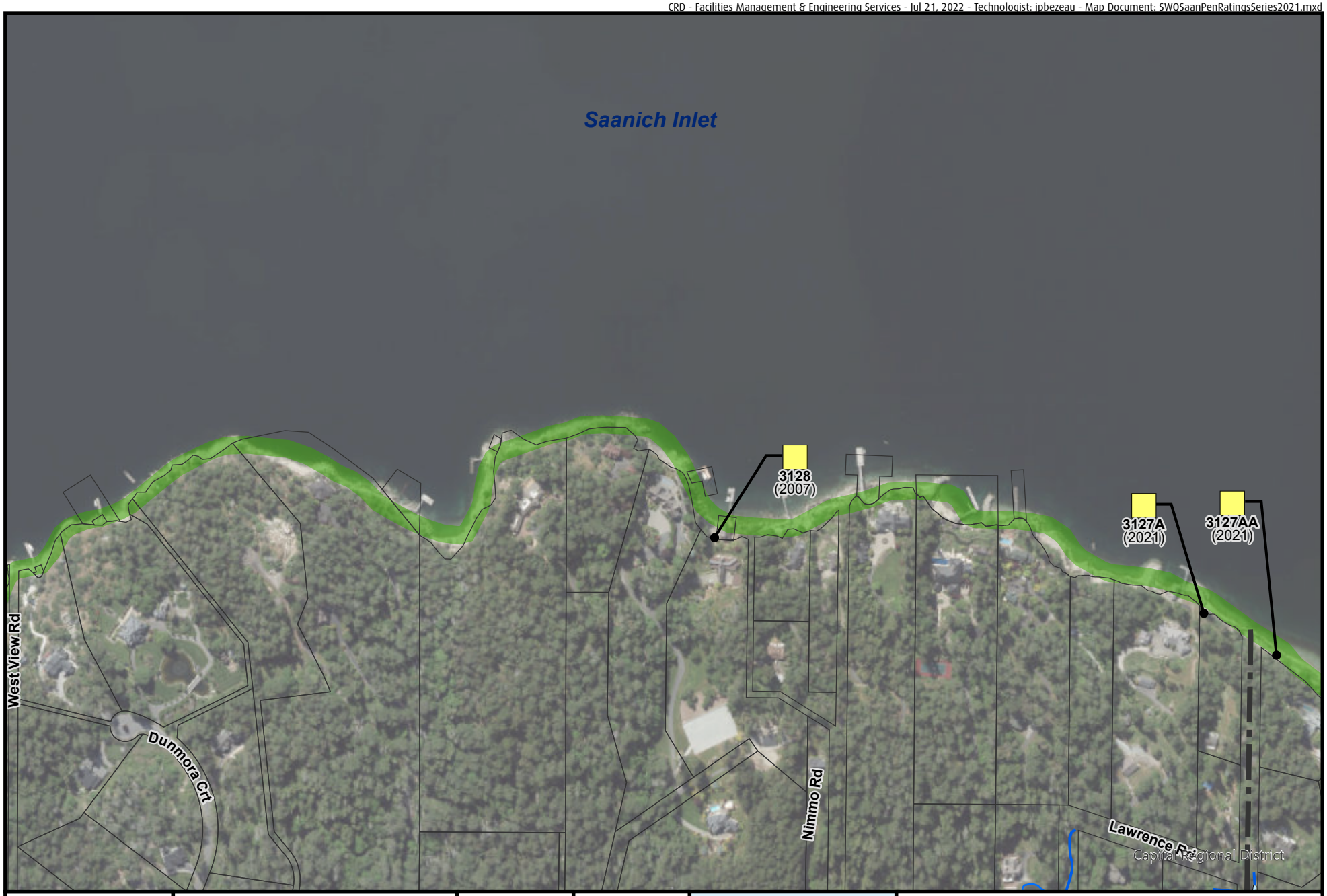


Figure 32
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



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0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S N E

For Key Index and Legend See Figure 1

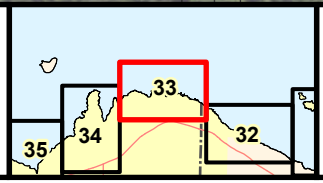
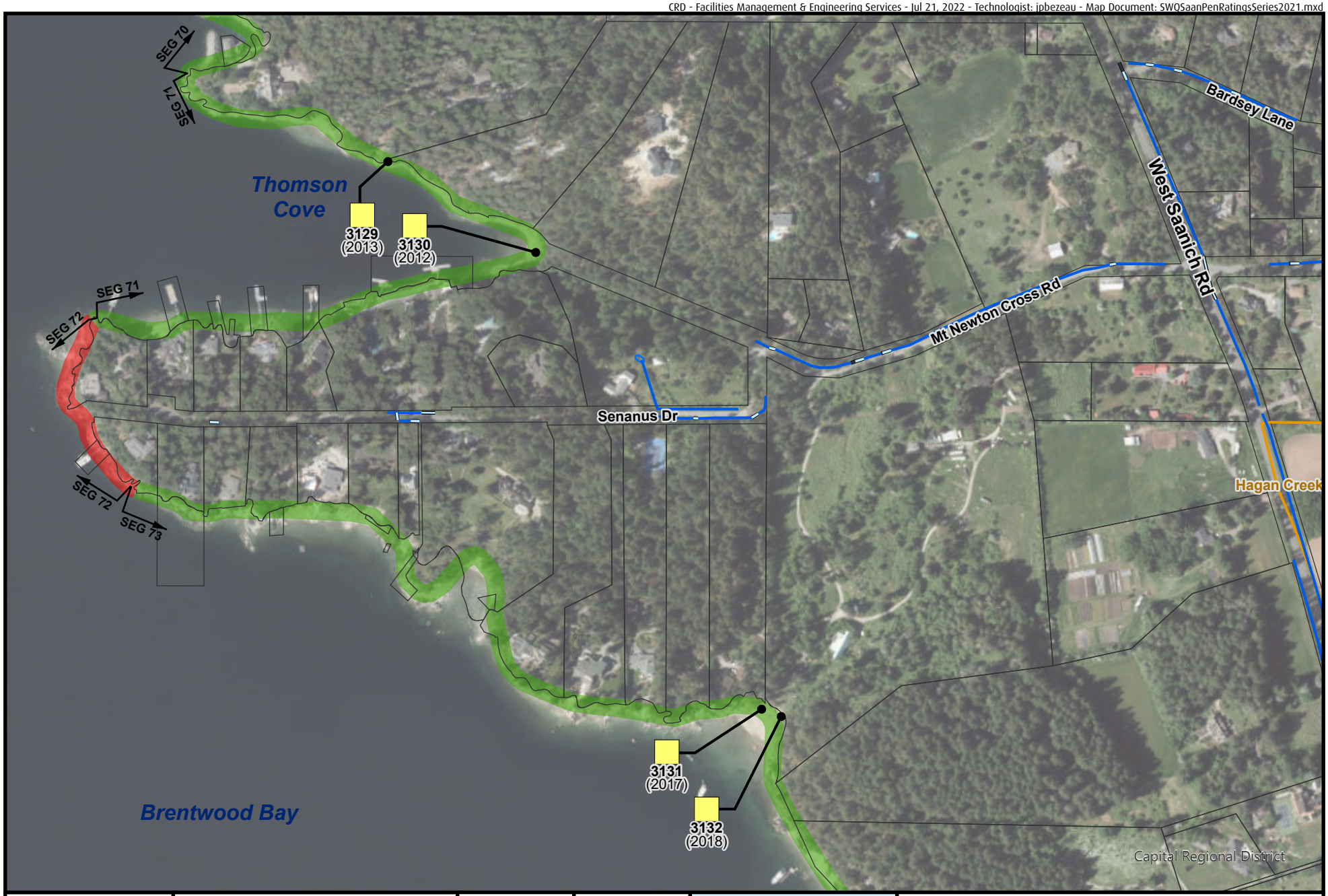


Figure 33

Saanich Peninsula 2021
Stormwater Discharge Location
and Level of Concern



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Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

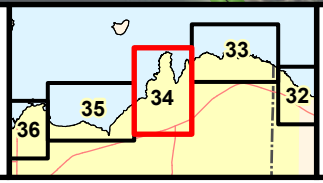
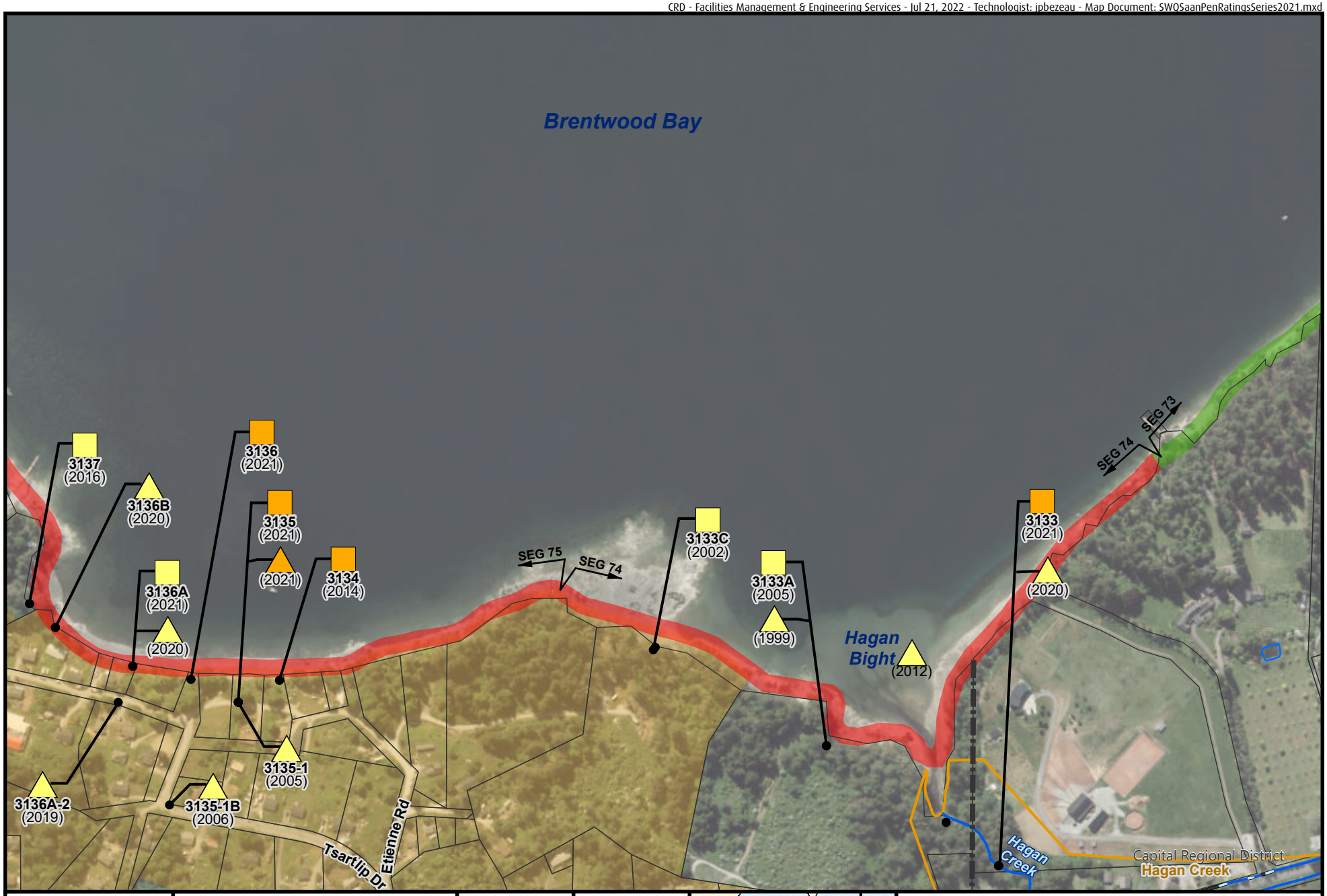


Figure 34
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



CRD
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Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

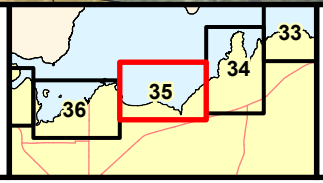
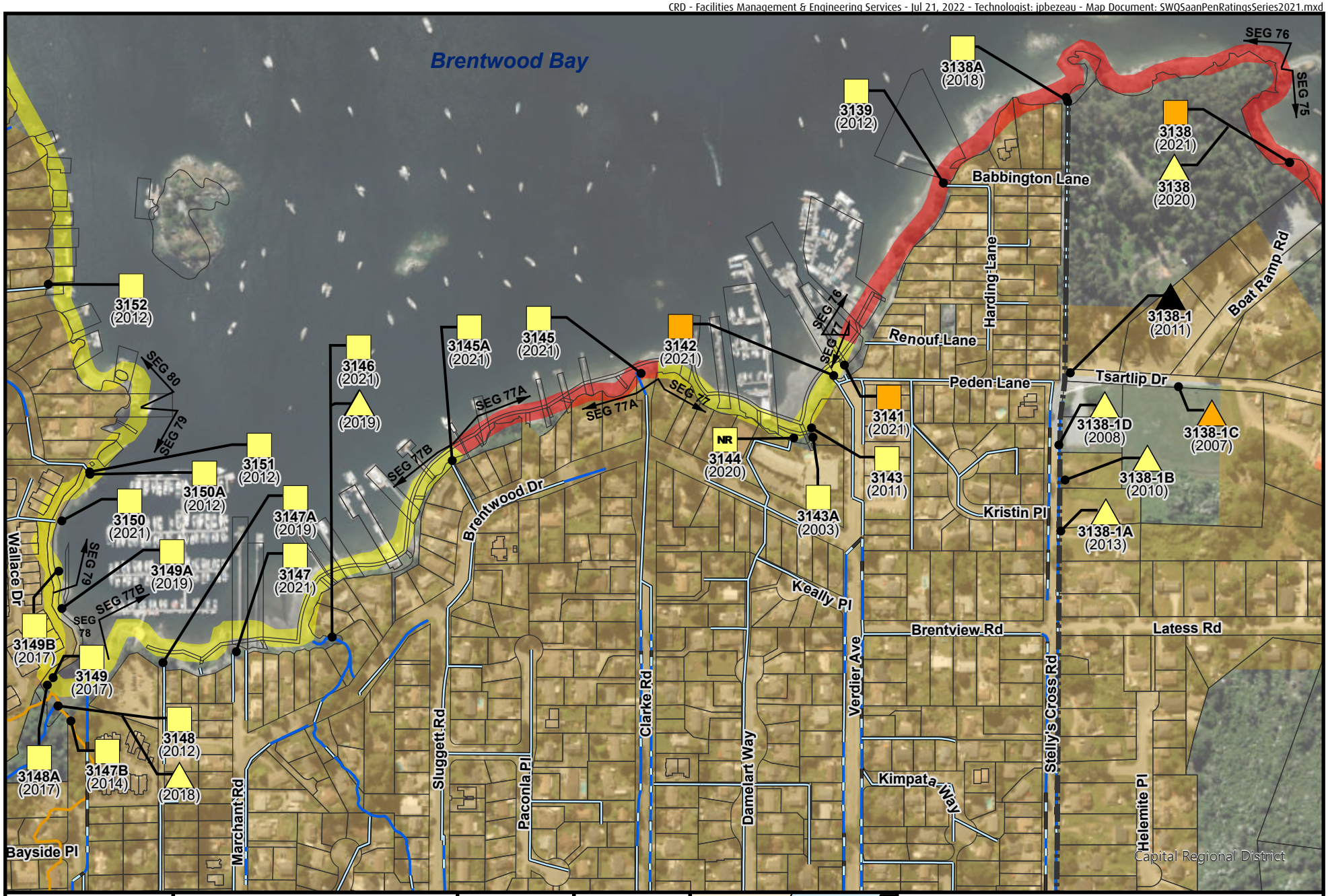


Figure 35
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



CRD
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Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

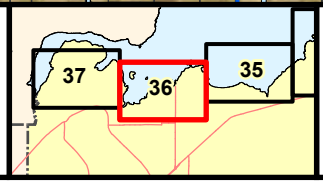

Figure 36
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

CRD
Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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For Key Index and Legend See Figure 1

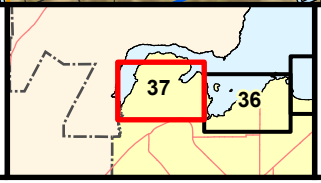
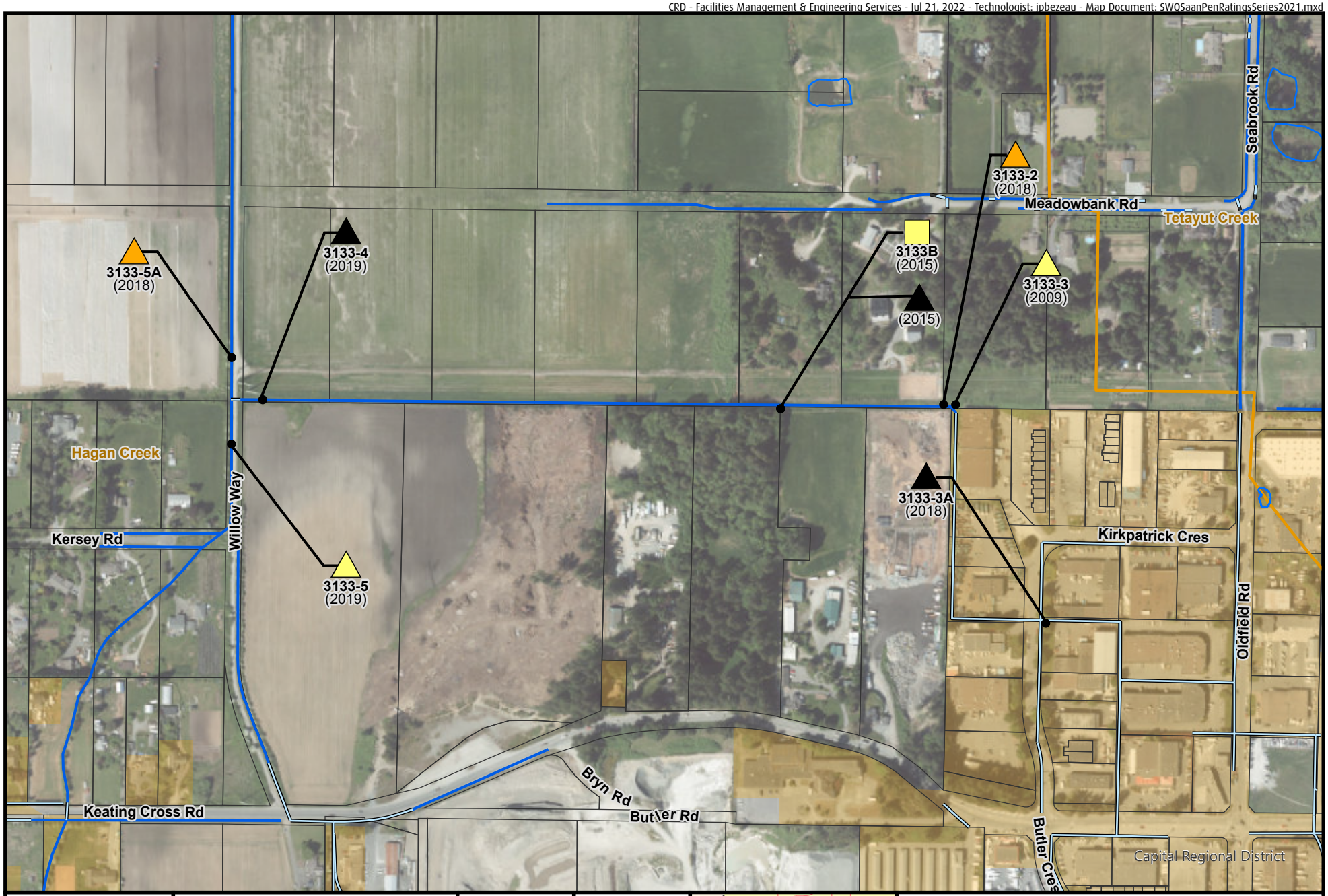


Figure 37
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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N W E S

For Key Index and Legend See Figure 1

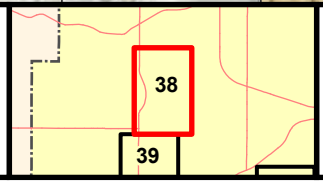

Figure 38

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

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N W E S

For Key Index and Legend See Figure 1

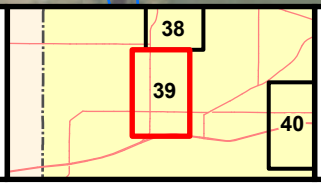
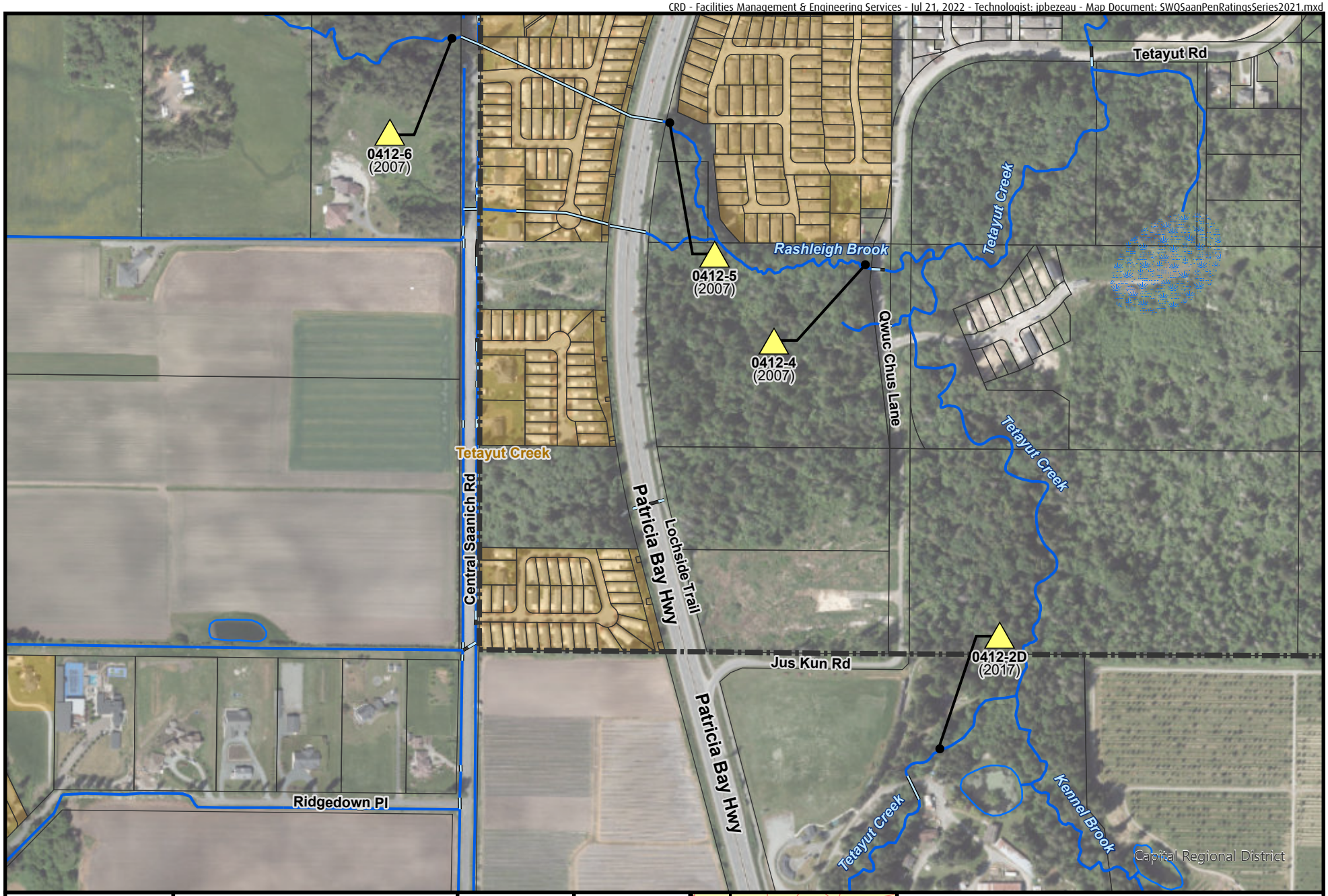


Figure 39

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres
0 25 50 100 150
Projection: UTM ZONE 10N NAD 83

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N W E S

For Key Index and Legend See Figure 1

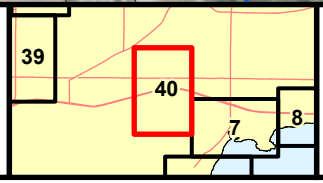
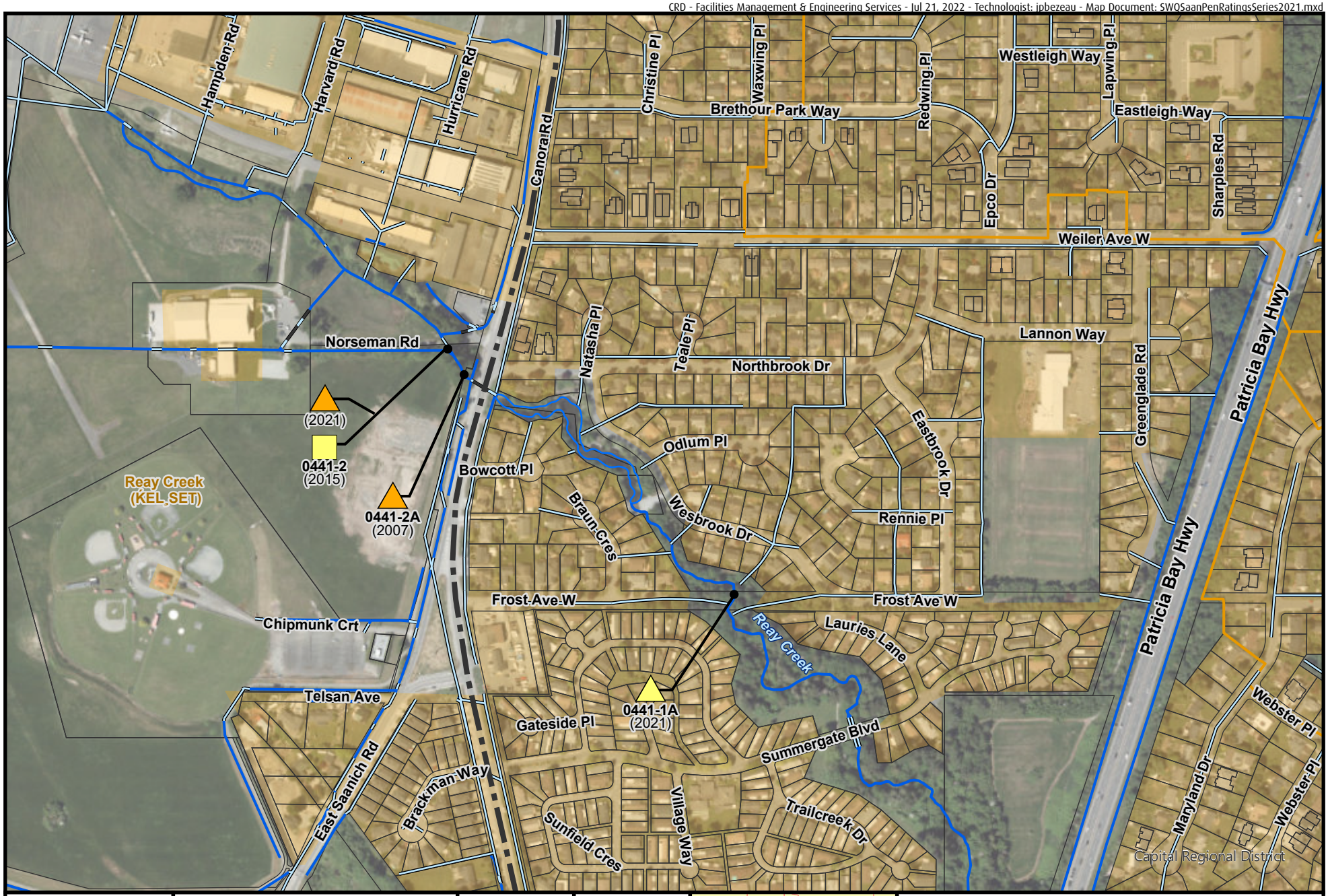


Figure 40
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern



Making a difference...together

Metres

0 25 50 100 150

Projection: UTM ZONE 10N NAD 83

N W E S

For Key Index and Legend See Figure 1

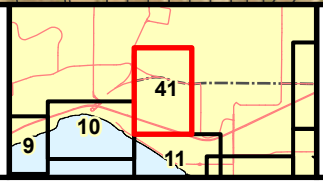


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Figure 41

Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

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W S E N

For Key Index and Legend See Figure 1

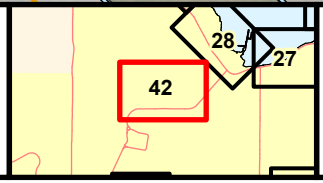
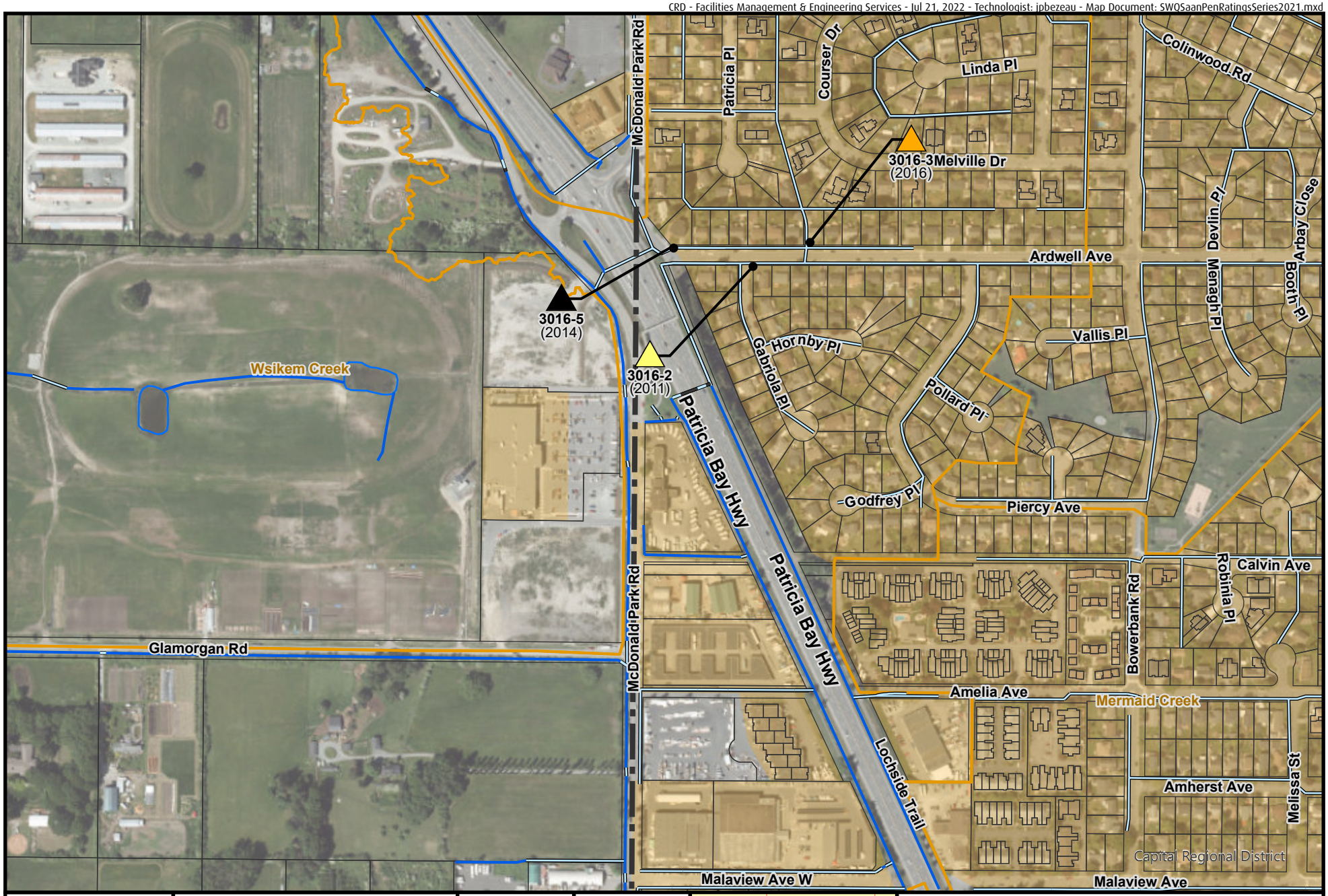


Figure 42

Saanich Peninsula 2021
Stormwater Discharge Location
and Level of Concern



Making a difference...together

0 25 50 100 150 Metres

Projection: UTM ZONE 10N NAD 83

N W E S

For Key Index and Legend See Figure 1

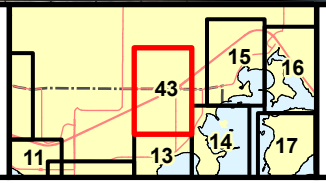


Figure 43
Saanich Peninsula 2021 Stormwater Discharge Location and Level of Concern

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APPENDIX B

BACTERIAL AND FLOW DATA (2020-2022)

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0405	N of Island View beach parking	2020-07-10	210	65	no odour, very rusty
		2021-01-26	7	< 0.01	no odour, tea colour, light rain previous
		2021-07-19	1700		no odour, amber, no rain, flow not estimated
		2022-03-22	10	> 500	organic odour, tea colour, light rain
SW0407	SA-SU Rd. E corner of Saanichton Bay	2020-09-29	8	50	no odour, slight amber
SW0409CA	Flow from between SA-SU Rd. & Jimmy Rd.	2020-09-29		< 0.01	flow too low to sample
SW0410	20 m N of 2764 SA-SU Rd.	2020-09-29	24	5	no odour, clear
SW0411	Near SA-SU Rd. & Mt. Newton X Rd.	2020-09-29		< 0.01	flow too low to sample
		2021-01-26	20	2	no odour, clear, light rain previous
		2021-07-19		0	dry, no rain
		2022-03-11	< 1	8	no odour, clear, no rain
SW0411A	Across from 2721 Mt. Newton X Rd.	2020-05-28	10	4	no odour, murky brown
		2020-09-29	53	1	no odour, clear
		2021-04-29	3	7	no odour, clear, light rain previous
		2021-07-19		0	dry, not sampled, no rain
		2022-03-11	< 1	11	no odour, clear, no rain
SW0411AA	Between church & 2769 Mt. Newton Rd.	2020-05-28	30	3	no odour, slight amber
		2020-09-29	84	< 1	no odour, clear
SW0412	Tetayut Creek mouth, d/s of Mure Brook	2020-09-29	89	1000	no odour, clear
		2021-01-26	100000	> 1000	no odour, clear, light rain previous
		2021-02-01	400	> 2000	no odour, brown, heavy rain
		2021-07-16	890	> 500	no odour, clear, no rain
		2021-08-10	96	> 250	no odour, clear, no recent rain
		2021-08-17	210	> 250	no odour, clear, no recent rain
		2021-08-24	230	> 300	no odour, clear, no recent rain
		2021-08-31	550	> 300	no odour, clear, no recent rain

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2021-09-07	64	> 300	no odour, clear, no recent rain
		2021-10-12	170	> 600	no odour, clear, rain within past two days
		2021-10-20	270	> 2000	no odour, turbid, light rain
		2021-10-26	380	> 3200	no odour, turbid brown, rain
		2021-11-03	150	> 3500	no odour, turbid brown, rain in past two days
		2021-11-09	900	> 3600	no odour, turbid brown, heavy rain previous
		2022-03-11	23	> 2000	no odour, clear, no rain
SW0412-2B	Tetayut Creek, at 2230 Cooperidge Dr.	2021-07-16	80	30	no odour, clear, no rain
		2021-08-10		< 0.01	wet only, no previous rain
		2021-08-17		< 0.01	wet only, no recent rain
		2021-08-24		< 0.01	wet only, no recent rain
		2021-08-31		< 0.01	wet only, no recent rain
		2021-09-07		< 0.01	wet only, no recent rain
		2021-10-12	33	40	no odour, clear, rain within past two days
		2021-10-20	1600	> 250	no odour, very turbid, rain
		2021-10-26	270	> 300	no odour, turbid brown, rain
		2021-11-03	150	> 450	no odour, turbid brown, rain in past two days
		2021-11-09	25	> 450	no odour, turbid brown, heavy rain previous
SW0412-2C	Tetayut Creek, d/s of E. Saanich Rd.	2021-08-17	72	200	no odour, clear, no recent rain
		2021-08-24	40	200	no odour, clear, no recent rain
		2021-08-31	130	250	no odour, clear, no recent rain
		2021-09-07	22	220	no odour, clear, no recent rain
		2021-10-12	20	> 350	no odour, clear, rain within past two days
		2021-10-20	72	> 1000	no odour, turbid, rain
		2021-10-26	320	> 1200	no odour, turbid brown, rain
		2021-11-03	90	> 1500	no odour, turbid brown, rain in past two days
		2021-11-09	38	> 2000	no odour, turbid brown, heavy rain previous

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0412-3	Tetayut Creek, SW of Keating X Rd.	2021-07-16	12	18	no odour, clear, no rain
SW0416	Ferguson Rd. beach access	2020-07-10	11	16	no odour, clear
		2021-01-19	< 1	10	no odour, clear, no rain
		2021-07-09	19	11	no odour, clear, otter in pipe, no rain
SW0420	Arthur Rd. beach access	2022-03-11	< 1	20	no odour, clear, no rain
SW0421A	N of 8055 Arthur Dr., foot of Arthur Dr.	2020-07-10		0	dry, not sampled
SW0422A	Foot of Newman Rd, 3 m N of boat house	2022-03-11		0	dry, not sampled, no rain
SW0424	Between 8475 and 8443 Lochside Dr.	2020-07-10	1	< 1	no odour, slight amber
		2021-01-19	4	40	no odour, clear, no rain
		2021-07-09		0	dry, no rain
		2022-01-17	3	75	no odour, clear, rain previous
SW0426	Wardle Rd. beach access	2020-07-10	600	6	no odour, clear
		2021-01-19	360	60	no odour, clear, no rain
		2021-07-09	10	5	no odour, clear, no rain
		2022-03-11	23	12	no odour, clear, no rain
SW0428	3 m N of beach access at Amity Dr.	2020-07-10	190	8	no odour, slight amber
		2021-01-19	1	100	no odour, clear, no rain
		2021-07-09	70	5	no odour, clear, no rain
SW0430	Ditch, S end of Bazan Bay Park	2020-07-10	17	18	no odour, slight amber
		2021-01-19	1	> 250	no odour, clear, no rain
		2021-07-09	140	13	no odour, clear, no rain
SW0430A	20 m N of beach access; Cy Hampton Pk.	2020-07-10	8	4	no odour, clear
		2021-01-19	1	5	no odour, clear, no rain
		2021-07-09	8	4	no odour, clear, no rain
SW0430B	40 m N of beach access; Cy Hampton Pk.	2020-07-10	250	6	no odour, clear
		2021-01-19	< 1	6	no odour, clear, no rain
		2021-07-09	120	1	no odour, dirty from sample agitation, no rain

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2022-03-11	< 1	5	no odour, slightly amber, no rain
SW0431	Bazan Bay Park 20 m N of dirt path	2020-07-10	1000	42	no odour, clear
		2021-01-19	3	> 200	no odour, clear, no rain
		2021-07-09	180	10	no odour, clear, no rain
SW0432	Foot of Bazan Bay Rd.	2020-07-10	160	60	no odour, clear
		2021-01-19	200	> 250	no odour, clear, no rain
		2021-07-09	170	32	no odour, clear, no rain
		2022-03-11	2	45	no odour, clear, no rain
SW0435	NE property line of 9165 Lochside Dr.	2020-07-10	50	65	no odour, clear
		2021-01-19	29	> 250	no odour, clear, no rain
		2021-07-19	120	60	no odour, clear, no rain
SW0441	Reay Creek, beach access; 9265 Lochside Dr.	2020-07-10	130	80	no odour, clear
		2020-12-16	52	> 300	no odour, slight amber
		2021-02-02	450	> 2000	no odour, brown, heavy rain
		2021-04-29	7	> 500	no odour, clear, light rain previous
		2021-07-19	600	85	no odour, clear, no rain
		2022-03-11	6	> 800	no odour, clear, no rain
SW0441-1	125 m downstream of Frost Rd.	2020-12-16	55	300	no odour, slight amber
SW0441-1A	Reay Creek @ Frost Ave., d/s of bridge	2020-12-07		> 2000	no odour, clear
		2021-04-29	30	> 200	no odour, clear, light rain previous
SW0441-2	Reay Creek, Canora Rd. @ Norseman Rd.	2021-04-29	4	> 120	no odour, clear, light rain previous
SW0442	9334 Lochside Dr. beach access	2020-07-13		< 0.01	flow too low to sample
SW0443	9348 Lochside Dr.	2020-07-13		0	dry, not sampled
SW0444	Across from 9360 Lochside Dr.	2021-02-01	490	10	earthy odour, brown, dead fish in pipe, heavy rain
		2021-07-12		0	dry, not sampled, no rain

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2022-03-10	< 1	< 1	no odour, clear, no rain
SW0444A	12 m S of steps across 9388 Lochside Dr.	2021-02-01	400	7	earthy odour, brown, heavy rain
		2021-07-12		0	dry, not sampled, no rain
		2022-03-10		< 0.01	flow too low to sample
SW0445	20 m N of steps across 9388 Lochside Dr.	2020-07-13	61	1	no odour, clear
SW0446	15 m S of beach access; 9462 Lochside Dr.	2020-07-13		0	dry, not sampled
		2021-01-26	6	3	no odour, clear, light rain previous
		2021-07-12		0	dry, not sampled, no rain
		2022-03-10	< 1	1	no odour, clear, no rain
SW0447	Across from 9498 Lochside Dr.	2020-07-13	84	3	no odour, clear
		2021-01-26	250	7	no odour, clear, light rain previous
		2021-07-12	16000	7	no odour, clear, no rain
		2022-03-10	34	2	no odour, clear, no rain
SW0448	Foot of Weiller Rd., Tulista Park	2020-07-13	2	1	no odour, clear
		2021-01-26	10	7	no odour, clear, light rain previous
		2021-07-12		0	dry, not sampled, no rain
		2022-03-10	1	3	no odour, slightly amber, no rain
SW0449	Ditch; W side of Tulista Park	2020-07-13	80	28	no odour, amber
		2021-02-01	500	> 250	no odour, murky brown, heavy rain
		2021-07-09	19000	23	no odour, clear, no rain
		2022-03-10	1	> 350	no odour, murky brown, no rain
SW0449-2D	MH153F on Fifth St. near boat launch	2020-07-13	1200		no odour, clear, pooled water; unknown flow
SW0449A	MH corner of Oakville and Eighth St.	2020-07-13	2700		no odour, clear, pooled water; unknown flow
		2021-02-02	1900	> 200	no odour, murky, heavy rain
		2021-07-12	26		no odour, clear, pooled, unknown flow, no rain
		2022-03-10	10	40	no odour, clear, no rain

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Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0450	Ocean Ave. & Second St. intersection	2020-07-13	240	12	no odour, clear
		2021-02-01	1800	> 400	no odour, murky brown, heavy rain
		2021-07-12	1600	7	no odour, clear, no rain
		2021-07-29	140000	10	no odour, clear, no rain
		2021-09-24	2300000	24	sewer odour from pipe, clear, no rain
		2022-03-10	860	35	no odour, slightly murky, no rain
SW0456	Eview Dr., 10 m N of sea wall	2021-02-22	< 1	1	no odour, clear, rain yesterday
		2021-07-12		< 0.01	flow too low to sample, no rain
SW0456A	20 m N of condos near Eview Park	2020-07-13		< 0.01	flow too low to sample
SW0457AB	End of Beacon Ave.	2020-07-13	4	2	no odour, clear
SW0458	Foot of Beacon Ave. Sidney Museum	2020-07-13	< 1	50	no odour, clear
		2020-09-29	< 1	12	no odour, clear
SW0458A	End of Seaport Rd., W side of pub	2020-07-13		< 0.01	flow too low to sample
SW0458B	Seaport Pt., 10 m N of dock access	2021-03-02	< 1	1	no odour, clear, no rain
		2021-07-12	< 1	2	no odour, clear, no rain
SW0458C	W of Seaport, W end of wood posts	2021-03-02	< 1	< 1	no odour, clear, no rain
		2021-07-12		< 0.01	flow too low to sample, no rain
SW0459	9901-3rd St. parking, S of beach access	2020-07-13	5	1	no odour, amber
		2021-01-26	6	6	no odour, clear, light rain previous
		2021-07-12	11	3	no odour, amber, no rain
		2022-03-14	90	5	no odour, clear, no rain
SW0462	Beach access at 10003 - 3rd St.	2020-07-13		0	dry, not sampled
		2022-03-14	1	2	no odour, clear, no rain
SW0464	Rothesay Rd. beach access	2022-03-14	< 1	3	no odour, clear, no rain
SW0466	Memory Lane beach access; Shoreacres Rd.	2021-02-22	4	7	no odour, clear, rain yesterday
		2021-07-12	120	6	no odour, clear, no rain

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Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW0467	Beach access at Shoreacres Rd. & Memory	2022-03-14	6	2	no odour, clear, no rain
		2022-03-22	5	5	no odour, amber, light rain
SW0468	Beach access at Amherst	2020-07-13		0	dry, not sampled
SW0469	Beach access at Amherst, S of steps	2020-07-13	83	1	no odour, clear
SW3001	10232 Sommerset Place, 5 m W of boat	2020-07-14		0	dry, not sampled
SW3003	Roberts Bay beach access at Third St.	2020-07-14	760	3	no odour, clear
		2021-02-01	32	6	no odour, clear, heavy rain
		2021-07-12	72	1	no odour, clear, no rain
		2022-03-14	25	4	no odour, clear, no rain
SW3005	Foot of Fifth St., Mermaid Canal	2020-05-28	70	> 120	no odour, clear
		2020-07-14	50	40	no odour, clear, likely influenced by marine
		2020-11-23	170	60	no odour, murky
		2021-02-01	210	> 100	no odour, clear, heavy rain
		2021-04-29	32	> 100	no odour, clear, light rain previous
		2021-07-12	480	32	no odour, clear, no rain
		2022-03-15	< 1	> 500	no odour, amber, light rain
SW3005-1A	MH on Rd. at 1021 Resthaven Dr.	2020-11-23	17	40	no odour, murky
		2021-04-29	18	24	no odour, clear, light rain previous
		2021-06-21	100	12	no odour, clear, no rain
		2022-03-15	280	60	no odour, amber, light rain
SW3005-2A	MH at 2356/2362 Malaview Ave.	2021-04-29	18	50	no odour, clear, light rain previous
SW3005-3	MH in grass @ 2287 Malaview Ave.	2020-11-23	19	10	no odour, murky
SW3005-4	MH in middle of Amelia Ave./Fifth St.	2020-11-23	190	90	no odour, murky
		2021-04-29	2	40	no odour, clear, light rain previous
		2021-06-21	2700	36	no odour, clear, no rain
SW3006	Foot of Ardwell Ave.	2020-07-14	40	7	no odour, clear

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Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3007	Foot of Bowden, 9 m W of beach access	2020-07-14	80	1	no odour, clear
		2021-01-26	810	5	no odour, clear, light rain previous
		2021-07-12	1300	1	no odour, clear, no rain
		2022-03-15	130	7	no odour, clear, light rain
SW3014	Eastern pipe, E side of DFO wharf	2020-07-14	10000	< 1	no odour, clear
		2021-02-01	150	11	no odour, murky, heavy rain
		2021-07-13	140	1	no odour, clear, no rain
SW3015	Western pipe, E side of DFO wharf	2020-07-14	290	1	no odour, clear
		2021-02-01	110	12	no odour, murky, heavy rain
		2021-07-13	200	3	no odour, clear, no rain
SW3016	Behind 10462 Resthaven Rd.	2020-07-14	47000	18	no odour, clear, potentially marine influenced
		2021-02-01	740	> 120	no odour, murky, heavy rain
		2021-04-29	42	16	no odour, clear, light rain previous
		2021-05-06	< 1	20	no odour, clear, no rain
		2021-07-13	4800	5	no odour, clear, no rain
		2022-03-15	3400	> 120	no odour, clear, light rain
SW3017A	Allbay Park, in front of first townhouse	2022-03-15	< 1	< 1	no odour, clear, light rain
SW3017B	Allbay Park, between townhouses	2022-03-15	< 2	< 1	no odour, clear, light rain
SW3018	Behind 2056 White Birch	2020-07-14	< 1	< 1	no odour, clear
SW3019	2056 White Birch, W end of grass	2020-07-14	80	3	no odour, clear
SW3020	E of yacht club (Blue Heron Rd.), NE pipe	2020-05-28	10	6	no odour, clear
		2020-07-16	340	6	no odour, clear
		2021-02-03	470	> 50	no odour, clear, heavy rain previous day
		2021-09-22	110	9	no odour, clear, light rain prior
SW3020A	E of yacht club (Blue Heron Rd.), SW pipe	2020-05-28	3	2	no odour, clear
		2020-07-16	40	6	no odour, clear
		2021-02-03	240	> 60	no odour, clear, heavy rain previous day

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2021-09-22	100	3	no odour, turbid from sampling, light rain prior
SW3021	Corner of McDonald Park Rd., Bayfield Rd.	2020-07-15	7	18	no odour, clear
		2020-11-23	7	13	no odour, clear
		2021-05-06	52	30	no odour, clear, no rain
		2021-07-13	310	2	no odour, slight amber, no rain
SW3021A	1835 Marina Dr., SW corner of marina	2020-07-15	3600	9	no odour, slight green
		2021-02-03	90	16	no odour, clear, heavy rain previous day
		2021-07-13	10	4	no odour, amber, no rain
SW3034B	W side of ramp; Royal Victoria Yacht Club	2021-02-08	< 1	18	no odour, clear, no rain
		2021-07-13	70	1	no odour, clear, no rain
SW3034C	Between Cedar Grove Marina and large house	2021-03-02	15	9	no odour, clear, no rain
		2021-07-13	29	1	no odour, clear, no rain
SW3034D	N end of Westport Marina	2020-07-15	330	6	no odour, clear
SW3034E	N end of Westport Marina	2020-07-15		< 0.01	flow too low to sample
SW3035C	W side of foot of Tyron Rd.	2020-07-15		< 0.01	flow too low to sample
SW3041	6 m W of A dock, Canoe Cove Marina	2020-07-15		0	dry, not sampled
		2021-02-03	6	9	no odour, amber, heavy rain previous day
		2021-07-13		0	dry, not sampled, no rain
SW3042	Barnacle Rd., 5 m E of government dock	2020-07-15		0	dry, not sampled
SW3051	W of Shearwater Terrace beach access	2021-02-08	1	80	no odour, clear, no rain
		2021-07-14		< 0.01	flow too low to sample, no rain
SW3051A	55 m W of Shearwater Terr. beach access	2021-02-08	< 1	7	no odour, clear, no rain
		2021-07-14	4	2	no odour, clear, no rain
SW3052	50 m W of Shearwater Terr. beach access	2021-02-08	2	8	no odour, clear, no rain
		2021-07-14	42	3	no odour, clear, no rain

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3053	W of Queen Mary Bay, W of beach access	2021-02-08	1	5	no odour, clear, no rain
		2021-07-14		< 0.01	flow too low to sample, no rain
SW3054	Foot of Dawson Way	2020-07-15	90	30	no odour, clear
SW3055	E. of wharf, Lands End Rd. & Sylvan Pl.	2020-05-28	69	7	no odour, clear
		2020-07-15	50	3	no odour, clear
SW3076	200 m W of Tatlow Rd. beach access	2020-07-16		0	dry, not sampled
SW3077	50 m W of Tatlow Rd. beach access	2020-07-16	3100	8	no odour, clear, construction during sampling
		2021-02-03	20	10	no odour, clear, heavy rain previous day
		2021-05-06	32	1	no odour, clear, no rain
		2021-07-14	44	1	no odour, clear, no rain
SW3077A	Foot of Tatlow beach access E of 3077	2021-02-08	1	1	no odour, clear, no rain
		2021-07-14		0	dry, no rain
SW3078	Beach access at foot of Tatlow Rd.	2021-02-03	15	8	no odour, clear, heavy rain previous day
		2021-07-14		< 0.01	flow too low to sample, no rain
SW3078A	Between 11250 Tatlow & 11198 Chalet Rd.	2020-07-16	810	1	no odour, murky
		2021-02-03	490000	8	sewer odour, brown, heavy rain previous day
		2021-02-08	2800	5	slight sewer odour, murky, no rain
		2021-07-14	270	2	no odour, clear, no rain
SW3078B	Foot of Tatlow, N of Tatlow Creek	2021-07-14	220	1	no odour, murky, no rain, one off sample
SW3079	Tatlow Creek	2020-07-16	40	40	no odour, clear
		2020-10-27	59	180	
		2020-12-10	49	> 250	no odour, slight amber colour with foam
		2021-02-03	260	> 2000	no odour, brown, heavy rain previous day
		2021-05-21	42	50	no odour, clear, no rain
		2021-07-14	150	> 40	no odour, clear, no rain
SW3080A	Bennes Creek, 10992 Kalitan Rd.	2020-07-16	57	12	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2021-02-03	530	> 180	no odour, slight amber, heavy rain previous day
		2021-07-19	510	7	no odour, clear, no rain
		2022-03-22	200	> 100	no odour, murky, light rain
SW3086	2 m S of beach access at Norris Rd.	2020-07-16		< 0.01	flow too low to sample
		2021-02-08	110	22	no odour, clear, no rain
		2021-07-21		0	dry, no rain
SW3087	1 m S of Towner Rd. beach access	2021-02-08	19	18	no odour, clear, no rain
		2021-07-21	4	2	no odour, clear, no rain
		2022-03-22	34	70	no odour, amber, light rain
SW3088	10608 Towner Rd., S of beach access	2021-02-08		< 0.01	flow too low to sample
		2021-07-21		0	dry, no rain
		2022-03-22	9600	< 1	no odour, clear, light rain
SW3089A	N side of 945 Towner Park Rd.	2021-02-23	49	85	no odour, clear, drizzle
		2021-07-23		0	dry, no rain
		2022-04-19	210	12	no odour, clear, rain yesterday
SW3089AA	E side of stairs below 693 Finlayson	2020-07-16		0	dry, not sampled
SW3089AAD	W of 693 Towner Park Rd.	2021-02-23	250	12	no odour, clear, drizzle
		2021-07-23		0	dry, no rain
		2022-04-19	2	1	no odour, clear, rain yesterday
SW3089AB	Between 785 and 771 Towner Park Rd.	2021-02-22	19	6	no odour, clear, rain yesterday
		2021-07-23		< 0.01	flow too low to sample, no rain
		2022-04-19	720	12	no odour, clear, rain yesterday
SW3089AC	W side of 825 Towner Park Rd.	2021-02-23	4	6	no odour, clear, drizzle
		2021-07-23		< 0.01	flow too low to sample, no rain
		2022-04-19	2	2	no odour, clear, rain yesterday
SW3089BB	W side of 701 Towner Park Rd.	2021-02-22	470	32	no odour, clear, rain yesterday
		2021-07-23		0	dry, no rain

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Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2022-04-19	12	1	no odour, clear, rain yesterday
SW3089CC	E side of 701 Towner Park Rd.	2021-02-23	13	25	no odour, clear, drizzle
		2021-07-23		0	dry, no rain
		2022-04-19	< 1	3	no odour, clear, rain yesterday
SW3090	100 m N of 10429 W Saanich Rd.	2020-07-16		0	dry, not sampled
		2021-02-03	17	40	no odour, murky amber, heavy rain previous day
		2021-07-21		0	dry, no rain
		2022-04-08	2	35	no odour, clear, no rain prior
SW3091	25 m N of 10425 W Saanich Rd.	2020-09-29		0	dry, not sampled
		2021-02-23	12	35	no odour, clear, drizzle
		2021-07-21		0	dry, no rain
		2022-04-08	130	10	no odour, clear, no rain prior
SW3092	100 m S of 10429 W Saanich Rd.	2020-09-29		0	dry, not sampled
SW3093	10 m N of totem pole and Totem Lane	2021-02-23		< 0.01	flow too low to sample, drizzle
		2021-07-21		0	dry, no rain
SW3095	Tseycum Creek, 10 m N of 1036 W Saanich Rd.	2020-07-16	2800	24	no odour, clear
		2021-02-23	250	> 500	no odour, clear, drizzle
		2021-07-21	440	26	no odour, amber, no rain
		2022-04-08	53	70	no odour, murky amber, no rain prior
SW3096	Below 10299 W Saanich Rd.	2021-02-23	1	3	no odour, clear, drizzle
		2021-07-21		0	dry, no rain
SW3097	Foot of Munro Rd.	2021-02-23		0	dry, not sampled, drizzle
		2021-07-21		0	dry, no rain
SW3099	20 m S of Munro Rd. beach access	2021-02-23	1	3	no odour, clear, drizzle
		2021-07-21		0	dry, no rain
SW3099A	Across from 10221 W Saanich Rd.	2021-02-23	14	6	no odour, clear, drizzle

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Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2021-07-21		0	dry, no rain
SW3100	Below 10177 W Saanich Rd.	2021-02-23	4	11	no odour, clear, drizzle
		2021-07-21	280	2	no odour, clear, no rain
SW3102	Middle of cemetery	2020-09-29		0	dry, not sampled
SW3102A	Below S side of Patricia Bay Park	2020-09-29		0	dry, not sampled
SW3102B	Ditch for seaplane base	2020-09-29		0	dry, not sampled
SW3104	N end of seaplane base, Ten Ten Creek	2020-09-29	25	50	no odour, clear
		2021-03-02	< 1	> 500	no odour, slight amber, no rain
		2021-08-24	700	50	no odour, slightly murky, no recent rain
		2022-04-19	7	> 180	no odour, slight amber, rain yesterday
SW3116	Ardmore Dr.	2020-09-15		0	dry, not sampled
		2020-12-10		< 0.01	flow too low to sample
SW3117	Ardmore Dr.	2020-09-15		0	dry, not sampled
		2020-12-10		< 0.01	flow too low to sample
SW3117A	SE corner of 673 Ardmore Dr., black pipe	2020-12-10	450	14	no odour, clear, pipe may be for construction on property
		2021-02-02	500	> 200	no odour, clear, heavy rain
		2021-07-22		0	dry, no rain
		2021-12-02	22	18	no odour, clear, rain previous
SW3117B	703 Ardmore Dr., white PVC pipe	2020-09-15	18	< 1	no odour, clear
		2020-09-17	7	< 1	no odour, clear
		2020-12-10	1	3	no odour, clear
		2021-02-02	17	7	no odour, clear, heavy rain
		2021-07-22	48	< 1	no odour, clear, no rain
SW3118	Foot of Hartfell Ave.	2020-09-15		0	dry, not sampled
		2020-11-23	20	15	no odour, clear
		2020-12-10	65	32	no odour, clear

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Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2021-02-02	300	> 180	no odour, murky, heavy rain
		2021-04-15	75	9	no odour, slight amber, no rain
		2021-07-22		0	dry, no rain
		2021-11-09	28	48	no odour, turbid brown, heavy rain previous night
SW3118A	20 m E of Hartfell beach access	2020-09-15	7	< 1	no odour, clear
		2020-09-17	4	< 1	no odour, slight amber
		2020-12-10	1	4	no odour, clear
		2021-02-02	1	9	no odour, clear, heavy rain
		2021-07-22	15	< 1	no odour, clear, no rain
SW3118AA	18 m E of Hartfell beach access	2020-09-15		0	dry, not sampled
		2020-12-10		< 0.01	flow too low to sample
SW3118B	30 m E Hartfell beach access	2020-09-15	1300	< 1	no odour, brown (stirred up bottom during sampling)
		2020-09-17		0	dry, not sampled
		2020-12-10	4800	3	no odour, clear
		2021-02-02	130	2	no odour, murky, heavy rain
		2021-07-22	4800	< 1	no odour, amber, no rain
		2021-12-02	50	< 1	no odour, clear, rain previous
SW3118C	45 m E of Hartfell beach access	2020-09-15		0	could not find pipe, no flow found at location
		2020-12-10	41	4	no odour, clear
		2021-02-02	60	8	no odour, clear, heavy rain
		2021-07-22		< 0.01	flow too low to sample, no rain
SW3118D	50 m E of Hartfell beach access	2020-09-15		0	dry, not sampled
		2020-12-10	< 1	3	no odour, clear
		2021-02-02	< 1	5	no odour, clear, heavy rain
		2021-07-22		0	dry, no rain

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Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3119	E of Coles Bay Regional Park beach access	2020-09-17		0	dry, not sampled
		2020-12-10	40	32	no odour, clear
		2021-02-02	270	> 250	no odour, clear, heavy rain
		2021-07-22		0	dry, no rain
SW3120	5 m S of wood steps; foot of McTavish Rd.	2020-09-17		0	dry, not sampled
		2020-12-10	90	45	no odour, clear
		2021-02-02	240	> 200	no odour, slightly amber, heavy rain
		2021-05-06	68	12	no odour, clear, no rain
		2021-07-27		0	dry, no rain
SW3121	Eern Coles Bay, from Pauquachin Lane	2021-02-18	3	45	no odour, clear, snow melt and rain
		2021-03-03	1	12	no odour, clear, no rain
		2021-07-22	53	< 1	no odour, clear, no rain
SW3122	40 m S of boat ramp; Pauquachin F.N.	2020-09-17		0	dry, not sampled
		2021-02-18	10	80	no odour, clear, snow melt and rain
		2021-07-27		0	dry, no rain
		2022-04-08	12	60	no odour, clear, no rain prior
SW3123	50 m S of boat ramp; Pauquachin F.N.	2020-09-17		0	dry, not sampled
		2021-02-18	6	60	no odour, clear, snow melt and rain
		2021-07-27		0	dry, no rain
		2022-04-08	12	45	no odour, clear, no rain prior
SW3124	200 m S of boat ramp; Pauquachin F.N.	2020-09-17	54	8	no odour, clear
		2021-02-18	< 1	> 250	no odour, clear, snow melt and rain
		2021-07-22	280	9	no odour, clear, no rain
		2022-04-08	< 1	> 500	no odour, clear, no rain prior
SW3124-2	d/s of W Saanich Rd.; Pauquachin F.N.	2020-06-04	1	7	slight sewer odour, clear
		2020-09-17		0	dry, not sampled

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3124A	300 m S of 3124, by large alder, Pauquachin F.N.	2021-02-19		< 0.01	flow too low to sample, no rain
		2021-07-23		0	dry, no rain
		2022-04-08	1	50	no odour, clear, no rain prior
SW3124B	Between 8660 & 8640 Kleewyck Rd.	2020-09-17		0	dry, not sampled
		2021-02-19	< 1	22	no odour, clear, rain and snow previous
		2021-07-23		0	dry, no rain
		2022-04-19	10	11	no odour, clear, rain yesterday
SW3125	Kleewyck Rd.	2020-09-17		0	dry, not sampled
		2021-03-03	2	> 250	no odour, clear, no rain
		2021-07-23		0	dry, no rain
		2022-04-19	3	110	no odour, clear, rain yesterday
SW3125A	1 m E of wood stairs, 8580 Mink Rd.	2020-09-17	250	< 1	no odour, amber
		2021-03-03	1	7	no odour, clear, no rain
		2021-07-23		0	dry, no rain
		2022-04-19	1800	4	no odour, clear, rain yesterday
SW3125B	Between 8560 and 8580 Mink Rd.	2020-09-17		0	dry, not sampled
		2021-03-03	2	8	no odour, clear, no rain
		2021-07-23		0	dry, no rain
		2022-04-19	< 1	9	no odour, clear, rain yesterday
SW3125C	Below 570 Seacliff Rd.	2020-09-17		0	dry, not sampled
		2021-03-03	< 1	22	no odour, clear, no rain
		2021-07-23		0	dry, no rain
		2022-04-19	< 1	7	no odour, clear, rain yesterday
SW3126	Under patio at 750 Seacliff Rd.	2020-09-17		0	dry, not sampled
		2021-03-03	13	5	no odour, clear, no rain
		2021-07-23		< 0.01	flow too low to sample, no rain

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2022-04-19	2	3	no odour, clear, rain yesterday
SW3126A	Below 8530 W Saanich Rd.	2020-09-17		0	dry, not sampled
		2021-02-19	2	22	no odour, clear, rain and snow previous
		2021-07-23		0	dry, no rain
		2022-04-19	< 1	14	no odour, clear, rain yesterday
SW3127	Salmon Creek, 570 Lawrence Rd	2020-09-17		0	dry, not sampled
		2021-02-19	6	70	no odour, clear, rain and snow previous
		2021-07-23		0	dry, no rain
		2022-04-19	< 1	4	no odour, clear, rain yesterday
SW3127A	30 m E of large grey boat house	2021-02-19	22	65	no odour, clear, rain and snow previous
		2021-07-23		0	dry, no rain
		2022-04-19	< 1	15	no odour, clear, rain yesterday
SW3127AA	Between 530 and 531 Salmon Rd.	2021-02-19	< 1	11	no odour, clear, rain and snow previous
		2021-07-23		0	dry, no rain
		2022-04-19	< 1	4	no odour, clear, rain yesterday
SW3133	Hagan Creek, S side of Woodwyn Farm	2020-07-17	66	> 400	no odour, clear
		2020-08-11	15	> 2000	no odour, clear
		2020-08-18	31	> 2000	no odour, amber
		2020-08-25	2	> 2000	no odour, clear
		2020-09-01	7	> 2000	no odour, clear
		2020-09-08	26	> 2000	no odour, clear
		2020-09-24	1500	> 2500	no odour, murky brown
		2020-10-13	1000	> 2000	no odour, brown
		2020-10-20	29	> 2000	no odour, clear
		2020-10-27	40	> 2000	no odour, clear
		2020-11-04	1300	> 2000	no odour, slight amber
		2020-11-12	8	> 2000	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2021-02-19	250	> 3000	no odour, murky, rain and snow previous
		2021-07-16	24	> 250	no odour, clear, no rain
		2021-11-18	490	> 3000	earthy odour, turbid brown, heavy rain, sewer spill investigation
		2022-04-08	27	> 2000	no odour, amber, no rain prior
SW3133-1B	Graham Creek above Hagan Creek confluence	2020-08-11	29	> 200	no odour, clear
		2020-08-18	160	> 200	no odour, clear
		2020-08-25	82	> 200	no odour, clear
		2020-09-01	140	> 200	no odour, clear
		2020-09-08	110	> 200	no odour, clear
		2020-09-24	2200	> 1000	no odour, amber
		2020-10-13	5500	> 1000	no odour, turbid brown
		2020-10-20	46	800	no odour, clear
		2020-10-27	30	700	no odour, clear
		2020-11-04	1100	800	no odour, slight amber
		2020-11-12	26	1000	no odour, clear
		2021-07-16	100	> 150	no odour, clear, no rain
		2021-11-18	5000	> 1500	earthy odour, turbid brown, heavy rain, sewer spill investigation
SW3133-2	Ditch; drains W side of Keating Industrial	2020-07-17	81000	38	musty organic odour, murky
		2020-07-21	8000	35	organic odour, murky
		2020-09-24	7500	48	sewer odour, murky grey/brown
		2020-10-13	7900	68	no odour, murky grey
		2020-10-23	1900	> 300	organic odour, murky brown
		2020-12-08	2600	100	organic odour, murky brown
		2021-07-16	1200	20	slight organic odour, murky, no rain
SW3133-3B	MH2349; W side of Kirkpatrick/Oldfield Rd.	2020-07-21	19000000	12	sewer/garbage odour, dark

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2020-12-08	22000	30	organic odour, very turbid brown
SW3133-4	Stevens Creek, Willow Way at Hydro poles	2020-07-21	26		no odour, clear, unknown flow (pooled)
		2020-08-11	320	80	no odour, clear
		2020-08-18	670	70	no odour, clear
		2020-08-25	90	60	no odour, clear
		2020-09-01	140	40	no odour, clear
		2020-09-08	85	30	no odour, clear, mowed vegetation in channel
		2020-09-24	15000	200	no odour, murky brown
		2020-10-13	9000	> 250	no odour, turbid brown
		2020-10-20	2000	200	no odour, clear
		2020-10-27	100	180	no odour, slight murky
		2020-11-04	1000	160	no odour, slight murky
		2020-11-12	2500	200	no odour, slight amber
SW3133-4A	Stevens Creek u/s confluence with ditch	2020-07-21	540	50	no odour, clear
SW3133-5	Graham Creek above Stevens Creek	2020-07-21	160	18	no odour, clear
		2020-08-11	240	40	no odour, clear
		2020-08-18	120	30	no odour, clear
		2020-08-25	540	30	no odour, clear
		2020-09-01	200	26	no odour, clear
		2020-09-08	42	26	no odour, clear
		2020-09-24	7700	80	no odour, amber
		2020-10-13	6800	> 250	no odour, turbid brown
		2020-10-20	150	250	no odour, clear
		2020-10-27	90	200	no odour, clear
		2020-11-04	2200	200	no odour, clear
		2020-11-12	470	250	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3133-6	Graham Creek u/s of Stelly's Cross Rd.	2021-11-18	200	> 1500	earthy odour, turbid brown, heavy rain
SW3134	30 m N of viewing platform; Tsartlip F.N.	2021-02-18	2	7	no odour, clear, snow melt and rain
		2021-09-22		0	dry, not sampled, light rain prior
SW3135	Above viewing platform on Tsartlip F.N.	2020-11-26	1	3	no odour, clear
		2021-02-18	1	9	no odour, clear, snow melt and rain
		2021-05-06	320	2	no odour, clear, no rain
		2021-09-22		0	dry, not sampled, light rain prior
		2022-04-11	1	5	no odour, clear, light rain prior
SW3136	Intersection of Ettiene and Tsartlip Rd.	2020-11-26	56	80	no odour, clear, sampled due to significant flow
		2021-02-18	210	> 300	no odour, brown, snow melt and rain
		2021-09-22		0	dry, not sampled, light rain prior
		2022-04-11	35	100	no odour, clear, light rain prior
SW3136A	Shoreline W of Tsartlip Dr.	2020-09-29		0	dry, not sampled
		2020-11-26	66	2	no odour, murky brown
		2021-02-18	15	7	no odour, clear, snow melt and rain
		2021-09-22		0	dry, not sampled, light rain prior
		2022-04-11	52	12	no odour, clear, light rain prior
SW3136B	Tsartlip F.N.	2020-11-26	28	7	no odour, clear
SW3138	S side of Tsartlip boat launch parking	2020-09-29		< 0.01	flow too low to sample
		2020-11-26	22	35	no odour, slightly murky
		2021-02-18	200	60	slight sewer odour, black, snow melt and rain
		2021-09-22	10	5	no odour, clear, light rain prior
		2022-04-11	23	40	no odour, clear, light rain prior
SW3141	Under ferry wharf at foot of Verdier Ave.	2021-02-18	1000	12	no odour, brown, snow melt and rain
		2021-07-21		0	dry, no rain
		2022-03-23	< 1	< 1	no odour, clear, light rain previous two days
SW3142	N of ferry wharf; foot of Verdier Ave.	2020-07-20	9	3	no odour, clear

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
		2021-02-18	2200	> 400	no odour, murky brown, snow melt and rain
		2021-07-21	800	3	no odour, clear, no rain
		2022-03-23	11	> 80	no odour, clear, light rain previous two days
SW3143	N end of Brentwood Inn; Verdier Ave.	2021-02-18	10	22	no odour, clear, snow melt and rain
		2021-07-21		0	dry, no rain
SW3144	15 m N of Brentwood Inn wharf	2021-02-18	170	80	no odour, murky brown, snow melt and rain
		2021-07-21	49	< 1	no odour, clear, no rain
SW3145	Foot of Clarke Rd.	2020-06-04	10	4	slight sewer odour, clear
		2020-07-20		0	dry, not sampled
		2020-09-29	4400	1	no odour, clear
		2021-01-26	2	32	no odour, clear, light rain previous
		2021-07-21		0	dry, no rain
		2021-12-02	15	24	no odour, clear, rain previous
		2022-03-23	1	45	no odour, clear, light rain previous two days
SW3145A	Devonshire beach access	2020-07-20	7	4	no odour, clear
		2021-01-26	4	6	no odour, clear, light rain previous
		2021-07-21	8	3	no odour, clear, no rain
		2022-03-23	6	9	no odour, clear, light rain previous two days
SW3146	Brentwood Dr. near Marchant Rd.	2020-07-20	230	42	no odour, clear
		2021-01-26	87	> 150	no odour, clear, light rain previous
		2021-07-23	56	9	no odour, clear, no rain
		2022-03-23	240	> 1000	no odour, clear, light rain previous two days
SW3147	Foot of Marchant Rd.	2020-07-20	100	8	no odour, clear
		2021-02-18	15	20	no odour, clear, snow melt and rain
		2021-07-23	38	5	no odour, clear, no rain
SW3148	E of Port Royale under bridge	2022-04-07	100	> 500	no odour, clear, no rain prior

Stormwater Discharge Quality Report

Bacterial and Flow Data (2020-2022)

Station ID	Station Name	Sample Start Date	E. Coli CFU/100 mL	Flow Rate L/min	Sample Comment
SW3150	Below Port Royale walkway, E of wharf	2020-06-04	87	7	slight sewer odour, clear, sampled before storm surge
		2020-06-04	1100	48	earthy, slight sewer odour, dirty, sampled after storm surge
		2020-07-20	120	< 1	no odour, clear
		2021-02-18	90	100	no odour, clear, snow melt and rain
SW3150A	E of Port Royale under bridge	2021-07-23		< 0.01	flow too low to sample, no rain
		2022-04-07	57	50	no odour, clear, no rain prior
SW3151	Foot of Deamere, W end of Port Royale	2022-04-07		0	dry, not sampled, no rain prior
SW3153	Butchart Gardens	2020-07-20		0	dry, not sampled
		2021-03-02	1	9	no odour, clear, no rain
		2021-09-22		< 0.01	flow too low to sample, light rain prior
SW3154	Tod Creek mouth; S of Butchart Gardens	2020-07-20	20	> 90	no odour, clear
		2020-12-16	13	> 2000	no odour, clear
		2021-03-02	8	> 2000	no odour, clear, no rain
		2021-04-15	11	> 2000	slight sewer odour, amber, no rain
		2021-09-22	26	80	no odour, clear, light rain prior
		2022-04-07	18	> 4000	no odour, clear, no rain prior

Notes:
Flow is visually estimated
CFU/100 mL is colony forming units per 100 millilitres
u/s is upstream
d/s is downstream
b/t is between

APPENDIX C

PUBLIC HEALTH CONCERN RATINGS 2021

Stormwater Quality Report
Public Health Concern Ratings

CRD Discharge No.	Report Figure No.	Jurisdiction at Discharge	Rating			Level of Concern			Comments	Recommendations
			E.coli Rating	Public Shoreline Use	Overall Rating	2019	2020	2021		
405	4	Central Saanich	2	2	4	moderate	moderate	moderate	Amber colour; Island View beach	Continue monitoring
416	7	Central Saanich	1	3	4	low	low	low	Slightly elevated in summer	Resample in 2026
3127	32	Central Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3127A	33	Central Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3127AA	33	Central Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3133	35	Central Saanich	2	2	4	moderate	moderate	moderate	SPSO, Hagan Creek	Continue monitoring
3141	36	Central Saanich	2	2	4	NA	NA	moderate	Dry in summer	Confirm rating
3142	36	Central Saanich	2	2	4	moderate	moderate	moderate	Elevated intermittently; suds observed	Continue monitoring
3145	36	Central Saanich	1	3	4	**high**	**high**	low	Human bacteria upstream	Confirm rating
3145A	36	Central Saanich	1	2	3	moderate	low	low	Dry in summer	Continue monitoring
3146	36	Central Saanich	1	2	3	moderate	moderate	low	SPSO	Continue monitoring
3147	36	Central Saanich	1	2	3	NA	NA	low	Brentwood Bay	Resample in 2026
3150	36	Central Saanich	1	2	3	**high**	moderate	low	Brentwood Bay	Confirm rating
3153	37	Central Saanich	1	2	3	low	low	low	Low flow	Resample in 2026
3154	37	Central Saanich	2	2	4	moderate	low	low	Tod Creek	Continue monitoring
424	8	North Saanich	1	1	2	low	low	low	No flow in summer, Bazan Bay	Resample in 2026
426	9	North Saanich	2	1	3	low	low	low	Bazan Bay; no human bacteria measured	Continue monitoring
428	9	North Saanich	1	1	2	low	low	low	Bazan Bay	Resample in 2026
430	9	North Saanich	1	1	2	low	low	low	Bazan Bay	Resample in 2026
430A	9	North Saanich	1	1	2	low	low	low	Bazan Bay; high counts intermittently	Resample in 2026
430B	9	North Saanich	1	1	2	NA	low	low	New location; dog park	Confirm rating
431	9	North Saanich	1	1	2	low	low	low	Bazan Bay; elevated counts intermittently	Resample in 2026
432	10	North Saanich	2	1	3	low	low	low	Bazan Bay	Continue monitoring
435	10	North Saanich	1	1	2	low	low	low	Bazan Bay	Resample in 2026
441	10	North Saanich	2	3	5	**high**	moderate	low	Reay Creek; birds upstream	Continue monitoring
3020	15	North Saanich	2	2	4	low	moderate	moderate	Dry in summer	Confirm rating

Stormwater Quality Report
Public Health Concern Ratings

CRD Discharge No.	Report Figure No.	Jurisdiction at Discharge	Rating			Level of Concern			Comments	Recommendations
			E.coli Rating	Public Shoreline Use	Overall Rating	2019	2020	2021		
3020A	15	North Saanich	2	2	4	NA	low	moderate	Dry in summer	Confirm rating
3021	15	North Saanich	2	2	4	low	low	moderate	Construction nearby; low flow in summer	Resample in 2026
3021A	16	North Saanich	1	2	3	moderate	moderate	low	Dry in summer	Continue monitoring
3034B	16	North Saanich	1	2	3	NA	NA	low	Dry in summer	Resample in 2026
3034C	16	North Saanich	1	2	3	NA	NA	low	Dry in summer	Resample in 2026
3041	18	North Saanich	1	2	3	moderate	low	low	Dry in summer	Resample in 2026
3051	19	North Saanich	1	2	3	NA	NA	low	Dry in summer	Resample in 2026
3051A	19	North Saanich	1	2	3	NA	NA	low	Low counts	Confirm rating
3077	23	North Saanich	1	3	4	**high**	**high**	moderate	Deep Cove; counts lower	Continue monitoring
3078A	23	North Saanich	3	3	6	**high**	**high**	**high**	Deep Cove; human bacteria present	Continue monitoring and source investigations
3078B	23	North Saanich	1	3	4	low	low	low	Dry	Resample in 2026
3079	23	North Saanich	2	3	5	moderate	moderate	moderate	Tatlow/Chalet Creek; human bacteria present	Continue monitoring
3080A	24	North Saanich	2	1	3	low	low	low	Benes Creek	Continue monitoring
3086	25	North Saanich	1	3	4	low	low	low	Dry in summer	Resample in 2026
3087	25	North Saanich	1	3	4	NA	NA	low	Low counts	Confirm rating
3088	25	North Saanich	1	3	4	NA	NA	low	Low flow; dry in summer	Confirm rating
3089A	26	North Saanich	1	3	4	NA	NA	low	Dry in summer	Confirm rating
3089AAD	26	North Saanich	1	3	4	NA	NA	low	Dry in summer	Confirm rating
3089AB	26	North Saanich	1	3	4	NA	NA	low	Dry in summer	Confirm rating
3089AC	26	North Saanich	1	3	4	NA	NA	low	Dry in summer	Confirm rating
3089BB	26	North Saanich	2	3	5	NA	NA	**high**	Dry in summer	Confirm rating
3089CC	26	North Saanich	1	3	4	NA	NA	low	Dry in summer	Confirm rating
3104	28	North Saanich	2	2	4	low	low	moderate	SPSO, Ten Ten Creek	Continue monitoring
3117A	31	North Saanich	2	2	4	NA	moderate	moderate	New; private	Confirm rating
3117B	31	North Saanich	1	2	3	NA	low	low	Private discharge	Confirm rating
3118	31	North Saanich	1	3	4	**high**	moderate	moderate	Source(s) fixed; counts lower	Continue monitoring
3118A	31	North Saanich	1	3	4	NA	low	low	Dry in summer	Resample in 2026
3118B	31	North Saanich	2	3	5	NA	**high**	**high**	High counts in summer and winter	Continue monitoring and source investigations
3118C	31	North Saanich	1	3	4	NA	low	low	Dry in summer	Confirm rating

Stormwater Quality Report
Public Health Concern Ratings

CRD Discharge No.	Report Figure No.	Jurisdiction at Discharge	Rating			Level of Concern			Comments	Recommendations
			E.coli Rating	Public Shoreline Use	Overall Rating	2019	2020	2021		
3118D	31	North Saanich	1	3	4	NA	low	low	Elevated count in past	Confirm rating
3119	31	North Saanich	2	3	5	moderate	low	moderate	Coles Bay; dry in summer	Confirm rating
3120	31	North Saanich	2	3	5	moderate	low	moderate	Coles Bay; dry in summer	Continue monitoring
3124B	32	North Saanich	2	2	4	NA	NA	low	Dry in summer	Confirm rating
3125	32	North Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3125A	32	North Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3125B	32	North Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3125C	32	North Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3126	32	North Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3126A	32	North Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
444	11	Sidney	2	3	5	NA	NA	moderate	High count during heavy rain; dry in summer	Confirm rating
444A	11	Sidney	2	3	5	NA	NA	moderate	High count during heavy rain; dry in summer	Confirm rating
446	11	Sidney	1	3	4	moderate	low	low	Suds previously in discharge	Continue monitoring
447	11	Sidney	2	3	5	**high**	**high**	**high**	Counts fluctuate	Continue monitoring and source investigations
448	11	Sidney	1	3	4	moderate	moderate	low	Low flow in summer, SPSO	Confirm rating
449	11	Sidney	3	3	6	**high**	moderate	**high**	Counts fluctuate	Continue monitoring and source investigations
449A	11	Sidney	2	3	5	moderate	moderate	moderate	Low flows; lower counts; extended outfall	Continue monitoring
450	11	Sidney	3	3	6	low	moderate	moderate	Cross-connection fixed; multiple sources upstream	Confirm investigations
456	12	Sidney	1	3	4	NA	NA	low	Previously low	Resample in 2026
458B	12	Sidney	1	2	3	NA	NA	low	Foot of Beacon Ave.	Resample in 2026
458C	12	Sidney	1	2	3	NA	NA	low	Low flows	Resample in 2026
459	12	Sidney	1	2	3	moderate	low	low	Dry in summer	Confirm rating
466	12	Sidney	1	1	2	NA	NA	low	Dry in summer	Resample in 2026
3001	13	Sidney	1	2	3	NA	low	low	Dry in summer	Resample in 2026
3003	13	Sidney	2	2	4	moderate	moderate	low	Low flow	Confirm rating
3005	13	Sidney	2	2	4	moderate	moderate	moderate	High count upstream, SPSO	Continue monitoring

Stormwater Quality Report
Public Health Concern Ratings

CRD Discharge No.	Report Figure No.	Jurisdiction at Discharge	Rating			Level of Concern			Comments	Recommendations
			E.coli Rating	Public Shoreline Use	Overall Rating	2019	2020	2021		
3007	14	Sidney	2	2	4	moderate	low	moderate	Foot of Bowden	Continue monitoring
3014	14	Sidney	1	2	3	low	moderate	low	Low EC, low flows; one high count lower when resampled	Confirm rating
3015	14	Sidney	2	1	3	moderate	low	low	Dry in summer	Confirm rating
3016	14	Sidney	2	2	4	moderate	**high**	moderate	Elevated EC in summer, SPSO	Continue monitoring
3090	26	Tseycum/North Saanich	1	3	4	low	low	low	Dry in summer	Continue monitoring
3091	26	Tseycum/North Saanich	1	3	4	low	low	low	Dry in summer	Continue monitoring
3095	27	Tseycum/North Saanich	3	3	6	**high**	**high**	**high**	Tseycum Creek, SPSO	Continue monitoring;
3121	31	Pauquachin/North Saanich	1	3	4	NA	moderate	moderate	Dry in summer	Continue monitoring
3122	31	Pauquachin/North Saanich	1	3	4	NA	moderate	moderate	Dry in summer	Confirm rating
3123	31	Pauquachin/North Saanich	1	3	4	low	low	low	Dry in summer	Continue monitoring
3124	31	Pauquachin/North Saanich	2	2	4	moderate	low	moderate	Low upstream as well; bathing may occur upstream	Continue monitoring
3124A	31	Pauquachin/North Saanich	1	2	3	NA	NA	low	Dry in summer	Confirm rating
3135	35	Tsartlip/Central Saanich	2	3	5	NA	low	moderate	Dry in summer	Confirm rating
3136	35	Tsartlip/Central Saanich	1	3	4	NA	NR	moderate	Dry in summer	Confirm rating
3136A	35	Tsartlip/Central Saanich	1	3	4	low	low	low	Dry in summer	Continue monitoring
3138	36	Tsartlip/Central Saanich	1	3	4	moderate	low	moderate	Dry in summer	Continue monitoring
411	6	Tsawout/Central Saanich	1	3	4	low	moderate	moderate	Dry in summer	Continue monitoring
411A	6	Tsawout/Central Saanich	1	3	4	low	low	low	Dry in summer	Continue monitoring
412	7	Tsawout/Central Saanich	2	2	4	low	low	moderate	Tetayut Creek	Continue monitoring

Notes:
Level of Concern determined by the sum of the *E. coli* and shoreline ratings. Low = sums of 2 and 3, moderate = sum of 4 and high = sums of 5 and 6.
EC = *E. coli* counts.
NA = Not rated because it was not one of the discharges assessed this year.
SPSO = This discharge acts as a sewage pump station overflow.

APPENDIX D

E. COLI SAMPLING QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM 2021

APPENDIX D
***E. COLI* SAMPLING QUALITY ASSURANCE**
AND QUALITY CONTROL PROGRAM
2021

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APPENDIX D

E. COLI SAMPLING QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM FOR 2021

1.0 INTRODUCTION

Quality Assurance and Quality Control (QA/QC) programs are protocols adopted to ensure that results of any study are valid, internally consistent and comparable with similar projects. These protocols are set out in writing and based on current and relevant research on related topics.

Data collected for the quality assurance (QA) program are used to ensure consistency in field handling and analytical methods. If data exceed a specified precision criterion, then the lab is notified of a potential problem in the procedure and steps are taken to resolve the issue.

2.0 METHODS FOR BACTERIAL SAMPLING

All water samples were collected in 250-mL wide-mouth polypropylene bottles supplied by the analytical laboratories (Bureau Veritas Laboratories formerly Maxxam Analytics International Corporation in Victoria). Labelled samples were stored in an insulated cooler with ice packs for protection from prolonged exposure to UV light and delivered the same day to the laboratory. *Escherichia coli* bacteria (*E. coli*) were analyzed following the procedures in Standard Methods (APHA, 1998) and reported as colony forming units per 100 mL (CFU/100 mL).

2.1 Stormwater Discharge Sampling

Where possible, stormwater samples were collected from the point of discharge. Where this was not possible, the stormwater system was followed back to the nearest point where samples could be taken.

2.2 Quality Assurance

2.2.1 Stormwater Sample Replicates (Field Splits)

Ten percent of the total number of samples collected were replicated in the field (field replicates) and are identified in this report as field splits. A single sample was collected in a laboratory-prepared one-litre sample bottle and inverted 30 times to ensure that the sample was homogeneous. The sample was split evenly into two sample bottles. The two bottles were labelled and sent to the lab for analysis as separate samples, but not identified as field splits.

2.2.2 Quality Control Assessment

To establish the precision criteria, 18 replicates (field splits) were analyzed for *E. coli* bacteria. Field splits were collected from six stormwater discharges on the Saanich Peninsula. Discharges were chosen based on previous results, specifically high, moderate or low levels of *E. coli* concentrations. The QA sampling for the assessment was for all *E. coli* samples analyzed by Maxxam. The three levels of *E. coli* concentrations were selected to represent the variance in the samples analyzed during the sampling program. Three grab samples were taken at each of the six stations and split into two replicate sample bottles. Three blank samples of potable water were also collected as part of the assessment. Samples were supplied to the lab with individual numbers.

2.2.3 Calculation of Quality Assurance Results

Laboratory precision for *E. coli* analysis is determined by analyzing several pairs of field samples (field splits). The following procedure is the same as that used for fecal coliforms from Standard Methods, 20th edition (APHA, 1998).

The data are arranged in pairs (D1 and D2). The log of each field measurement is determined (L1, L2) and the difference (range) in the log value between each pair of field splits is calculated: R = (L2 - L1). An average range (Mean-R) is then determined for all of the pairs.

The precision criterion is calculated by multiplying the Mean-R by 3.27 and is rounded to one decimal place.

The log range (R) is calculated for each of the field splits and compared to the precision criterion, to determine whether the sample is acceptable or not, according to the following criteria:

Acceptable (A) If the calculation is less than the precision criterion, then the field data are within normal variability.

Unacceptable (U) If the calculation is greater than the precision criterion, then the field data are outside of the normal variability. Data collected after the last "acceptable" set of data should be discarded and no further analysis should be done until the source of the problem is identified by the lab.

It is important not to put too severe an interpretation on the results, especially when they are close to the "unacceptable" guideline. Each result represents a value within a 95% confidence interval, which gets proportionately larger as the actual result gets smaller. Therefore, one can expect, through randomness, 5% of the samples to be outside of the precision criterion. Also, bacterial counts under 200 CFU/100 mL are considered too small to accurately calculate or compare to a precision criterion (APHA, 1998). It is also important to note that discharges with *E. coli* counts lower than 200 CFU/100 mL receive a low public health concern rating.

The results should be rounded to one decimal place and compared to the precision criterion (e.g., 0.3). If the calculated value from the duplicate results still exceeds the criterion, then an informal investigation of the laboratory should be initiated. If only a few duplicates are unacceptable (i.e., one out of every 20 pairs of duplicates), the lab is probably meeting the guideline.

The overall process is intended to act as an alarm, alerting the study group to potential problems with the sampling and analytical procedures.

3.0 RESULTS

CRD staff collected 18 pairs of stormwater samples from six discharges having high, moderate or low levels of bacteria. Samples were analyzed for *E. coli* concentration used to calculate the precision criterion.

3.1 Blanks

Staff submitted three blank samples (tap water) to the lab for *E. coli* analysis. Blanks were reported as having <1 CFU/100 mL. Therefore, the results meet the QA requirements.

3.2 Precision Criteria

Three of the field splits exceeded the precision criterion, however, these had low results (<200 CFU/100 mL), which are not expected to meet the criterion. In addition, it is expected that 5% of the results will exceed the criterion, due to randomness; therefore, the data are acceptable.

Table 1 shows lab results of the 18 pairs of samples used to determine the precision criterion. The calculated precision criterion was 0.4.

3.3 Field Splits

Table 2 presents results for the field splits collected during the wet period. Data were compared to the precision criterion of 0.4. Three of the field splits exceeded the precision criterion, however, these had low results (<200 CFU/100 mL), which are not expected to meet the criterion. In addition, it is expected that 5% of the results will exceed the criterion, due to randomness; therefore, the data are acceptable.

Table 3 presents results for the field splits collected during the dry period. Three of the field splits exceeded the precision criterion, however, these had low results (<200 CFU/100 mL), which are not expected to meet the criterion. In addition, it is expected that 5% of the results will exceed the criterion, due to randomness; therefore, the data are acceptable.

Table 1. 2021 Precision Criterion Calculation

Date	Discharge No.	Pair No.	1st Duplicate D1	2nd Duplicate D2	Log of D1 L1	Log of D2 L2	Range of Logs (Rlog) (Log L1 - Log L2)
7-Jan	518	1	3	7	0.4771	0.8451	0.3680
		2	10	10	1.0000	1.0000	0.0000
		3	17	17	1.2304489	1.2304489	0.0000
7-Jan	533	1	8	4	0.9031	0.6021	0.3010
		2	5	6	0.6990	0.7782	0.0792
		3	6	4	0.7781513	0.60206	0.1761
7-Jan	503	1	260	240	2.4150	2.3802	0.0348
		2	280	220	2.4472	2.3424	0.1047
		3	280	260	2.447158	2.4149733	0.0322
6-Jan	245	1	230	140	2.3617	2.1461	0.2156
		2	150	190	2.1761	2.2788	0.1027
		3	250	170	2.39794	2.2304489	0.1675
6-Jan	744B	1	47000	42000	4.6721	4.6232	0.0488
		2	14000	7600	4.1461	3.8808	0.2653
		3	21000	26000	4.3222193	4.4149733	0.0928
12-Jan	634A	1	15000	15000	4.1761	4.1761	0.0000
		2	17000	15000	4.2304	4.1761	0.0544
		3	17000	14000	4.2304	4.1461	0.0843
	Mean - R_{log} (Sum R_{log}/18)						0.1182
	Precision Criterion (3.27 x Mean - R_{log})						0.3865

Table 2. Comparison of Field Splits to Precision Criterion – 2021 Dry Period

Date	Discharge	Bacterial Counts (CFU/100 mL)	Log	Log Range	Acceptable (A) or Unacceptable (U)
8-Jun	574	280	2.4472	0.1047	A
		220	2.3424		
14-Jun	245	<1	0.0000	0.0000	A
		<1	0.0000		
15-Jun	611	260000	5.4150	0.1362	A
		190000	5.2788		
17-Jun	541	12	1.0792	0.0969	A
		15	1.1761		
18-Jun	781	7	0.0000	1.1139	U*
		13	1.1139		
21-Jun	222	3000	3.4771	0.0414	A
		3300	3.5185		
24-Jun	620	7600	3.8808	0.0223	A
		8000	3.9031		
25-Jun	854	1300	3.1139	0.1695	A
		880	2.9445		
6-Aug	928	150	2.1761	0.8239	U*
		1000	3.0000		
25-Sep	559-1	34	1.5315	1.2089	U*
		550	2.7404		
8-Sep	6003-1	26	1.4150	0.0164	A
		27	1.4314		
16-Sep	245	170	2.2304	0.1513	A
		120	2.0792		
16-Sep	323	800	2.9031	0.0607	A
		920	2.9638		
20-Oct	6003-1	2	0.3010	0.3010	A
		1	0.0000		
3-Nov	559-1	80	1.9031	0.0580	A
		70	1.8451		

Notes:
CFU: colony forming units
A: calculated data is less than the precision criterion and, therefore, falls within normal variability.
U: calculated data is greater than the precision criterion and, therefore, falls outside normal variability.
A*: any *E. coli* count under 200 is considered too small an amount to calculate precision.

Table 3. Comparison of Field Splits to Precision Criterion – 2021 Wet Period

Date	Discharge	Bacterial Counts (CFU/100 mL)	Log	Log Range	Acceptable (A) or Unacceptable (U)
15-Jan	212	5	0.6990	0.2218	A
		3	0.4771		
20-Jan	322	380	2.5798	0.0223	A
		400	2.6021		
20-Jan	574	12	1.0792	0.1249	A
		16	1.2041		
4-Feb	222	500	2.6990	0.0492	A
		560	2.7482		
10-Feb	940A	<1	0.0000	0.0000	A
		1	0.0000		
24-Feb	813	34	1.5315	0.0367	A
		37	1.5682		
25-Feb	541	16	1.2041	0.8751	U*
		120	2.0792		
25-Feb	316	260	2.4150	1.0348	U*
		24	1.3802		
4-Mar	567	20	1.3010	0.5441	U*
		70	1.8451		
5-Mar	574	17	1.2304	0.0248	A
		18	1.2553		
8-Mar	6004	2	0.3010	0.0000	A
		2	0.3010		
9-Mar	736A	1	0.0000	0.0000	A
		1	0.0000		
17-Mar	610	610	2.7853	0.0371	A
		560	2.7482		
30-Mar	639A	1200	3.0792	0.3522	A
		2700	3.4314		
31-Mar	854	3000	3.4771	0.1663	A
		4400	3.6435		
31-Mar	865G	5600	3.7482	0.0300	A
		6000	3.7782		
1-Apr	806	1300	3.1139	0.0348	A
		1200	3.0792		
26-Apr	659	14	1.1461	0.3010	A
		7	0.8451		
27-Apr	749A	1	0.0000	0.0000	A
		<1	0.0000		
27-Apr	924	14	1.1461	0.0322	A
		13	1.1139		
12-May	742-2B	40	1.6021	0.0110	A
		39	1.5911		

Notes:
CFU: colony forming units
A: calculated data is less than the precision criterion and, therefore, falls within normal variability.
U: calculated data is greater than the precision criterion and, therefore, falls outside normal variability.
A*: any *E. coli* count under 200 is considered too small an amount to calculate precision.

4.0 CONCLUSIONS

All requirements for the stormwater monitoring QA/QC program were carried out in 2021. All QA/QC results were acceptable for rating stormwater discharges for public health concerns.

5.0 REFERENCES

APHA, 1998. American Public Health Association, American Water Works Association, Water Pollution Control Federation, 20th Edition. Standard Methods for the Examination of Water and Wastewater.

APPENDIX E

Contaminant Data and Ratings for Environmental Concern

Table 1. 2021 Stormwater Sediment Contaminant Concentrations

Station ID	Sample Start Date	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Silver	Zinc	HPAH	LPAH	TOC
Marine Sediment Quality Guidelines	CRD MSQG	57	5.1	260	390	450	0.41	6.1	410	12	5.2	-
	CCME ISQG	7.24	0.7	52.3	18.7	30	0.13	1	124	-	-	-
	CCME PEL	42	4.2	160	108	112	0.7	2.2	271	-	-	-
Vancouver Island Background		4	0.95	65	100	40	0.15	1	150	-	-	-
SW0405	2019-10-10	3.82	0.171	21.5	10.4	2.31	< 0.05	< 0.05	34.9	< 0.001	0.005	1.7
SW0409C	2019-10-28	3.04	0.232	25.1	*57.8*	21	< 0.05	0.083	156	0.13	0.068	1.7
SW0410	2019-10-10	1.92	0.066	17.2	16.4	11.5	< 0.05	< 0.05	66.9	0.35	0.049	0.46
SW0411A	2021-04-29	2.68	0.058	18.2	*20.1*	6.76	< 0.05	< 0.05	81.1	0.012	< 0.001	0.81
SW0412	2019-10-10	1.83	0.058	19.5	12.4	3.63	< 0.05	< 0.05	59.7	0.046	0.009	2.6
SW0412	2021-09-07	1.32	0.05	17.6	12.6	2.45	< 0.05	< 0.05	48.2	0.002	< 0.001	0.65
SW0416	2019-10-10	5.62	0.144	36.1	*45*	8.52	< 0.05	0.072	88.1	0.021	0.002	1.3
SW0441	2020-12-16	13.8	0.253	37.7	*69.8*	12.8	0.07	0.15	253	0.1	0.023	3.6
SW0441	2021-04-29	2.73	2.25	23.3	*27.2*	19.4	< 0.05	0.075	*128*	0.15	0.017	5.2
SW0441-1	2020-12-16	6.17	0.207	32	*54.5*	13.3	< 0.05	0.074	170	0.051	0.005	3.3
SW0441-1A	2021-04-29	2.69	0.76	17.3	16.6	5.16	< 0.05	0.051	*143*	0.03	0.003	0.5
SW0441-2	2021-04-29	6.47	1.75	39.4	*19.8*	7.24	< 0.05	< 0.05	*142*	0.087	0.007	0.29
SW0449-2D	2019-10-10	2.85	0.127	43.8	*40.6*	11.5	< 0.05	< 0.05	163	0.36	0.11	3.2
SW0449-2D	2020-07-13	3.14	0.061	17.1	*29.4*	8.71	< 0.05	< 0.05	164	0.41	0.071	0.4
SW3016	2021-04-29	6.15	0.267	35.9	*56.4*	16.8	0.054	0.08	*146*	0.34	0.047	1.1
SW3021	2020-11-23	3.28	0.288	23.9	*28.1*	40.3	0.418	0.297	*133*	0.89	0.11	3.8
SW3021	2021-05-06	3.77	0.215	21.3	*33.3*	60.3	0.174	0.178	106	0.4	0.065	
SW3021	2021-07-13	4.67	0.21	22.6	*27*	23.7	0.239	0.18	105			4.1
SW3090	2019-10-28	7	0.075	45.3	*49.9*	8.77	0.061	< 0.05	107	0.01	0.016	< 0.05
SW3104	2019-12-03	5.54	0.182	24	*38.2*	7.53	0.05	0.127	*143*	0.92	0.22	4.9
SW3104	2021-08-24	6.56	0.225	26.4	*44.7*	9	0.055	0.115	167	0.076	0.024	3.2
SW3104-2	2019-12-03	14	0.402	46.5	130	17.4	0.089	0.154	360	0.75	0.12	6.4
SW3118	2020-11-23	3.81	0.125	29.7	*45.5*	8.4	0.051	0.075	116	0.91	0.097	5.4
SW3120	2021-05-06	6.35	0.114	29.5	*29*	5.08	< 0.05	< 0.05	67.6	0.01	0.007	
SW3122	2019-10-28	4.62	0.23	32	*48*	23.7	0.061	0.094	100	0.15	0.029	3.1
SW3122-2	2019-10-28	7.46	0.088	46.9	*48.7*	8.4	0.054	< 0.05	77	0.01	0.004	1.4
SW3133	2019-10-17	2.74	0.107	19.7	17.6	5.24	< 0.05	< 0.05	67.7	0.023	0.004	0.76
SW3133	2020-09-08	1.8	0.06	17.1	11.7	3.28	< 0.05	< 0.05	44.4	0.12	0.02	0.2
SW3133-1B	2020-09-01	2.01	0.053	17.5	15.5	2.31	< 0.05	0.092	42.3	< 0.001	< 0.001	0.083
SW3133-2	2019-10-17	2.2	0.158	226	*77.9*	9.03	< 0.05	< 0.05	121	0.054	0.019	0.41
SW3133-4	2019-10-17	6.56	1.23	237	191	49.3	0.117	0.348	459	1.7	0.38	12
SW3133-5	2019-10-17	6.21	0.109	43	*54.4*	6.82	0.061	0.082	92.1	0.052	0.023	0.88
SW3135	2020-11-26	6.45	0.962	27.7	169	52.9	0.076	0.1	300	0.022	0.005	2
SW3135	2021-05-06	6.24	0.929	32.5	*60.8*	32.5	0.08	0.09	254	0.024	0.007	

Table 1, cont'd

Station ID	Sample Start Date	Arsenic	Cadmium	Chromium	Copper		Lead	Mercury		Silver	Zinc	HPAH	LPAH	TOC
Marine Sediment Quality Guidelines	CRD MSQG	57	5.1	260	390		450	0.41		6.1	410	12	5.2	-
	CCME ISQG	7.24	0.7	52.3	18.7		30	0.13		1	124	-	-	-
	CCME PEL	42	4.2	160	108		112	0.7		2.2	271	-	-	-
Vancouver Island Background		4	0.95	65	100		40	0.15		1	150	-	-	-
SW3136A	2020-11-26	5.14	0.37	31.2	*35.5*		22	< 0.05		0.081	147	0.034	0.006	4.2
SW3136A-2	2019-10-17	4.15	0.272	32	*46.7*		17.9	0.054		0.096	*138*	0.061	0.014	2
SW3136B	2020-11-26	7.62	0.208	37.4	*39.9*		9.01	< 0.05		0.062	89.1	0.013	0.006	2.6
SW3138	2019-10-17	6.88	0.214	33.9	*60.4*		9.68	< 0.05		0.071	83.9	0.17	0.019	1.1
SW3138	2020-11-26	1.86	0.062	22.9	*38.8*		3.44	< 0.05	<	0.05	47.3	0.069	0.008	0.38
SW3146	2019-10-28	3.05	0.095	16.9	*34.3*		6.92	< 0.05	<	0.05	*142*	< 0.001	< 0.001	0.36
SW3153	2019-12-03	6.8	0.251	43.1	*40*		19.1	< 0.05		0.105	105	0.053	0.24	4.3
SW3154	2020-12-16	7.1	0.273	19.8	*58.8*		40.3	< 0.05	<	0.05	*136*	0.026	0.016	1.7

Notes:

Concentrations are in mg/kg dry weight.

CRD MSQG = Marine sediment quality guidelines adopted from Washington State's Department of Ecology for protection of aquatic life.

LPAH and HPAH are low and high molecular weight polycyclic aromatic hydrocarbons, respectively.

CCME = Canadian Council of Ministers of the Environment.

ISQG = interim sediment quality guideline; concentrations above this level but below the PEL will occasionally result in adverse effects on aquatic life.

PEL = probable effects level; concentrations above this level will frequently result in adverse effects to aquatic life.

Vancouver Island Background Concentrations are regional estimates (95th percentiles) from BC ENV; https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/protocols/protocol_4.pdf

XX Italicized values are those that exceed a guideline but are below the Vancouver Island background concentration.

XX Value is greater than or equal to the CCME ISQG.

XX Value is greater than or equal to the CCME PEL.

XX Value it greater than or equal to CRD MSQG and adverse effects to aquatic life are likely to occur.

For mercury only, the CRD MSQG is lower than the CCME PEL.

Some samples are not collected at the discharge to marine and therefore marine guidelines are not applicable but are used for screening purposes.

Table 2. 2021 Sediment Contaminant Ratings

Station ID	Sample Date	Ratios of Concentration / Marine Sediment Quality Guideline										Sum of Ratios	Contaminant Rating
	Parameter	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Silver	Zinc	HPAH	LPAH		
CRD Marine Sediment Quality Guidelines		57	5.1	260	390	450	0.41	6.1	410	12	5.2		
SW0405	2019-10-10	0.07	0.03	0.08	0.03	0.01	0.12	0.01	0.09	0.00	0.00	0.43	Low
SW0409C	2019-10-28	0.05	0.05	0.10	0.15	0.05	0.12	0.01	0.38	0.01	0.01	0.93	Low
SW0410	2019-10-10	0.03	0.01	0.07	0.04	0.03	0.12	0.01	0.16	0.03	0.01	0.51	Low
SW0411A	2021-04-29	0.05	0.01	0.07	0.05	0.02	0.12	0.01	0.20	0.00	0.00	0.52	Low
SW0412	2019-10-10	0.03	0.01	0.08	0.03	0.01	0.12	0.01	0.15	0.00	0.00	0.44	Low
SW0412	2021-09-07	0.02	0.01	0.07	0.03	0.01	0.12	0.01	0.12	0.00	0.00	0.39	Low
SW0416	2019-10-10	0.10	0.03	0.14	0.12	0.02	0.12	0.01	0.21	0.00	0.00	0.75	Low
SW0441	2020-12-16	0.24	0.05	0.15	0.18	0.03	0.17	0.02	0.62	0.01	0.00	1.47	Moderate
SW0441	2021-04-29	0.05	0.44	0.09	0.07	0.04	0.12	0.01	0.31	0.01	0.00	1.15	Moderate
SW0441-1	2020-12-16	0.11	0.04	0.12	0.14	0.03	0.12	0.01	0.41	0.00	0.00	1.00	Low
SW0441-1A	2021-04-29	0.05	0.15	0.07	0.04	0.01	0.12	0.01	0.35	0.00	0.00	0.80	Low
SW0441-2	2021-04-29	0.11	0.34	0.15	0.05	0.02	0.12	0.01	0.35	0.01	0.00	1.16	Moderate
SW0449-2D	2019-10-10	0.05	0.02	0.17	0.10	0.03	0.12	0.01	0.40	0.03	0.02	0.95	Low
SW0449-2D	2020-07-13	0.06	0.01	0.07	0.08	0.02	0.12	0.01	0.40	0.03	0.01	0.81	Low
SW3016	2021-04-29	0.11	0.05	0.14	0.14	0.04	0.13	0.01	0.36	0.03	0.01	1.02	Moderate
SW3021	2020-11-23	0.06	0.06	0.09	0.07	0.09	1.02	0.05	0.32	0.07	0.02	1.86	**High**
SW3021	2021-05-06	0.07	0.04	0.08	0.09	0.13	0.42	0.03	0.26	0.03	0.01	1.17	Moderate
SW3021	2021-07-13	0.08	0.04	0.09	0.07	0.05	0.58	0.03	0.26	0.00	0.00	1.20	Moderate
SW3090	2019-10-28	0.12	0.01	0.17	0.13	0.02	0.15	0.01	0.26	0.00	0.00	0.88	Moderate
SW3104	2019-12-03	0.10	0.04	0.09	0.10	0.02	0.12	0.02	0.35	0.08	0.04	0.95	Low
SW3104	2021-08-24	0.12	0.04	0.10	0.11	0.02	0.13	0.02	0.41	0.01	0.00	0.97	Low
SW3104-2	2019-12-03	0.25	0.08	0.18	0.33	0.04	0.22	0.03	0.88	0.06	0.02	2.08	Moderate
SW3118	2020-11-23	0.07	0.02	0.11	0.12	0.02	0.12	0.01	0.28	0.08	0.02	0.86	Low
SW3120	2021-05-06	0.11	0.02	0.11	0.07	0.01	0.12	0.01	0.16	0.00	0.00	0.63	Low
SW3122	2019-10-28	0.08	0.05	0.12	0.12	0.05	0.15	0.02	0.24	0.01	0.01	0.85	Low
SW3122-2	2019-10-28	0.13	0.02	0.18	0.12	0.02	0.13	0.01	0.19	0.00	0.00	0.80	Low
SW3133	2019-10-17	0.05	0.02	0.08	0.05	0.01	0.12	0.01	0.17	0.00	0.00	0.50	Low
SW3133	2020-09-08	0.03	0.01	0.07	0.03	0.01	0.12	0.01	0.11	0.01	0.00	0.40	Low
SW3133-1B	2020-09-01	0.04	0.01	0.07	0.04	0.01	0.12	0.02	0.10	0.00	0.00	0.40	Low
SW3133-2	2019-10-17	0.04	0.03	0.87	0.20	0.02	0.12	0.01	0.30	0.00	0.00	1.59	**High**
SW3133-4	2019-10-17	0.12	0.24	0.91	0.49	0.11	0.29	0.06	1.12	0.14	0.07	3.54	**High**
SW3133-5	2019-10-17	0.11	0.02	0.17	0.14	0.02	0.15	0.01	0.22	0.00	0.00	0.85	Low
SW3135	2020-11-26	0.11	0.19	0.11	0.43	0.12	0.19	0.02	0.73	0.00	0.00	1.90	Moderate
SW3135	2021-05-06	0.11	0.18	0.13	0.16	0.07	0.20	0.01	0.62	0.00	0.00	1.48	Moderate
SW3136A	2020-11-26	0.09	0.07	0.12	0.09	0.05	0.12	0.01	0.36	0.00	0.00	0.92	Low
SW3136A-2	2019-10-17	0.07	0.05	0.12	0.12	0.04	0.13	0.02	0.34	0.01	0.00	0.90	Low
SW3136B	2020-11-26	0.13	0.04	0.14	0.10	0.02	0.12	0.01	0.22	0.00	0.00	0.79	Low
SW3138	2019-10-17	0.12	0.04	0.13	0.15	0.02	0.12	0.01	0.20	0.01	0.00	0.83	Low

Table 2, cont'd

Station ID	Sample Date	Ratios of Concentration / Marine Sediment Quality Guideline										Sum of Ratios	Contaminant Rating
	Parameter	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Silver	Zinc	HPAH	LPAH		
CRD Marine Sediment Quality Guidelines		57	5.1	260	390	450	0.41	6.1	410	12	5.2		
SW3138	2020-11-26	0.03	0.01	0.09	0.10	0.01	0.12	0.01	0.12	0.01	0.00	0.49	Low
SW3146	2019-10-28	0.05	0.02	0.07	0.09	0.02	0.12	0.01	0.35	0.00	0.00	0.72	Low
SW3153	2019-12-03	0.12	0.05	0.17	0.10	0.04	0.12	0.02	0.26	0.00	0.05	0.93	Low
SW3154	2020-12-16	0.12	0.05	0.08	0.15	0.09	0.12	0.01	0.33	0.00	0.00	0.96	Low

Notes:

CRD MSQG = Marine sediment quality guidelines adopted from Washington State's Department of Ecology for protection of aquatic life.

These are ratios of the measured value over the MSQG.

LPAH and HPAH are low and high molecular weight polycyclic aromatic hydrocarbons, respectively.

[redacted]

Some samples are not collected at the discharge to marine and therefore marine guidelines are not applicable but are used for screening purposes

Table 3. Summary of Contaminant Ratings for Environmental Concern

Discharge # (Location)	Figure #	Jurisdiction	Contaminant Ratings							Comments & Recommendations
			2015	2016	2017	2018	2019	2020	2021	
405 (Island View Beach)	4	Central Saanich	-	-	-	Low	Low	-	-	Resample in 2024 to monitor for change.
407 (Saanichton Bay)	5	Tsawout First Nation	-	-	Low	-	-	-	-	Rated low in 2005, 2011 and 2017. Resample in 2022 to monitor for change.
409C (Saanichton Bay)	6	Tsawout First Nation	-	-	-	Low	Low	-	-	Resample in 2024 to monitor for change.
410 (Saanichton Bay)	6	Tsawout First Nation	-	-	-	-	Low	-	-	Elevated lead in 2012. Resample in 2025.
411A (Saanichton Bay)	6	Tsawout First Nation	-	Low	-	-	-	-	Low	Rated low in 2011 and 2016. Rated moderate in 2008. Resample in 2026 to confirm rating.
412 (Tetayut Creek)	7	Tsawout First Nation	Low	Low	Low	-	Low	-	Low	Low at discharge but elevated levels upstream. Resample discharge in 2024 to monitor for change.
416 (Foot of Ferguson Rd)	7	Central Saanich	-	Moderate	-	Low	Low	-	-	Rated low in 1999, 2000 & 2011. Resample in 2024 to monitor for change.
435 (Bazan Bay)	10	North Saanich	-	-	Low	Low	-	-	-	High upstream near highway but low at discharge and in marine. Resample in 2024 to monitor for change.
441 (Reay Creek)	10	North Saanich	High	High	-	-	-	Moderate	Moderate	Remedial action undertaken, continue monitoring.
445 (Foot of Frost Ave.)	11	Sidney	-	-	-	-	-	NR	-	Rated high yearly (2002 to 2007) due to zinc. HPAH elevated in 2005. U/S: 445-2 high in 2007 due to mercury & PAHs. No sediment available since 2009. Elevated copper and zinc in water.
449 (Tulista Park)	11	Sidney	-	-	Moderate	Low	Moderate	Low *	-	Tidally influenced at discharge. Sample 449-2D for rating. *Zn low in sediment, but copper and zinc elevated in one water sample.
450 (Foot of Ocean Ave.)	11	Sidney	-	-	Low	-	-	-	-	Rated moderate in 2005 and 2007 due to cumulative contaminants. Rated low in 2011, 2012 and 2017. Resample in 2022 to monitor for change.
467 (Foot of Shoreacres)	12	Sidney	-	-	Low	-	-	-	-	Resample in 2022 to monitor for change.

Table 3, cont'd

Discharge # (Location)	Figure #	Jurisdiction	Contaminant Ratings							Comments & Recommendations
			2015	2016	2017	2018	2019	2020	2021	
3005 (Mermaid Canal)	13	Sidney	-	-	**High**	-	-	NR	-	Rated high due to Zn & PAH. Marine data >CCME ISQG for Cu, Pb, Hg and Zn. Cu and Zn elevated in water (2020). Elevated As, Cu, Pb and Zn at 3005-3 (2011). Sediment usually not available. **Action Required** (higher priority). Continue source investigations with water.
3006 (Roberts Bay)	13	Sidney	-	-	Low	-	-	-	-	Resample in 2022 to monitor for change.
3016 (All Bay)	14	Sidney	Low	Low	Moderate	Moderate	-	-	Moderate	Rated moderate due to Cu and Zn > CCME ISQG. Upstream arsenic concentrations lower. Sidney flushed line in fall 2015. Resample in 2021.
3021 (Tsehum Harbour)	15	North Saanich	-	-	-	**High**	Moderate	**High**	Moderate	2020: elevated Hg and Pb in sediment; no exceedances in water. Confirm rating.
3077 (Deep Cove)	23	North Saanich	-	-	-	-	-	NR	NR	In 2020, aqueous Cu and Zn 10X above BC ENV marine guidelines, lower in 2021. Pipe buried. Measure aqueous metals. Confirm rating in 2022.
3079 (Tatlow Creek.)	23	North Saanich	-	-	-	Low	-	-	-	Rated low in 2000 & 2008. Resample in 2023 to monitor for change.
3080A (Benes Creek)	24	North Saanich	High	Low	Low	Low	-	-	-	Rated high in 2015 due to mercury; possible lab error. Resample in 2023 to monitor for change.
3090 (Patricia Bay)	26	Tseycum First Nation	-	-	Low	Low	Low	-	-	Rated low in 2001, 2005 & 2010. Resample in 2024 to monitor for change.
3095 (Tseycum Creek)	27	Tseycum First Nation	-	-	Low	Low	-	-	-	Rated low in previous years. Resample in 2023 to monitor for change.
3104 (Tén Tén Creek)	28	North Saanich	-	-	**High**	Moderate High u/s	Low High u/s	-	Low	Zn and Cu above the PEL at Willingdon Road but low at discharge. Transport Canada remediated gross contaminants in the catchment area. Confirm rating.
3118 (Coles Bay)	31	North Saanich	-	-	-	-	-	Low	-	Rated low in 2001, 2005 & 2011. Rated moderate in 2006 and 2008 & 2012. Resample in 2025.
3119 (Coles Bay)	31	North Saanich	High	-	Low	Low	-	-	-	Rated low in 1998, 2004 & 2011. Rated high in 2015 due to mercury; possible lab error. Resample in 2023 to monitor for change.

Table 3, cont'd

Discharge # (Location)	Figure #	Jurisdiction	Contaminant Ratings							Comments & Recommendations
			2015	2016	2017	2018	2019	2020	2021	
3120 (Coles Bay)	31	North Saanich	-	Low	-	-	-	-	Low	Rated low in 1999, 2006, 2011 and 2016. Resample in 2026 to monitor for change.
3122 (Coles Bay)	31	Pauquachin First Nation	High	Low	**High**	Low	Low	-	-	Rated low in past. Rated high in 2015 due to Hg and in 2017 due to Ca. Resample in 2024.
3124 (Coles Bay)	31	Pauquachin First Nation	-	-	-	Low	-	-	-	Rated low in 2001 & 2005. Resample in 2023 to monitor for change.
3133 (Hagan Creek)	35	Tsartlip First Nation	High U/S	-	Low to High U/S	Low to High U/S	Low but High U/S	Low	-	Rated low at point of discharge. Elevated As, Ca, Cr, Cu, Pb and Zn upstream Resample discharge in 2025. Continue investigations around Keating Industrial Park.
3135 (South of Hagan Bight.)	35	Tsartlip First Nation	-	-	Moderate	-	-	Moderate	Moderate	Copper and zinc elevated above CCME PEL. U/S: stations were rated low. Resample in 2026.
3136A (Stream, south of Hagan Bight)	35	Tsartlip First Nation	Moderate	Moderate	-	-	Low	Low	-	No exceedances of guidelines in 2015. Rated high in 2014 due to zinc. Resample in 2025.
3136B (North of Tsartlip boat launch)	35	Tsartlip First Nation	-	-	-	-	-	Low	-	Rated low in 2002 & 2008. Resample in 2025.
3138 (Brentwood Bay, north of boat ramp)	36	Tsartlip First Nation	High	High	-	**High**	Low	Low	-	Rated high between 2004-2013 due to zinc. Tsartlip replaced pipes. Resample in 2025.
3146 (Brentwood Drive)	36	Central Saanich	-	-	-	-	Low	-	-	Rated low in 2006, 2007. Resample in 2024.
3148 (Brentwood Bay)	36	Central Saanich	-	-	-	Low	-	-	-	Rated low in 2000, 2005, 2010 & 2011. Resample in 2023 to monitor for change.
3153 (Brentwood Bay)	37	Central Saanich	-	-	Moderate	-	-	-	-	Elevated levels of Zn but rated moderate because the sediment is pumped out. U/S: in 2008 & 2009, station 3153-1 rated low. Remedial action undertaken, confirm sediment is still being removed.
3154 (Tod Creek)	43	Central Saanich	Low	-	Moderate	-	-	Low	-	U/S: station 3154-1 rated low. As, Cd, Cu, Pb, Zn elevated above CCME ISQG at mouth. Resample in 2022 to monitor for change.

Notes:
POD = Point of discharge; U/S = upstream
CCME = Canadian Council of Ministers of the Environment
ISQG = Interim sediment quality guidelines
U/S = upstream

Table 4. 2021 Stream Sediment Data

			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Silver	Zinc	HPAH	LPAH	TOC
Freshwater Sediment		**CCME ISQG**	5.9	0.6	37.3	35.7	35	0.17	0.5	123	0.1	0.1	-
Quality Guidelines		**CCME PEL**	17	3.5	90	197	91	0.486	-	315			-
		Vancouver Island Background	4	0.95	65	100	40	0.15	1	150	-	-	-
Creek	**Station ID**	**Sample Date**											
Tetayut Creek	SW0412	2019-10-10	1.83	0.058	19.5	12.4	3.63	< 0.05	< 0.05	59.7	0.046	0.009	2.6
		2021-09-07	1.32	0.05	17.6	12.6	2.45	< 0.05	< 0.05	48.2	0.002	< 0.001	0.65
Reay Creek	SW0441	2020-12-16	13.8	0.253	*37.7*	*69.8*	12.8	0.07	0.15	253	0.1	0.023	3.6
		2021-04-29	2.73	2.25	23.3	27.2	19.4	< 0.05	0.075	*128*	0.15	0.017	5.2
Reay Creek upstream	SW0441-1	2020-12-16	6.17	0.207	32	*54.5*	13.3	< 0.05	0.074	170	0.051	0.005	3.3
	SW0441-1A	2021-04-29	2.69	*0.76*	17.30	16.60	5.16	< 0.05	0.05	*143*	0.030	0.003	0.5
	SW0441-2	2021-04-29	6.47	1.75	*39.4*	19.8	7.24	< 0.05	< 0.05	*142*	0.087	0.007	0.29
Unnamed creek	SW3021	2020-11-23	3.28	0.288	23.9	28.1	40.3	0.418	0.297	*133*	0.89	0.11	3.8
		2021-05-06	3.77	0.215	21.3	33.3	60.3	0.174	0.178	106	0.4	0.065	-
		2021-07-13	4.67	0.21	22.6	27	23.7	0.239	0.18	105	-	-	4.1
Tén Tén Creek	SW3104	2019-12-03	5.54	0.182	24	*38.2*	7.53	0.05	0.127	*143*	0.92	0.22	4.9
		2021-08-24	6.56	0.225	26.4	*44.7*	9	0.055	0.115	167	0.076	0.024	3.2
Tén Tén Creek upstream	SW3104-2	2019-12-03	14	0.402	*46.5*	130	17.4	0.089	0.154	360	0.75	0.12	6.4
Unnamed creek	SW3120	2021-05-06	6.35	0.114	29.5	29	5.08	< 0.05	< 0.05	67.6	0.01	0.007	-
Unnamed creek	SW3122	2019-10-28	4.62	0.23	32	*48*	23.7	0.061	0.094	100	0.15	0.029	3.1
	SW3122-2	2019-10-28	7.46	0.088	*46.9*	*48.7*	8.4	0.054	< 0.05	77	0.01	0.004	1.4
Hagan Creek	SW3133	2019-10-17	2.74	0.107	19.7	17.6	5.24	< 0.05	< 0.05	67.7	0.023	0.004	0.76
		2020-09-08	1.8	0.06	17.1	11.7	3.28	< 0.05	< 0.05	44.4	0.12	0.02	0.2
Hagan Creek upstream	SW3133-1B	2020-09-01	2.01	0.053	17.5	15.5	2.31	< 0.05	0.092	42.3	< 0.001	< 0.001	0.083
	SW3133-2	2019-10-17	2.2	0.158	226	*77.9*	9.03	< 0.05	< 0.05	121	0.054	0.019	0.41
	SW3133-4	2019-10-17	6.56	1.23	237	191	49.3	0.117	0.348	459	1.7	0.38	12
	SW3133-5	2019-10-17	6.21	0.109	*43*	*54.4*	6.82	0.061	0.082	92.1	0.052	0.023	0.88
Unnamed creek	SW3146	2019-10-28	3.05	0.095	16.9	34.3	6.92	< 0.05	< 0.05	*142*	< 0.001	< 0.001	0.36
Butchart Creek	SW3153	2019-12-03	6.8	0.251	*43.1*	*40*	19.1	< 0.05	0.105	105	0.053	0.24	4.3
Tod Creek	SW3154	2020-12-16	7.1	0.273	19.8	*58.8*	40.3	< 0.05	< 0.05	*136*	0.026	0.016	1.7

Table notes on next page.

Table 4, continued

Notes:

Concentrations are in mg/kg dry weight

Samples are collected at the point of discharge to marine unless otherwise stated.

LPAH and HPAH are low and high molecular weight polycyclic aromatic hydrocarbons, respectively

CCME = Canadian Council of Ministers of the Environment

ISQG = interim sediment quality guideline; concentrations above this level but below the PEL will occasionally result in adverse effects on aquatic life

PEL = probable effects level; concentrations above this level will frequently result in adverse effects to aquatic life

Vancouver Island Background Concentrations are regional estimates (95th percentiles) from BC ENV; https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/protocols/protocol_4.pdf

"-" means no guideline available

XX	Light yellow; italicized values are those that exceed a guideline but are below the Vancouver Island background concentration
XX	Value is greater than or equal to the CCME ISQG
XX	Value is greater than or equal to the CCME PEL

Table 5. 2021 Stormwater Aqueous Metals Concentrations on Saanich Peninsula

				Aluminum		Antimony		Arsenic		Barium		Beryllium		Bismuth		Boron		Cadmium		Calcium		Chromium		Cobalt		Copper		E. Coli	Flow Rate
				TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	NoRs	NoRs
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	CFU/100 mL	L/min
Marine Aquatic Life Guidelines			**max**		**-**			**12.5** [1]										**0.12**				**-**				**3**			
			average		**-**			**-**										**-**	**-**			**-**				**2**			
Freshwater Aquatic Life Guidelines			**max**		**100**			**5**										**-**	**0.59**			**1/9** [2]				**11.4**			
			average		**50**			**-**										**-**	**0.21**			**-**				**4**			
Discharge ID	**Figure #:**	**Sample Comment**	**Sample Date**																										
SW0412	7	clear	2021-08-10	140	6.52	0.073	0.054	0.595	0.583	11.3	10.4	<0.01	<0.01	<0.005	<0.005	25	25	<0.005	<0.005	31.7	31.7	0.28	0.12	0.132	0.0756	1.55	1.26	96	>250
(Tetayut Ck)		clear	2021-08-17	140	6.23	0.055	0.051	0.791	0.659	11.2	10.2	<0.01	<0.01	<0.005	<0.005	30	30	<0.005	<0.005	31.1	32.2	0.37	0.17	0.154	0.0735	1.26	1.03	210	>250
		clear	2021-08-24	119	6.05	0.053	0.048	0.613	0.542	9.83	8.78	<0.01	<0.01	<0.005	<0.005	23	22	0.0075	<0.005	31.2	30.7	0.33	0.18	0.113	0.0495	1.08	0.598	230	>300
		clear	2021-08-31	113	6.25	0.043	0.045	0.56	0.541	9.3	9.44	<0.01	<0.01	<0.005	<0.005	21	24	<0.005	<0.005	29.8	32	0.3	0.17	0.107	0.0558	0.869	0.647	550	>300
		clear	2021-09-07	165	209	0.092	0.096	0.552	0.633	10.4	12.3	<0.01	<0.01	<0.005	<0.005	46	47	0.0058	0.006	28	30.3	0.42	0.57	0.125	0.163	1.39	1.61	64	>300
		clear	2021-10-12	106	7.08	0.079	0.083	0.506	0.434	10.6	10.1	<0.01	<0.01	<0.005	<0.005	32	30	<0.005	<0.005	29.8	29.6	0.28	0.14	0.129	0.0675	1.31	1.01	170	>600
		turbid, raining	2021-10-20	387	8.81	0.132	0.094	0.604	0.494	13.8	10.4	0.012	<0.01	<0.01	<0.005	24	23	0.0068	<0.005	30.9	29.6	0.92	0.31	0.422	0.232	2.68	1.8	270	>2000
		turbid, raining	2021-10-26	564	14.5	0.175	0.179	0.561	0.611	18.4	16.1	0.015	<0.01	<0.01	<0.005	98	91	0.011	<0.005	34.8	36.4	*1.14*	0.43	0.298	0.121	3.16	2.2	380	>3200
		turbid brown	2021-11-03	785	22.7	0.17	0.147	0.659	0.553	18.5	14.2	0.02	<0.01	<0.01	<0.005	33	32	0.0111	<0.005	27.1	25.7	*1.26*	0.33	0.362	0.149	4.29	2.89	150	>3500
		turbid, heavy rain previous	2021-11-09	1470	21.4	0.17	0.158	0.751	0.488	22.4	14.7	0.035	<0.01	<0.01	<0.005	63	57	0.0258	0.0074	25.1	25.5	*2.19*	0.23	0.667	0.166	5.1	2.54	900	>3600
SW0441	1	clear, back flooded	2020-12-07	405	313	0.155	0.162	0.526	0.596	12.2	12.9	0.011	<0.01	<0.01	<0.005	26	28	0.12	0.125	27.6	28.3	*1.09*	0.82	0.328	0.266	3.69	4.51		
(Reay Ck)		amber	2020-12-16	1040		0.114		0.691		13.4		0.019		<0.01		30		0.0149		19.9		*1.46*		0.427		4.82		52	>300
		clear	2021-04-29	344		0.144		0.598		13.3		0.01		<0.01		34		0.122		32.2		*1.09*		0.271		4.24		7	>500
		clear	2021-07-19	90		0.119		0.978		10.9		<0.01		<0.005		199		0.0333		49.3		0.28		0.151		2.65		600	85
		clear	2022-03-11	96.7		0.101		0.402		10.4		<0.01		<0.005		50		0.0394		35.6		0.39		0.138		2.12		6	>800
SW0444	11	clear	2022-03-10	185		0.266		0.566		13.8		<0.01		<0.005		23		0.0063		40.5		0.42		0.151		3.36		<1	<1
SW0445	11	clear	2020-07-13	391		0.194		0.787		23.9		<0.01		<0.01		54		0.017		56		0.81		0.223		8.65		61	1
SW0458	12	clear	2020-09-29	24		<0.4		2.79		11.1		<0.2		<0.1		4360		<0.1		430		*<2*		<0.1		1.4		<1	12
SW3005	13	murky brown	2020-11-23	491		0.393		0.907		15.6		0.013		<0.01		35		0.0122		25.8		*1.05*		0.205		6.98		170	60
		clear	2021-04-29	504		0.244		0.75		16.9		0.012		<0.01		86		0.0288		51.2		3.57		0.529		6.03		32	>100
		amber	2022-03-15	835		0.417		0.952		18.6		0.023		<0.01		49		0.0182		32.4		*1.39*		0.328		8.26		<1	>500
SW3016	14	clear	2020-07-14	118		<0.4		1.89		24.7		<0.2		<0.1		2140		<0.1		198		*<2*		0.17		8.4		47000	18
		clear	2021-04-29	251		0.177		0.934		15.1		<0.01		<0.01		30		0.0257		41.7		*1.28*		0.27		5.2		42	16
		clear	2021-05-06	758		0.242		1.1		19.9		0.014		0.034		30		0.0464		40.9		*1.52*		0.864		9.21		<1	20
		clear	2021-07-13	414		0.33		1.11		13.2		0.01		0.024		54		0.0299		27		*0.85*		0.379		10.1		4800	5
		clear	2022-03-15	542		0.248		0.723		13.9		0.01		0.041		25		0.0289		25.3		1.08		0.27		7.15		3400	>120
SW3021	15	clear	2020-11-23	923		0.183		0.548		18.9		0.018		<0.01		43		0.0107		22.3		*1.24*		0.305		6.24		7	13
		clear	2021-05-06	204		0.106		0.592		19.1		<0.01		<0.01		126		0.01		52.6		0.51		0.339		4.56		52	30
		amber	2021-07-13	105		0.079		0.499		17.5		<0.01		<0.01		252		0.0051		55		0.23		0.298		2.15		310	2
SW3077	23	clear, construction nearby	2020-07-16	5950		0.171		1.7		35.3		0.191		0.042		127		0.223		50		*9.13*		4.58		43.2		3100	8
		clear	2021-05-06	156		0.133		0.592		10.1		<0.01		<0.01		161		0.0082		42.3		0.43		0.169		4.21		32	1
		brown, heavy rain	2022-03-17	1910		0.161		1.16		17.9		0.035		0.016		22		0.021		20.9		*2.96*		0.716		7.26		94	6
SW3118	31	clear	2020-11-23	1310		0.113		0.729		14.6		0.026		<0.01		30		0.0087		20.4		*1.94*		0.428		4.54		20	15
SW3133	35	clear	2020-08-11	18.7	55	0.051	0.055	0.545	0.818	5.05	6.92	<0.01	<0.01	<0.005	<0.005	21	20	<0.005	0.0057	28.3	29.7	0.11	0.24	0.0592	0.103	0.707	0.871	15	>2000
	35	amber	2020-08-18	22.7	2.64	0.053	0.026	0.714	0.583	5.71	5.09	<0.01	<0.01	<0.005	<0.005	15	21	<0.005	<0.005	28	29.2	<0.1	<0.1	0.061	0.0331	0.684	0.593	31	>2000
		clear	2020-08-25	19.8	2.02	0.052	0.044	0.522	0.513	5.07	4.79	<0.01	<0.01	<0.005	<0.005	20	17	<0.005	<0.005	28	27.9	0.12	<0.1	0.0634	0.0464	0.63	0.553	2	>2000
		clear	2020-09-01	12.9	1.39	<0.02	<0.02	0.424	0.379	5.27	5.32	<0.01	<0.01	<0.005	<0.005	17	16	<0.005	<0.005	27.6	28.5	<0.1	<0.1	0.0512	0.0402	0.481	0.442	7	>2000
		clear	2020-09-08	21.8	2.74	0.041	0.041	0.476	0.449	5.2	5.08	<0.01	<0.01	<0.01	<0.005	19	18	0.0118	0.0205	28.8	28.4	0.11	<0.1	0.056	0.0405	0.69	0.804	26	>2000
		murky brown	2020-09-24	289	10.6	0.245	0.283	0.652	0.57	8	6.32	<0.01	<0.01	<0.01	<0.005	24	23	0.0074	<0.005	15.1	15.2	0.69	0.24	0.218	0.0514	3.71	2.7	1500	>2500
		brown	2020-10-13	539	25.6	0.21	0.191	0.678	0.532	10.6	6.83	0.011	<0.01	<0.01	<0.005	20	21	0.0082	<0.005	17.3	16.5	0.98	0.29	0.318	0.0721	4.04	2.78	1000	>2000
		clear	2020-10-20	91	11.5	0.135	0.129	0.479	0.469	10.4	9.67	<0.01	<0.01	<0.01	<0.005	26	25	0.0059	<0.005	26.6	28.1	0.32	0.25	0.105	0.0629	2.85	2.35	29	>2000
		clear	2020-10-27	64.6	8.41	0.085	0.094	0.356	0.333	8.99	8.59	<0.01	<0.01	<0.01	<0.005	25	25	<0.005	<0.005	28.8	30.1	0.28	0.21	0.082	0.0583	1.91	1.84	40	>2000
		amber	2020-11-04	673	26.5	0.157	0.157	0.593	0.484	12.6	9.02	0.017	<0.01	<0.01	<0.005	23	25	0.0059	<0.005	21.4	21.4	*1.1*	0.33	0.272	0.0686	4.73	3.45	1300	>2000
		clear	2020-11-12	66.4	10.3	0.119	0.106	0.37	0.373	10.4	10	<0.01	<0.01	<0.01	<0.005	24	25	<0.005	<0.005	31	30.7	0.3	0.22	0.08	0.066	2.35	1.95	8	>2000
SW3135	35	clear	2020-11-26	11.7		0.128		0.197		15.9		<0.01		<0.005		35		0.0759		53.1		<0.1		0.0547		2.28		1	3
SW3136	35	clear	2020-11-26	293		0.137		0.558		10.6		<0.01		<0.01		31		0.0069		38.2		0.56		0.266		1.95		56	80

Table 5, cont'd

			Aluminum		Antimony		Arsenic		Barium		Beryllium		Bismuth		Boron		Cadmium		Calcium		Chromium		Cobalt		Copper		E. Coli	Flow Rate
			TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	NoRs	NoRs
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	CFU/100 mL	L/min
Marine Aquatic Life Guidelines		**max**		**-**			**12.5** [1]										**0.12**				**-**				**3**			
		average		**-**			**-**										**-**	**-**			**-**				**2**			
Freshwater Aquatic Life Guidelines		**max**		**100**			**5**										**-**	**0.59**			**1/9** [2]				**11.4**			
		average		**50**			**-**										**-**	**0.21**			**-**				**4**			
Discharge ID	**Figure #:**	**Sample Comment**	**Sample Date**																									
SW3136A	35	murky brown	2020-11-26	589		0.198		0.41		17.8		<0.01		<0.01		24		0.0311		35.2		0.95		0.351		4.04		66	2
SW3136B	35	clear	2020-11-26	606		0.269		0.522		17.1		0.014		<0.01		38		0.0146		28.9		0.94		0.322		2.63		28	7
SW3138	36	murky	2020-11-26	79		0.246		0.545		10.2		<0.01		<0.005		19		0.0255		77.6		0.19		0.0751		3.14		22	35
		clear	2022-04-11	179		0.194		0.769		12.1		<0.01		<0.005		22		0.0163		53.9		0.76		0.153		3.51		23	40
SW3154	37	clear	2020-12-16	146		0.073		0.366		6.54		<0.01		<0.01		26		0.0057		19.4		0.33		0.177		2.13		13	>2000
		clear	2022-04-07	138		0.089		0.364		6.07		<0.01		<0.01		30		0.0051		18.6		0.34		0.25		1.99		18	>4000

Table 5, cont'd

				Iron		Lead		Lithium		Magnesium		Manganese		Mercury	Molybdenum		Nickel		Potassium		Selenium		Silicon		Silver	
				TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Marine Aquatic Life Guidelines			**max**	**-**	**-**	**140**								**-**											**3**	
			average	**-**	**-**	**2**								**0.002- 0.01** [3]											**1.5**	
Freshwater Aquatic Life Guidelines			**max**	**1000**	**350**	**81.6**								**-**											**0.1**	
			average	**-**	**-**	**6.5**								**0.002- 0.01** [3]											**0.05**	
Discharge ID	**Figure #:**	**Sample Comment**	**Sample Date**																							
SW0412	7	clear	2021-08-10	272	84.7	0.0695	0.0107	0.64	0.54	12.8	13.2	56.2	47.2		1.04	1.03	0.562	0.4	1.77	1.83	0.072	0.068	9500	9270	<0.005	<0.005
(Tetayut Ck)		clear	2021-08-17	300	83.1	0.071	0.0092	0.95	0.78	13.7	14.2	56.2	49.1		0.977	0.85	0.502	0.348	1.88	2	0.068	0.058	10300	10000	<0.005	<0.005
		clear	2021-08-24	252	83.3	0.0573	0.0073	0.69	0.63	12.8	12.6	48.7	39.1		0.697	0.683	0.453	0.235	1.52	1.49	0.067	0.063	10300	9830	<0.005	<0.005
		clear	2021-08-31	253	84.9	0.0617	0.0091	0.59	0.77	12.4	13.5	43.8	35.8		0.613	0.647	0.373	0.247	1.45	1.58	0.05	0.057	9440	10400	<0.005	<0.005
		clear	2021-09-07	281	368	0.0874	0.11	0.93	1.03	11.9	13	36.7	57.4		0.916	0.945	0.501	0.647	1.72	1.91	0.066	0.069	9440	9810	<0.005	<0.005
		clear	2021-10-12	271	79.5	0.0499	0.0088	0.75	0.75	11.9	11.4	38.8	0.862	<0.0019	0.845	0.874	0.564	0.45	2.17	2.16	0.053	0.061	8610	8250	<0.005	<0.005
		turbid, raining	2021-10-20	620	96	0.387	0.0723	0.95	0.68	12	11.5	61	31.3	<0.0019	1.09	1.02	1.16	0.723	2.92	2.8	0.073	0.06	8510	7200	<0.01	<0.005
		turbid, raining	2021-10-26	671	110	0.353	0.0415	3.75	3.17	30.7	27	39.1	18.7	0.0029	1.1	1.19	1.11	0.733	9.89	8.52	0.08	0.088	6720	6360	<0.01	<0.005
		turbid brown	2021-11-03	842	114	0.347	0.0437	1.07	0.53	9.55	9.21	27.3	11.7	0.0025	0.859	0.83	1.63	0.796	4.39	4.3	0.114	0.12	6660	5200	0.011	<0.005
		turbid, heavy rain previous	2021-11-09	1590	104	0.912	0.0519	2.77	1.52	17.2	16.5	45	17.4	<0.0019	0.952	0.999	2.12	0.699	6.66	6.5	0.099	0.093	7070	4970	0.012	<0.005
SW0441	1	clear, back flooded	2020-12-07	638	488	0.525	1.29	1.17	1.11	11.7	12	60.7	62.4		1.97	1.89	1.25	1.11	1.42	1.53	0.107	0.116	7130	7110	<0.01	0.013
(Reay Ck)		amber	2020-12-16	957		0.387		1.04		7.43		45.5			1.45		1.91		1.97		0.135		6750		<0.01	
		clear	2021-04-29	574		0.488		1.3		12.7		70.8			3.36		1.24		1.67		0.1		6320		<0.01	
		clear	2021-07-19	346		0.112		7.01		53.5		127			4.33		0.813		15.5		0.09		7530		0.0062	
		clear	2022-03-11	329		0.118		1.71		18.1		70.9			2.64		0.774		2.93		0.096		6440		<0.005	
SW0444	11	clear	2022-03-10	129		0.0903		1.75		23.7		8.39			1.77		1.27		1.57		0.116		7400		0.0051	
SW0445	11	clear	2020-07-13	328		0.175		3.18		36.3		9.42			5.56		1.74		2.59		0.321		8460		<0.01	
SW0458	12	clear	2020-09-29	<20		<0.1		165		1300		1.3			12.7		0.47		404		<0.8		1770		<0.1	
SW3005	13	murky brown	2020-11-23	415		0.477		1.38		8.1			26			2.7	1.46		1.96		0.103		5090		<0.01	
		clear	2021-04-29	641		1.14		4.78		34.3			62			6.79	13.7		4.48		0.111		8040		0.012	
		amber	2022-03-15	700		0.792		2.04		15			21			3.33	2.09		2.83		0.14		7570		0.011	
SW3016	14	clear	2020-07-14	271		0.71		79		558			61			5.5	1.47		172		<0.8		4110		<0.1	
		clear	2021-04-29	669		0.276		1.39		15.2			43			3.06	4.6		1.04		0.074		6250		<0.01	
		clear	2021-05-06	1890		0.976		1.42		15.1			166			2.23	3		1.04		0.08		6820		<0.01	
		clear	2021-07-13	502		0.298		3.83		15.2			38.3			0.889	2.29		3.36		0.118		10100		0.015	
		clear	2022-03-15	637		0.601		1.23		9.26			33			1.26	1.94		1.22		0.085		6490		<0.01	
SW3021	15	clear	2020-11-23	912		0.396		1.17		8.36			54.5			0.8	2.19		3.24		0.097		6650		0.011	
		clear	2021-05-06	1060		0.329		0.86		18.6			347	<0.0019		2.86	2.03		2.91		0.091		6450		<0.01	
		amber	2021-07-13	483		0.164		1.06		25.2			561	<0.0019		3.23	1.47		3.77		0.087		8690		<0.01	
SW3077	23	clear, construction nearby	2020-07-16	10100		4.83		8.47		19.8			256			2.31	10.1		7.67		0.162		14500		0.089	
		clear	2021-05-06	179		0.087		2.42		18			9.58	0.002		1.21	1.14		3.19		0.09		9440		<0.01	
		brown, heavy rain	2022-03-17	2060		0.969		1.75		6.72			51.1			0.79	2.48		1.33		0.068		6930		0.018	
SW3118	31	clear	2020-11-23	1220		0.337		1.39		6.92			18.4			0.316	1.68		1.57		0.066		9330		<0.01	
SW3133	35	clear	2020-08-11	54.9	131	0.0207	0.069	0.58	0.59	10.5	10.5	48	32	<0.0019	0.423	0.378	0.358	0.446	1.23	1.32	0.041	0.051	9350	10700	<0.005	<0.005
	35	amber	2020-08-18	59.8	12.9	0.0221	<0.005	0.58	0.71	10.8	11.5	14.2	43.4	<0.0019	0.38	0.427	0.381	0.329	1.14	1.14	<0.04	<0.04	11100	10800	<0.005	<0.005
		clear	2020-08-25	53.2	18	0.0173	<0.005	0.58	0.6	11	11.6	22.8	31.1	<0.0019	0.335	0.338	0.354	0.297	1.04	0.994	<0.04	0.044	10100	9190	<0.005	<0.005
		clear	2020-09-01	43.3	14.9	0.0066	<0.005	0.53	0.67	11.6	11.2	22.6	31	<0.0019	0.29	0.291	0.288	0.263	1.07	1.05	<0.04	<0.04	9740	11200	<0.005	<0.005
		clear	2020-09-08	56.6	12.9	0.022	0.0059	0.61	0.59	11.5	11.5	16.2	29.3		0.353	0.312	0.34	0.339	0.8	0.843	<0.04	<0.04	11400	11100	<0.01	<0.005
		murky brown	2020-09-24	521	77.1	0.258	0.0327	0.52	<0.5	4.63	4.64	0.599	60.4	<0.0019	0.564	0.578	0.75	0.489	2.65	2.71	0.045	0.049	4420	3890	<0.01	<0.005
		brown	2020-10-13	796	143	0.323	0.0422	0.57	<0.5	4.96	4.83	14.1	66		0.59	0.594	1.08	0.569	2.46	2.36	0.061	0.055	5610	4400	<0.01	0.01
		clear	2020-10-20	176	71.4	0.059	0.0092	<0.5	<0.5	8.56	8.19	5.91	14.3		0.615	0.61	0.75	0.667	2.41	2.38	0.075	0.078	7120	7100	<0.01	<0.005
		clear	2020-10-27	129	48.8	0.035	0.0071	0.53	0.56	9.15	9.72	6.45	10.8		0.463	0.448	0.69	0.628	1.95	2	0.057	0.064	8090	8170	<0.01	<0.005
		amber	2020-11-04	714	112	0.274	0.0344	0.71	<0.5	6.55	6.67	1.22	21.9		0.615	0.664	1.26	0.767	2.56	2.64	0.101	0.112	6640	5760	<0.01	<0.005
		clear	2020-11-12	155	66.1	0.043	0.0137	0.57	0.61	9.52	9.62	8.27	10.7		0.505	0.505	0.75	0.669	2.06	2.12	0.078	0.067	7700	7350	<0.01	<0.005
SW3135	35	clear	2020-11-26	12.6		0.0757		<0.5		14.6			0.393			0.481	0.59		0.804		0.104		7700		<0.005	
SW3136	35	clear	2020-11-26	354		0.199		<0.5		10.3			19.4			0.609	1.3		1.39		0.073		6990		<0.01	

Table 5, cont'd

				Iron		Lead		Lithium		Magnesium		Manganese		Mercury	Molybdenum		Nickel		Potassium		Selenium		Silicon		Silver	
				TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Marine Aquatic Life Guidelines			**max**	**-**	**-**	**140**								**-**											**3**	
			average	**-**	**-**	**2**								**0.002- 0.01** [3]											**1.5**	
Freshwater Aquatic Life Guidelines			**max**	**1000**	**350**	**81.6**								**-**											**0.1**	
			average	**-**	**-**	**6.5**								**0.002- 0.01** [3]											**0.05**	
Discharge ID	**Figure #:**	**Sample Comment**	**Sample Date**																							
SW3136A	35	murky brown	2020-11-26	684		0.761		<0.5		9.46			17.3			0.195	2.27		0.82		0.062		8050		<0.01	
SW3136B	35	clear	2020-11-26	646		0.353		<0.5		7.14			12.1			0.36	0.89		1.48		0.079		6150		<0.01	
SW3138	36	murky	2020-11-26	50.5		0.0444		1.1		14.1			1.07			3.01	1.95		1.06		0.276		6720		<0.005	
		clear	2022-04-11	142		0.0878		0.77		12.2			4.69			1.73	1.3		1.27		0.189		7710		0.0061	
SW3154	37	clear	2020-12-16	316		0.214		<0.5		3.98			21.5			0.278	0.79		1.03		0.076		4210		<0.01	
		clear	2022-04-07	447		0.238		<0.5		3.73			33.3			0.253	0.8		0.97		0.066		3460		<0.01	

Table 5, cont'd

				Sodium		Strontium		Sulfur		Thallium		Tin		Titanium		Uranium		Vanadium		Zinc		Zirconium	
				TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
				mg/L	mg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Marine Aquatic Life Guidelines			**max**																	**55**			
			average																	**10**			
Freshwater Aquatic Life Guidelines			**max**																	**40.5**			
			average																	**15**			
Discharge ID	**Figure #:**	**Sample Comment**	**Sample Date**																				
SW0412	7	clear	2021-08-10	16.6	17.1	131	133	5.7	6	<0.002	<0.002	<0.2	<0.2	7.12	<0.5	0.186	0.185	2.14	1.81	2.35	0.49	0.11	<0.1
(Tetayut Ck)		clear	2021-08-17	26.4	26.9	143	131	6	5.7	0.002	<0.002	<0.2	<0.2	9.19	0.53	0.18	0.166	2.28	1.9	6.65	0.43	0.24	<0.1
		clear	2021-08-24	15	14.7	125	124	5.8	4.8	<0.002	<0.002	<0.2	<0.2	4.48	<0.5	0.166	0.159	1.88	1.52	3.34	0.39	0.14	<0.1
		clear	2021-08-31	14.1	15.5	116	127	4.8	5.6	0.003	<0.002	<0.2	<0.2	4.46	<0.5	0.163	0.175	1.85	1.77	2.29	0.39	<0.1	<0.1
		clear	2021-09-07	17.5	19.2	122	137	5.6	5.3	<0.002	<0.002	<0.2	<0.2	7.08	7.84	0.141	0.147	1.86	2.27	4.53	2.49	0.58	<0.1
		clear	2021-10-12	17.7	17.4	125	130	6.3	5	<0.002	<0.002	<0.2	<0.2	4.78	<0.5	0.146	0.146	1.15	0.92	2.18	0.61	<0.1	<0.1
		turbid, raining	2021-10-20	18.4	17.7	134	122	5.8	6.1	0.0026	<0.002	<0.2	<0.2	16.1	0.6	0.149	0.137	1.66	0.97	4.8	1.67	0.16	<0.1
		turbid, raining	2021-10-26	189	155	272	250	22.7	19.1	<0.002	<0.002	<0.2	<0.2	25.8	0.87	0.164	0.136	1.98	1.26	5.2	1.88	0.32	0.12
		turbid brown	2021-11-03	13.9	13.6	115	112	5.9	6.5	0.0045	0.0023	<0.2	<0.2	31.9	2.01	0.0869	0.0732	2.74	1.27	7.4	2.6	0.39	0.14
		turbid, heavy rain previous	2021-11-09	91	86.3	174	166	12.4	11.6	0.0063	<0.002	<0.2	<0.2	53.2	1.54	0.119	0.076	4.09	1.06	11.7	2.39	0.32	0.14
SW0441	1	clear, back flooded	2020-12-07	25.5	27.9	130	129	6.2	7.1	0.0029	0.0028	<0.2	<0.2	17.1	13.3	0.423	0.44	1.65	1.51	15.9	22.4	0.2	0.24
(Reay Ck)		amber	2020-12-16	16.7		89.7		4.2		0.0043		<0.2		43.3		0.15		2.82		11.4		0.63	
		clear	2021-04-29	34		155		6.7		0.0032		<0.2		12.3		0.387		1.74		10.2		<0.1	
		clear	2021-07-19	376		451		39.5		0.0025		<0.2		4.44		0.664		1.61		2.58		0.76	
		clear	2022-03-11	72.4		202		11.1		0.0022		<0.2		3.97		0.435		0.96		5.89		<0.1	
SW0444	11	clear	2022-03-10	39		186		10.9		<0.002		<0.2		9.28		0.661		1.6		8.78		0.14	
SW0445	11	clear	2020-07-13	66.6		261		19.7		0.0042		<0.2		20.4		1.55		2.94		10.8		0.28	
SW0458	12	clear	2020-09-29	10900		9030		1060		<0.04		<4		<10		3.28		<4		<2		<2	
SW3005	13	murky brown	2020-11-23	16.6		125		7.2		0.0034		<0.2		23.8		0.368		2.26		14.5		0.25	
		clear	2021-04-29	126		305		21.7		0.0046		<0.2		19.8		1.23		2.57		20.3		0.22	
		amber	2022-03-15	41.7		166		9.7		0.0059		<0.2		29.6		0.519		2.85		14.7		0.42	
SW3016	14	clear	2020-07-14	4690		4080		432		<0.04		<4		<10		1.32		<4		17.6		<2	
		clear	2021-04-29	43.8		172		6.8		0.0028		<0.2		10.2		0.353		1.3		9.1		<0.1	
		clear	2021-05-06	45.9		172		6.9		0.005		<0.2		31.7		0.382		3.21		22.1		0.24	
		clear	2021-07-13	27.2		108		5		0.0042		<0.2		16		0.331		2.92		16.4		0.61	
		clear	2022-03-15	24.1		100		4.7		0.0038		<0.2		20.1		0.143		1.82		13		0.2	
SW3021	15	clear	2020-11-23	15.5		106		4.3		0.0048		<0.2		38.7		0.128		2.4		5		0.61	
		clear	2021-05-06	22.4		214		9.9		0.003		<0.2		8.4		0.682		1.09		3.2		0.15	
		amber	2021-07-13	35.1		259		12.9		<0.002		<0.2		4.2		0.726		0.54		3.1		<0.1	
SW3077	23	clear, construction nearby	2020-07-16	28.8		356		7.8		0.0134		0.21		121		0.288		18.7		52.3		0.52	
		clear	2021-05-06	40.6		268		10.4		0.0023		<0.2		6.9		0.379		1.72		3.4		0.11	
		brown, heavy rain	2022-03-17	10.2		114		3.6		0.0081		<0.2		86.7		0.165		5.63		11.4		1.2	
SW3118	31	clear	2020-11-23	11.6		87.1		4		0.0047		<0.2		61.9		0.0952		4.11		12.9		0.43	
SW3133	35	clear	2020-08-11	11.9	11.8	110	122	3.9	4.2	<0.002	<0.002	<0.2	<0.2	1.11	0.66	0.122	0.143	1.05	1.3	0.44	1.01	<0.1	<0.1
	35	amber	2020-08-18	11.8	12.5	122	111	3.5	3.7	<0.002	<0.002	<0.2	<0.2	1.15	<0.5	0.138	0.139	1.51	0.97	0.81	0.54	<0.1	<0.1
		clear	2020-08-25	12.5	13.2	115	108	4.1	4.1	<0.002	<0.002	<0.2	<0.2	0.82	<0.5	0.138	0.121	0.89	0.88	0.46	0.24	<0.1	<0.1
		clear	2020-09-01	12.8	12.1	106	114	3.6	4	<0.002	<0.002	<0.2	<0.2	<0.5	<0.5	0.123	0.122	0.82	0.79	0.2	0.2	<0.1	<0.1
		clear	2020-09-08	12.9	12.5	117	111	4.2	3.8	<0.002	<0.002	<0.2	<0.2	<2	<0.5	0.128	0.127	0.87	0.82	<1	0.97	<0.1	<0.1
		murky brown	2020-09-24	7.83	8.01	60	58.5	3.9	3.9	0.0021	0.0026	<0.2	<0.2	12.4	0.91	0.0276	0.0182	2.19	1.58	3.6	1.13	0.26	<0.1
		brown	2020-10-13	8.3	8.3	70.5	67.1	5.1	5.2	<0.002	<0.002	<0.2	<0.2	24	2.66	0.0592	0.0345	2.54	1.55	4.3	1.27	0.23	0.12
		clear	2020-10-20	12	11.5	112	124	9.3	8.8	<0.002	<0.002	<0.2	<0.2	3.8	0.68	0.0825	0.0712	1.21	1.01	1.9	0.85	0.18	0.14
		clear	2020-10-27	12.1	12.9	121	130	10.2	9.2	<0.002	<0.002	<0.2	<0.2	2.6	<0.5	0.119	0.118	0.85	0.73	1.2	1	0.11	<0.1
		amber	2020-11-04	9.3	9.86	98.6	99.6	6.6	6.9	0.0038	0.0023	<0.2	<0.2	28.2	2.25	0.0719	0.0481	2.47	1.2	4.7	1.39	0.25	0.17
		clear	2020-11-12	13	13.2	136	138	10.5	10.2	<0.002	<0.002	<0.2	<0.2	2.8	0.71	0.114	0.112	0.77	0.69	1.9	0.99	<0.1	0.11
SW3135	35	clear	2020-11-26	12.8		215		13.8		<0.002		<0.2		<0.5		0.0306		0.46		31.6		<0.1	
SW3136	35	clear	2020-11-26	12.5		133		6.7		<0.002		<0.2		10.2		0.121		1.28		2		<0.1	

Table 5, cont'd

				Sodium		Strontium		Sulfur		Thallium		Tin		Titanium		Uranium		Vanadium		Zinc		Zirconium	
				TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS
				mg/L	mg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Marine Aquatic Life Guidelines			**max**																	**55**			
			average																	**10**			
Freshwater Aquatic Life Guidelines			**max**																	**40.5**			
			average																	**15**			
Discharge ID	**Figure #:**	**Sample Comment**	**Sample Date**																				
SW3136A	35	murky brown	2020-11-26	11.1		147		4.3		0.0021		<0.2		25.3		0.0338		2.2		15.4		<0.1	
SW3136B	35	clear	2020-11-26	9.86		119		5		<0.002		<0.2		26.1		0.0645		2.24		4.4		0.13	
SW3138	36	murky	2020-11-26	14.8		197		29.8		0.0041		<0.2		2.26		0.419		0.29		1.53		<0.1	
		clear	2022-04-11	17.5		181		9.9		<0.002		<0.2		6.32		0.264		2.04		2.56		<0.1	
SW3154	37	clear	2020-12-16	7.4		62.7		5		<0.002		<0.2		6.8		0.0317		0.85		3.4		0.11	
		clear	2022-04-07	7.42		63.6		4.2		<0.002		<0.2		4.6		0.0309		0.99		2.6		<0.1	

Table notes on next page.

Table 5, cont'd

Notes:

TOT = total state; DIS = dissolved state

British Columbia approved and working water quality guidelines for protection of freshwater or marine aquatic life were used for comparison

Although aquatic life guidelines would not apply to stormdrains, as they are not viable habitat for aquatic life, these comparisons indicate potential impacts to the marine environment

a hardness of 100 mg/L CaCO3 was used to calculate hardness dependant water quality parameters

1 Interim guideline

2 Cr (IV) / Cr (III)

3 guideline If methylmercury is 5% of the total mercury; methyl mercury was not measured in these samples

xx	value exceeds the provincial guideline for protection of freshwater aquatic life
xx	value exceeds the provincial guideline for protection of marine aquatic life
xx	value exceeds the provincial guideline for the marine and freshwater aquatic life
xx	italicized value exceeds a guideline which is only partially applicable. Further investigation is needed.

Table 6. 2021 Stormwater Aqueous Polycyclic Aromatic Hydrocarbon Data from Saanich Peninsula

				1-Methyl-naphthalene	2-Methyl-naphthalene	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benzo(B) Fluoranthene + Benzo(J) Fluoranthene	Benzo(K) Fluoranthene	Benzo(A) Anthracene	Benzo(A)pyrene	Benzo(G,H,I)-perylene	Chrysene	Dibenzo(A,H) Anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-C,D)Pyrene	Naphthalene	Phenanthrene	Pyrene	Quinoline	High Molecular Weight PAH's	Low Molecular Weight PAH's	Total PAH
Guidelines			Freshwater	1	1	6						0.1	0.01				4	12		1	0.3	0.02 [1]				
			Marine			6							0.01		0.1			12		1						
Stormwater Discharge	Figure #	Sample Comment	Sample Date																							
405	4	organic odour, amber	2022-03-22	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
411	6	clear	2022-03-11	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
411a	6	clear	2022-03-11	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
420	7	clear	2022-03-11	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
426	9	clear	2022-03-11	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
430B	10	amber	2022-03-11	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
432	10	clear	2022-03-11	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
441	10	amber	2020-12-16	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
441	10	clear	2022-03-11	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
444	11	clear	2022-03-10	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
445	11	clear	2020-07-13	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
446	11	clear	2022-03-10	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
447	11	clear	2022-03-10	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
448	11	amber	2022-03-10	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
449	11	murky brown	2022-03-10	<0.05	<0.1	0.071	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	0.029	<0.05	<0.05	0.14	0.13	<0.02	<0.071	<0.05	0.34	0.37
449A	11	clear	2022-03-10	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
450	11	murky	2022-03-10	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
458	12	clear	2020-09-29	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
459	12	clear	2022-03-14	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
462	12	clear	2022-03-14	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
464	12	clear	2022-03-14	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
467	12	clear	2022-03-14	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
467	12	amber,	2022-03-22	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3005	13	murky	2020-11-23	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01		<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3005	13	amber	2022-03-15		<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3016	14	clear	2020-07-14	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01		<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3016	14	clear	2021-05-06	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01		<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3016	14	clear	2021-07-13		<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3016	14	clear	2022-03-15		<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3021	15	clear	2021-05-06	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01		<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3021	15	slight amber,	2021-07-13		<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3077	23	clear	2020-07-16	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01		<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3077	23	clear	2021-05-06	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01		<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3077	23	brown, heavy rain	2022-03-17		<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3138	36	murky	2020-11-26	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01		<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3139	36	clear	2022-04-11	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1
3154	37	clear	2022-04-07	<0.05	<0.1	<0.05	<0.05	<0.05	<0.01	<0.03	<0.05	<0.01	<0.005	<0.05	<0.02	<0.003	<0.02	<0.05	<0.05	<0.1	<0.05	<0.02	<0.02	<0.05	<0.1	<0.1

Table notes on next page.

Table 6, cont’d

Notes:

Concentrations are in µg/L

PAH = polycyclic aromatic hydrocarbons

HMW = High Molecular Weight, LMW = Low Molecular Weight

Guidelines are BC ENV for protection of aquatic life maximums. The freshwater guideline is a chronic guideline.

The guideline for methylated naphthalene was used for 1-methylnaphthalene and 2-methylnaphthalene

[1] The guideline for pyrene is based on a phototoxic exposure

No values exceeded a guideline

APPENDIX F

2021 WATERCOURSE MONITORING DATA

Table 1. 2021 Tetayut Watercourse Monitoring Data

Station	BC ENV FW Aquatic Life Guidelines	parameter	Alkalinity	Aluminum	Aluminum	Antimony	Antimony	Arsenic	Arsenic	Barium	Barium	Beryllium	Beryllium	Bismuth	Bismuth	Boron	Boron
		state	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT
		unit	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
		max		100			20 1		5		5,000 1		0.13 1				1,200
		mean		50							1,000 1						
SW0412	summer	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Jovi Road		%nd	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	0%	0%
		min	110	6.05	113	0.045	0.043	0.541	0.552	9.3	8.78	0.01	0.01	0.005	0.005	22	21
		max	130	**209**	165	0.096	0.092	0.659	0.791	11.3	12.3	0.01	0.01	0.005	0.005	47	46
		mean	120	47	135	0.0588	0.063	0.5916	0.62	10.4	10.2	0.01	0.01	0.005	0.005	29.6	29
		sd	6	81	18	0.019	0.017	0.048	0.09	0.77	1.2	0.00	0.00	0.00	0.00	9.09	9
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	100%	100%	100%	0%	0%
		min	66	7.08	106	0.083	0.079	0.434	0.506	10.6	10.1	0.01	0.01	0.005	0.005	23	24
		max	110	22.7	1470	0.179	0.175	0.611	0.751	22.4	16.1	0.035	0.01	0.005	0.01	91	98
		mean	86.8	15	662.4	0.1322	0.15	0.516	0.616	16.7	13.1	0.02	0.01	0.005	0.009	46.6	50
		sd	17	6	461	0.037	0.04	0.061	0.084	4.1	2.41	0.01	0.00	0.00	0.00	25	27
SW0412-2B	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Cooperidge Dr.		%nd	0%	0%	0%	0%	0%	0%	0%	0%	0%	60%	100%	100%	80%	0%	0%
		min	30	6.07	43.1	0.11	0.115	0.436	0.444	9.76	8.92	0.01	0.01	0.005	0.005	23	24
		max	83	23.4	2540	0.301	0.541	0.528	1.28	27.1	15.4	0.043	0.01	0.005	0.02	168	171
		mean	57	17.4	742	0.20	0.26	0.49	0.69	17.7	12.5	0.017	0.01	0.005	0.01	61	62
		sd	17	6.7	909	0.06	0.15	0.04	0.30	5.5	2.75	0.01	0.00	0.00	0.00	55	56
SW0412-2C	summer	n	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Tetayut Crk, E. Saanich Rd. fish ladder.		%nd	0%	0%	0%	40%	20%	0%	0%	0%	0%	80%	80%	80%	80%	0%	0%
		min	110	1.7	20	0.02	0.02	0.318	0.31	7.95	7.94	0.01	0.01	0.005	0.005	17	17
		max	120	46.8	40	0.045	0.041	0.4	0.4	8.5	9.5	0.01	0.01	0.005	0.01	65	66
		mean	115	13.1	29	0.03	0.03	0.4	0.4	8.1	8.4	0.01	0.01	0.005	0.01	30	30
		sd	5	19	7	0.01	0.01	0.0	0.0	0.2	0.6	0.00	0.00	0.000	0.00	20	21
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	0%	0%	0%	0%	0%	0%	0%	0%	0%	80%	100%	100%	100%	0%	0%
		min	57	3.88	41.4	0.04	0.042	0.337	0.346	8.63	8.49	0.01	0.01	0.005	0.005	24	25
		max	110	19.1	950	0.194	0.29	0.444	0.649	21	13.8	0.019	0.01	0.005	0.01	40	39
		mean	75	11.6	451	0.131	0.17	0.386	0.50	15	11.54	0.01	0.01	0.005	0.01	32	32.6
		sd	19	5	298	0.05	0.08	0.035	0.11	4	2	0.00	0.00	0.00	0.00	5	5

Table 1, cont'd

Station	BC ENV FW Aquatic Life Guidelines	parameter	Cadmium	Cadmium	Calcium	Calcium	Chloride	Chromium	Chromium	Cobalt	Cobalt	Sp. Conductivity 25°C.	Copper	Copper	Oxygen
		state	DIS	TOT	DIS	TOT	DIS	DIS	TOT	DIS	TOT	NA	DIS	TOT	DIS
		unit	µg/L	µg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µS/cm	µg/L	µg/L	mg/L
		max	0.36 [2]						1 / 8.9 [1,3]		110		1.6-13.3 [4]		5 [5]
		mean	0.15 [2]								4		0.2-21 [4]		8 [5]
SW0412	summer	n	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Jovi Road		%nd	80%	60%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	0.005	0.005	30.3	28	22	0.12	0.28	0.0495	0.107	330.1	0.598	0.869	7.82
		max	0.006	0.0075	32.2	31.7	46	0.57	0.42	0.163	0.154	428.6	1.61	1.55	9.09
		mean	0.005	0.00566	31.38	30	27.2	0.242	0.34	0.0835	0.1262	357.4	1.03	1.23	8.34
		sd	0.000	0.00	1	1	9	0.17	0.05	0.04	0.02	36.0	0.38	0.24	0.45
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	80%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	0.005	0.005	25.5	25.1	21	0.14	0.28	0.0675	0.129	294.3	1.01	1.31	8.68
		max	0.0074	0.0258	36.4	34.8	180	0.43	***2.19***	0.232	0.667	812	**2.9**	5.1	10.71
		mean	0.005	0.012	29.36	29.54	85	0.288	***1.16***	0.1471	0.376	495.7	**2.1**	3.31	9.97
		sd	0.001	0.007	3.9	3.3	73.6	0.1	0.6	0.1	0.176	211.2	0.6	1.3	0.7
SW0412-2B	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Cooperidge Dr.		%nd	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	0.005	0.0061	12.5	14.3	17	0.2	0.29	0.0235	0.0924	134	**1.39**	1.67	8.01
		max	0.0134	0.0541	20.8	20.7	26	0.65	***7.81***	0.121	1.59	273.1	**4.33**	16.1	10.89
		mean	0.009	0.0199	17.54	18.1	20.2	0.37	***2***	0.08942	0.50	203.54	**3.26**	6.4	9.65
		sd	0.003	0.0175	2.7	2.2	3.7	0.2	3	0.035	0.55	50.6	1.00	5.0	0.95
SW0412-2C	summer	n	4	4	4	4	4	4	4	4	4	4	4	4	4
Tetayut Crk, E. Saanich Rd. fish ladder.		%nd	80%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	0.005	0.005	30	27.6	18	0.36	0.34	0.0307	0.048	326.5	0.161	0.326	8.83
		max	0.005	0.009	32	31	19	0.42	0.45	0.070	0.056	335	**0.607**	0.58	10.09
		mean	0.005	0.007	31	30	19	0.38	0.41	0.042	0.052	331	0.291	0.44	9.38
		sd	0.000	0.002	0.6	1.1	0.4	0.02	0.04	0.016	0.003	3.5	0.183	0.1	0.48
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	40%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	0.005	0.005	18.4	18.4	17	0.29	0.39	0.0247	0.051	200.4	0.457	0.614	9
		max	0.010	0.0377	28.5	29.2	35	0.46	***1.74***	0.106	0.605	317.3	**2.85**	5.6	11
		mean	0.007	0.015	23.5	24	22.2	0.35	***1.07***	0.074	0.284	257.5	**2.14**	3.5	10
		sd	0.002	0.012	4.0	4.1	6.6	0.1	0.5	0.028	0.182	44.8	0.88	1.6	1

Table 1, cont'd

Station	BC ENV FW Aquatic Life Guidelines	parameter	E.coli	Flow Rate	Hardness	Iron	Iron	Lead	Lead	Lithium	Lithium	Magnesium	Magnesium	Manganese	Manganese
		state	NA	NA	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT
		unit	CFU/100 mL	L/min	mg/L as $CaCO_3$	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L
		max	400 [6]			350	1,000		44.1 [7]	870 [1]				1219 [8]	
		mean	200 [6]						5.0 [7]					876 [8]	
SW0412	summer	n	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Jovi Road		%nd	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	64	250	119	83.1	252	0.0073	0.0573	0.54	0.59	12.6	11.9	35.8	36.7
		max	**550**	300	134	**368**	300	0.11	0.0874	1.03	0.95	14.2	13.7	57.4	56.2
		mean	**230**	280	128.4	141	272	0.03	0.069	0.75	0.76	13.3	12.7	45.72	48.32
		sd	172	24	5	114	18	0.04	0.010	0.17	0.15	0.5	0.6	7.6	7.5
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	150	600	107	79.5	271	0.0088	0.0499	0.53	0.75	9.21	9.55	0.862	27.3
		max	**900**	3600	213	114	**1590**	0.0723	0.912	3.17	3.75	27	30.7	31.3	61
		mean	**374**	2580	140.6	101	799	0.0436	0.410	1.33	1.86	15	16	16.0	42.24
		sd	275	1143	37	12	437	0.0205	0.279	0.98	1.19	6	8	9.9	11
SW0412-2B	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Cooperidge Dr.		%nd	0%	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%	0%	0%
		min	25	40	48.2	21.2	105	0.015	0.0814	0.5	0.53	1.77	3.05	0.597	23
		max	**1600**	450	68.3	154	**3300**	0.693	2.95	1.59	1.76	4.54	4.73	16.7	91.9
		mean	**416**	298	61.62	84	**1046**	0.176	1.31	0.8	1.1	3.68	4.0	9.2	39.96
		sd	599	152	7	47	1144	0.259	1.29	0.4	0.5	0.99	0.6	5	26
SW0412-2C	summer	n	4	4	4	4	4	4	4	4	4	4	4	4	4
Tetayut Crk, E. Saanich Rd. fish ladder.		%nd	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	0%	0%	0%
		min	22	200	118	14.4	56.5	0.005	0.0319	0.72	0.71	12.5	11.9	15.8	16.1
		max	130	250	132	109	72	0.049	0.05	1.06	1.03	13.7	13.4	23	21
		mean	66	218	127	38	66	0.016	0.04	0.86	0.86	13.2	12.8	18	19
		sd	41	20	5	41	6	0.019	0.01	0.12	0.12	0.5	0.5	3	2
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	0%	0%	0%	0%	0%	20%	0%	40%	0%	0%	0%	0%	0%
		min	20	350	69.3	9.5	66.4	0.005	0.0442	0.5	0.63	5.61	5.7	0.6	14.1
		max	320	2000	119	113	**1260**	0.0919	1.02	0.93	1.22	11.5	11.7	9.67	45.2
		mean	108	1210	91.6	52	584	0.0432	0.48	0.7	0.87	7.4	7.7	5.7	22.2
		sd	109	546	18	34	390	0.028	0.33	0.2	0.21	2.2	2.2	3.0	12

Table 1, cont'd

Station	BC ENV FW Aquatic Life Guidelines	parameter	Mercury	Molybdenum	Molybdenum	Nitrate as N	Nitrite as N	Nickel	Nickel	O. Carbon	Phosphorus	pH	Potassium	Potassium	Selenium	Selenium
		state	TOT	DIS	TOT	DIS	DIS	DIS	TOT	DIS	TOT	NA	DIS	TOT	DIS	TOT
		unit	µg/L	µg/L	µg/L	mg/L	mg/l	µg/L	µg/L	mg/L	µg/L	pH	mg/L	mg/L	µg/L	µg/L
		max		2,000		32.8	0.06	25 -110 [1,9]			10 [10]	6.5-9 [11]		373 - 432		2
		mean		1,000		3	0.02				5 [10]					
SW0412	summer	n		5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Jovi Road		%nd		0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min		0.647	0.613	0.954	0.005	0.235	0.373	1.9	**38**	7.59	1.49	1.45	0.057	0.05
		max		1.03	1.04	1.3	0.005	0.647	0.562	3.6	**52**	7.97	2	1.88	0.069	0.072
		mean		0.831	0.8486	1.16	0.005	0.375	0.4782	2.66	**45**	7.75	1.762	1.67	0.063	0.0646
		sd		0.15	0.17	0.15	0.000	0.15	0.06	0.63	6	0.12	0.20	0.16	0.005	0.008
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	60%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	0.0019	0.83	0.845	1.28	0.005	0.45	0.564	4.4	**65.4**	7.08	2.16	2.17	0.06	0.053
		max	0.0029	1.19	1.1	5.88	0.0289	0.796	2.12	7.7	**142**	7.68	8.52	9.89	0.12	0.114
		mean	0.0022	0.98	0.9692	**3.30**	0.015	0.680	1.3168	5.9	**107**	7.39	4.856	5.21	0.084	0.08
		sd	0.0	0.13	0.1	1.8	0.009	0.1	0.5	1.2	26	0.20	2.4	2.80	0.022	0.02
SW0412-2B	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Cooperidge Dr.		%nd	60%	0%	0%	0%	40%	0%	0%	0%	0%	0%	0%	0%	40%	20%
		min	0.0019	0.507	0.526	0.372	0.005	0.299	0.325	2	**79.2**	6.82	1.77	1.72	0.04	0.04
		max	0.0023	1.8	1.75	2.31	0.051	0.646	3.57	7.4	**170**	7.47	5.87	6.11	0.067	0.068
		mean	0.002	1.0	0.997	1.132	**0.023**	0.523	1.349	5.06	**111**	7.13	3.79	3.89	0.0506	0.0536
		sd	0.000	0.5	0.48	0.77	0.020	0.125	1.137	2.0	33	0.26	1.64	1.69	0.01	0.01
SW0412-2C	summer	n		4	4	4	4	4	4	4	4	4	4	4	4	4
Tetayut Crk, E. Saanich Rd. fish ladder.		%nd		0%	0%	0%	80%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min		0.314	0.293	2.27	0.005	0.098	0.114	0.53	**11**	7.51	1.13	1.09	0.114	0.127
		max		0.773	0.732	2.92	0.005	0.21	0.22	1	**22**	7.9	1.5	1.3	0.146	0.168
		mean		0.442	0.424	2.73	0.005	0.14	0.17	1	**16**	7.6	1.2	1.2	0.130	0.138
		sd		0.192	0.179	0.27	0.000	0.04	0.04	0.17	4	0.2	0.1	0.1	0.011	0.018
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	80%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		min	0.0019	0.469	0.483	1.38	0.005	0.161	0.197	1.3	**44.2**	7.24	1.39	1.38	0.056	0.072
		max	0.002	1.16	1.31	2.39	0.0294	0.562	1.54	5.9	**138**	7.44	4.59	4.73	0.107	0.114
		mean	0.002	0.63	0.68	2.03	0.017	0.408	0.87	3.7	**86**	7.3	3.19	3.25	0.078	0.086
		sd	0.000	0.27	0.32	0.41	0.010	0.146	0.4	1.6	30	0.07	1.15	1.21	0.017	0.015

Table 1, cont'd

Station	BC ENV FW Aquatic Life Guidelines	parameter	Silicon	Silicon	Silver	Silver	Sodium	Sodium	Strontium	Strontium	Sulphur	Sulphur	Sulphate	Temperature	Thallium	Thallium	Tin	Tin
		state	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT	DIS	NA	DIS	TOT	DIS	TOT
		unit	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	°C	µg/L	µg/L	µg/L	µg/L
		max				0.1 [12]								17 [13]	0.3			
		mean				0.05 [12]									0.8			
SW0412	summer	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Jovi Road		%nd	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	60%	100%	100%	100%
		min	9270	9440	0.005	0.005	14.7	14.1	124	116	4.8	4.8	18	13.3	0.002	0.002	0.2	0.2
		max	10400	10300	0.005	0.005	26.9	26.4	137	143	6	6	20	16	0.003	0.002	0.2	0.2
		mean	9862	9796	0.005	0.005	18.68	18	130	127	5	5.6	18.6	14	0.0022	0.002	0.2	0.2
		sd	364	412	0.000	0.000	4.4	4	5	9	0	0	1	1	0.000	0.000	0.000	0
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	0%	0%	100%	60%	0%	0%	0%	0%	0%	0%	0%	0%	40%	80%	100%	100%
		min	4970	6660	0.005	0.005	13.6	13.9	112	115	5	5.8	19	7.9	0.002	0.002	0.2	0.2
		max	8250	8610	0.005	0.012	155	189	250	272	19.1	22.7	44	10.6	0.0063	0.0023	0.2	0.2
		mean	6396	7514	0.005	0.01	58	66	156	164	9.66	10.62	28	9	0.00348	0.00206	0.2	0.2
		sd	1229	866	0.0	0.00	55.6	67.9	50	58	5	7	11	1	0.0	0.0	0.0	0
SW0412-2B	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Cooperidge Dr.		%nd	0%	0%	100%	100%	0%	0%	0%	0%	20%	20%	0%	0%	40%	80%	100%	100%
		min	1360	3610	0.005	0.005	7.14	7.52	57.2	69.9	3	3	7	7.7	0.002	0.002	0.2	0.2
		max	5960	5850	0.005	0.01	29.6	28.1	182	173	4.9	5.7	18	10.8	0.0081	0.002	0.2	0.2
		mean	3642	4856	0.005	0.009	14.0	13.9	107.0	108.7	3.9	4.12	12.8	9.3	0.00338	0.002	0.2	0.2
		sd	1523	783	0.00	0.00	8.2	7.5	41.9	35.5	0.6	0.9	3.5	1.2	0.002	0.0	0.0	0.0
SW0412-2C	summer	n	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Tetayut Crk, E. Saanich Rd. fish ladder.		%nd	0%	0%	80%	80%	0%	0%	0%	0%	0%	0%	0%	0%	80%	80%	80%	80%
		min	11200	10900	0.005	0.005	11.9	12	109	104	4.9	5	18	11.7	0.002	0.002	0.2	0.2
		max	12100	11700	0.005	0.01	19	17	139	129	6	6	20	13	0.002	0.002	0.2	0.2
		mean	11525	11400	0.005	0.01	14	13	117	112	5	5	19	12	0.002	0.002	0.2	0.2
		sd	349	332	0.000	0.00	3	2	13	10	0.3	0.2	0.7	0.4	0.000	0.000	0.0	0.0
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	40%	100%	100%	100%
		min	4870	5840	0.005	0.005	9.12	9.52	82.3	85.1	3.9	4.1	13	8.6	0.002	0.002	0.2	0.2
		max	10700	10700	0.005	0.01	15.2	15.4	133	149	8	7.8	25	10.7	0.005	0.002	0.2	0.2
		mean	6376	7306	0.005	0.01	11.7	11.8	105	110	5	5.4	17	9.7	0.003	0.002	0.2	0.2
		sd	2203	1771	0.000	0.00	2.5	2.4	18.2	22.3	1.5	1.4	4.3	0.8	0.001	0.00	0.0	0.0

Table 1, cont'd

Station	BC ENV FW Aquatic Life Guidelines	parameter	Titanium	Titanium	Sus. Solids	Turbidity	Uranium	Uranium	Vanadium	Vanadium	Zinc	Zinc	Zirconium	Zirconium
		state	DIS	TOT	TOT	NA	DIS	TOT	DIS	TOT	DIS	TOT	DIS	TOT
		unit	µg/L	µg/L	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
		max	2,000 [1]		26 [14]	9 [15]	8.5 [1]					33 [16]		
		mean	4,600		6 [14]	3 [15]						7.5 [16]		
SW0412	summer	n	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Jovi Road		%nd	60%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	20
		min	0.5	4.46	2.4	6.23	0.147	0.141	1.52	1.85	0.39	2.29	0.1	0.1
		max	7.84	9.19	6	7.91	0.185	0.186	2.27	2.28	2.49	6.65	0.1	0.58
		mean	1.974	6.466	4.2	**6.76**	0.1664	0.1672	1.854	2.002	0.838	3.83	0.1	0.234
		sd	3	2	1	0.61	0.013	0.016	0	0	1	2	0	0
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	40%	20%
		min	0.5	4.78	1.6	6.56	0.0732	0.0869	0.92	1.15	0.61	2.18	0.1	0.1
		max	2.01	53.2	24	**56.7**	0.146	0.164	1.27	4.09	2.6	11.7	0.14	0.39
		mean	1.104	26.356	**9**	**24.1**	0.114	0.13298	1.096	2.324	1.83	6.3	0.12	0.258
		sd	1	16	8	17	0.032	0.027	0.15	1.02	0.7	3.2	0.0	0
SW0412-2B	fall	n	5	5	5	5	5	5	5	5	5	5	5	5
Tetayut Crk, Cooperidge Dr.		%nd	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	60%	20%
		min	0.5	1.91	1.6	3.65	0.0136	0.0307	0.47	0.56	2.78	5.26	0.1	0.1
		max	1.66	106	**50**	**108**	0.0522	0.0636	0.73	7.04	13.1	**63**	0.12	0.47
		mean	1.1	31.262	**14**	**32**	0.03064	0.046	0.592	2.304	9.616	**24**	0.106	0.22
		sd	0.4	38	18	38	0.014	0.01	0	2	4	20	0	0
SW0412-2C	summer	n	4	4	4	4	4	4	4	4	4	4	4	4
Tetayut Crk, E. Saanich Rd. fish ladder.		%nd	60%	20%	0%	0%	0%	0%	0%	0%	0%	0%	80%	80%
		min	0.5	1.3	2.0	1.73	0.183	0.174	1.62	1.49	0.69	2.22	0.1	0.1
		max	2.5	2.0	3.2	1.88	0.215	0.211	1.70	1.75	1.67	3.9	0.1	0.1
		mean	1.0	1.6	3	1.82	0.200	0.196	1.66	1.67	0.98	2.9	0.1	0.1
		sd	0.9	0.3	1	0.06	0.012	0.014	0.03	0.10	0.40	0.7	0.0	0.0
	fall	n	5	5	5	5	5	5	5	5	5	5	5	5
		%nd	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	80%	20%
		min	0.5	1.46	1.6	3.93	0.0441	0.0582	0.78	1.29	1.07	2.55	0.1	0.1
		max	1.53	44.4	15	**41.5**	0.176	0.17	1.24	3.3	5.67	19.2	0.13	1.38
		mean	0.808	21.6	**6**	**18.9**	0.0886	0.10	0.99	1.958	4.23	**10.6**	0.106	0.438
		sd	0.38	14.2	5	12.6	0.05	0.04	0.2	0.7	1.8	5.5	0.0	0.5

Table Notes on next page

Table 1, cont'd

Notes:

Where values were not detected, statistics were calculated using the detection limit.
BC ENV approved water quality guidelines for protection of freshwater aquatic life applied unless otherwise stated.
Minimum average hardness (61.6 mg/L as $CACO_3$) was used to calculate hardness-dependant water quality guidelines for screening purposes.
Samples that exceeded the minimum guideline were highlighted to be assessed further based on the sample hardness.
DIS = dissolved state, TOT = total state.
NTU = Nephelometric Turbidity Unit
Summer samples were all collected during dry weather and the fall samples were collected during or after recent heavy rainfall.

1 BC ENV working water quality guideline.
2 Hardness-dependant; max (e[1.03 * ln(Hss) - 5.274]) ranges from 0.19 to 0.65 µg/L Cd; average (e[0.736 * ln(Hss) - 4.943]) ranges from 0.11 to 0.30 µg/L Cd
3 Cr(IV) / Cr (III)
4 Site specific BC Biotic Ligand Model acute and chronic guidelines for dissolved copper were calculated for each sample. There were no exceedances of the acute guideline, but each sample was also compared to the chronic guideline.
Goldstream River guidelines ranged from 0.4 to 2.3 ug/L for acute and 0.2 to 0.4 µg/L for chronic.
If 1 of 5 samples or average of the 5 samples exceed chronic guideline, station has exceeded.
5 Minimum values for dissolved oxygen.
6 Average guideline is a geomean of 400 CFU/100 mL for E. coli; E. coli values in the average row are geomeans.
7 If hardness > 8 mg/L : e(1.273 ln (hardness) - 1.460; if hardness < 8 mg/L : 3 ug/L total lead; if mean hardness > 8 mg/L CaCO3 then, 3.31 + e(1.273 ln (mean hardness) - 4.704) ug/L total lead.
8 0.01102 hardness + 0.54 maximum mg/L total Mn; 0.0044 hardness + 0.605 average mg/L total Mn.
9 25 ug/L total Ni if hardness is < or = 60 mg/L $CaCO_3$, 110 ug/L Ni at hardness > 60 to 180 mg/L as $CaCO_3$, 150 ug/L Ni at hardness of 120 to 180 mg/L as $CaCO_3$
10 Draft Vancouver Island Objective, applies to monthly samples collected June to September; our data was collected 5 times in 30 days.
11 Optimum pH range
12 0.1 ug/L Ag max, 0.05 ug/L Ag ave if hardness is <=100 mg/L; otherwise 3 mg/L Ag max, 1.5 mg/L Ag ave.
13 Draft objective proposed to protect juvenile Coho (the most sensitive species); average weekly temperature at any location in the creeks.
14 25 and 5 mg/L over ambient levels of 2 mg/L in the upper Sooke River watersheds.
15 Max: 9 NTU (8 NTU above ambient levels in the upper Sooke River watershed) at any time during clear flow periods, and average 3 NTU (2 NTU above ambient levels during clear flow periods).
16 If H is >90 mg/L then 33 +0.75 (hardness-90); if H is less < or = 90 mg/L then 33 ug/L or 0.033 mg/L; if H is >90 then 75+0.75(hardness-90); if less < or = 90 then 7.5 ug/L or 0.0075 mg/L.

xx value exceeds the provincial guideline protective for aquatic life.

xx italicized value exceeds a guideline/objective which is only partially applicable. Further investigation is needed.

APPENDIX G

CRD Public Health and Environmental Concern Rating System

STORMWATER DISCHARGE RATING SYSTEM

The Capital Regional District (CRD) evaluates stormwater discharges for public health and environmental concerns using a rating system for stormwater discharges developed by the CRD titled *Stormwater Discharge Rating System for the Capital Regional District* (Drinnan, 1997). As part of the rating system, the following study was used to determine levels of public use, coastline habitat sensitivity and flushing characteristics of the marine receiving waters:

- *An Evaluation of the Coastline Sensitivity Associated with Stormwater Discharges on the Saanich Peninsula (Drinnan, 1997)*

Public shoreline use ratings indicate the potential for public contact with stormwater. These ratings were updated in 2010.

The rating of discharges allows the jurisdictions involved to better manage limited funds and undertake remedial measures where necessary. A copy of the rating system and the coastline sensitivity evaluations are available upon request from the CRD. A brief explanation of the stormwater discharge rating system follows.

1.1 Public Health Concern

CRD staff rate each discharge as a high, moderate or low level of concern for public health based on the level of bacterial contamination in the stormwater and the potential for human contact. The parameters used to assess the level of concern for public health are:

- Escherichia coli (*E. coli*) concentrations in the stormwater discharge
- discharge flow rate
- location of the discharge (e.g., below high-water line)
- public use of the shoreline (uses such as swimming, fishing, or kayaking)

The level of contamination is used to assign a bacterial rating. Public shoreline use ratings are used to indicate the potential for public contact with stormwater and depends on the type of activities carried out on the shoreline. Table 1 shows criteria for the bacterial and public shoreline use ratings.

Table 1 Fecal Coliform and Public Shoreline Use Rating Criteria

Rating	Bacterial Rating Criteria	Rating	Public Shoreline Use Rating Criteria
1	No flow measured or *E. coli* count consistently under 200 CFU/100 mL	1	Low contact (e.g., inaccessible, beach walking)
2	*E. coli* count between 200 and 5,000 CFU/100 mL	2	Secondary contact (e.g., kayaking)
3	*E. coli* count greater than 5,000 CFU/100 mL	3	Primary contact (e.g., swimming, scuba diving)

Note: *E. coli* counts above 200 CFU/100 mL (on average) indicate the potential to cause adverse public health effects from primary recreational activities such as swimming or diving.

1.2 Environmental Concern

Environmental concerns are based on a contaminant rating of discharge sediments. The contaminant rating is determined by comparing the sediment concentration of each of eight metals and two groups of organic contaminants (Cn) with the CRD Marine Sediment Quality Guidelines (MSQG) to obtain a ratio (Cn/MSQG). To account for potential additive effects, these ratios are summed to calculate the toxic equivalent unit (TEU). Table 2 provides the criteria for determining the contaminant rating.

Table 2 Criteria for Determining the Contaminant Rating

Contaminant Rating	Criteria for Determining the Contaminant Rating
Low	Sum of the individual ratios of Cn/MSQG (TEU) is less than 1.0
Moderate	Sum of the individual ratios of Cn/MSQG (TEU) is greater than or equal to 1.0, but no individual parameter exceeds, or is equal to, a value of 0.75
High	The ratio Cn/MSQG is greater than, or equal to, 0.75 for any single parameter

Discharges evaluated are located near environmentally sensitive areas, in creeks or near heavily settled areas where there is an increased probability of pollution. All discharges sampled for environmental concern are sampled for at least two years to confirm the contaminant concentrations and contaminant(s) of concern. Only a small number of discharges can be sampled each year due to budgetary constraints; therefore, each discharge selected for sampling can only be sampled once per year.

Discharges with a confirmed high contaminant rating are investigated to determine the source(s) of contamination. The priority in which high-rated discharges are investigated and problems mitigated is determined by calculating a habitat rating (high, moderate or low). The habitat rating is based on the habitat sensitivity, discharge flow and marine flushing characteristics. The following briefly describes the rating criteria for the habitat rating.

Table 3 Criteria for Determining Ratings for Habitat Sensitivity, Discharge Flow and Marine Flushing

Habitat Sensitivity Rating		Discharge Flow Rating		Marine Flushing Ratings	
Rating	Criteria	Rating	Criteria	Rating	Criteria
1	Low productivity; less diverse habitats	0.5	Less than 50 L/minute	0.5	Open shoreline; high flushing
2	Moderate productivity; diverse habitats	1	Between 50 to 500 L/minute	1	Partially enclosed area; moderate flushing
3	High productivity or endangered or protected habitats	1.5	Greater than 500 L/minute	1.5	Enclosed area; poor flushing

These three ratings (habitat sensitivity, discharge flow and marine flushing) are summed to determine a habitat rating as shown in Table 4. The habitat rating assigned to each discharge will allow limited resources to be spent in a prioritized manner.

Table 4 Criteria for Establishing the Habitat Rating

Habitat Rating and Mitigative Priority	Sum of Criteria (Habitat + Flow + Flushing)
Low	2.0-3.0
Moderate	3.5-4.5
High	5.0-6.0

OTHER CONCERNS

There are a number of other concerns that have been jointly reviewed and discussed by staff from the CRD and the other jurisdictions involved. This review and discussion assists in setting priorities for remediation of discharges with a high level of concern for public health and the environment. These include:

- the cost of remediation
- the likelihood that remediation will be successful
- compatibility with the priorities of the jurisdictions
- public interest