Saanich Peninsula Treatment Plant

Environmental Monitoring Program 2022 Report

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SAANICH PENINSULA TREATMENT PLANT
ENVIRONMENTAL MONITORING PROGRAM
2022 REPORT

EXECUTIVE SUMMARY

The Capital Regional District (CRD) has been operating the Saanich Peninsula Treatment Plant (SPTP) since February 2000. The treatment plant serves North Saanich, Central Saanich and the Town of Sidney, as well as the Victoria International Airport, the Institute of Ocean Sciences and the Tseycum, Tsartlip, and Pauquachin First Nations communities. It is a conventional secondary level wastewater treatment plant, which has periodically produced Class A biosolids. The treatment plant discharges un-disinfected secondary effluent into the marine receiving environment (Bazan Bay) through an outfall located approximately 1,580 metres (m) from the shoreline at a depth of 30 m. Residual solids left over from the treatment process are currently disposed of at the Hartland Landfill. The CRD undertakes monitoring to meet provincial and federal regulatory requirements, as well as to assess the impacts of the outfall on the marine environment and human health. Information is often used to inform the CRD's Regional Source Control Program (RSCP) and treatment plant operations. This monitoring is stipulated by the BC Ministry of Environment and Climate Change Strategy (ENV) through the Municipal Wastewater Regulation under the *Environmental Management Act* and the federal Wastewater Systems Effluent Regulations under the *Fisheries Act*.

Historically, the CRD developed the monitoring program in consultation with the Marine Monitoring Advisory Group (MMAG). Subsequently, the long-term monitoring program was revised in collaboration with ENV, and the regular use of the MMAG has been discontinued.

The 2022 Wastewater and Marine Environment Program consisted of the following components:

- daily, weekly and monthly analysis of wastewater for federal and provincial compliance monitoring and treatment plant performance parameters, and quarterly analysis for priority substances
- quarterly wastewater toxicity testing
- monthly analysis of biosolids for fecal coliforms and metals
- a twice-yearly surface monitoring program, consisting of five sampling days within a 30-day period, once each in summer and winter

All Saanich Peninsula Wastewater Monitoring components were in compliance in 2022.

WASTEWATER MONITORING

Compliance Monitoring and Treatment Plant Performance

The CRD conducted wastewater monitoring on a regular basis to profile the chemical and physical constituents of influent and effluent, determine concentrations relative to provincial and federal regulatory limits, and assess treatment plant performance. Parameters monitored for regulatory compliance were all below the applicable effluent regulatory limits. Influent and effluent quality was within expected ranges and met all treatment plant operating objectives.

Priority Substances

In addition to the compliance and treatment plant performance monitoring, over 550 substances were analyzed in the SPTP influent and effluent on a quarterly basis. These substances were monitored to comprehensively assess potential risks of the wastewater discharge to organisms living in the marine environment around the outfall.

Approximately 39% of substances were detected in more than 50% of the samples, and included most of the conventional variables, metals, some organics, and high-resolution parameters. Most frequently detected substances were below BC and Canadian Water Quality Guidelines (WQG), even in undiluted effluent. Only enterococci, WAD cyanide, nitrogen, copper, zinc, and high-resolution total polychlorinated biphenyls exceeded guidelines in undiluted effluent, prior to discharge to the marine receiving environment.

Water quality guidelines must be met outside of the initial dilution zone (IDZ) (an area with a radius of approximately 100 m around the outfall). In order to predict levels at the edge of the IDZ, estimated minimum initial dilution factors were applied to all substance concentrations. All substances were predicted to be below WQG after the application of this dilution factor, including those substances that were above guidelines in undiluted effluent, except for enterococci. As such, impacts of these discharged substances to aquatic life are likely minimal. Surface water monitoring was undertaken to assess the human health and shellfish impacts of the effluent bacteriological exceedances (see Surface Water Monitoring section below).

Toxicity Testing

In 2022, all toxicity tests passed with no mortality and no impacts on survival or reproductive endpoints.

Disinfection

When the SPTP was commissioned in 2001, a technical advisory group determined that disinfection to reduce effluent bacteriological levels was unnecessary to meet water quality guidelines for primary contact (e.g., recreation). The advisory group confirmed this recommendation in 2015. In 2020, after consultation with W̱SÁNEĆ First Nations and other stakeholders, staff again recommended that disinfection not be installed.

Biosolids Monitoring

No biosolids were produced at the SPTP in 2022. All sludge generated at the facility was disposed of at the Hartland Landfill. The CRD monitored the sludge in 2022 to inform the CRD's Regional Source Control Program (RSCP), and all regulated parameters were below Class A biosolids limits.

Surface Water Monitoring

Bacteriology

Surface water (1 m depth) fecal coliform and enterococci concentrations were low at all stations, with geometric means of 2 CFU/100 mL or less. IDZ stations also had low bacteriology concentrations, with geometric means of 2 CFU/100 mL or less, below BC and Health Canada recreational and shellfish guidelines. There were no elevated geometric mean fecal coliform or enterococci concentrations observed at any station, on any sampling date, and no samples that exceeded the Health Canada enterococci single sample guideline of 70 CFU/100 mL.

Overall, results indicate that adverse health effects from recreational primary contact activities and shellfish harvesting are not expected. However, an area of approximately 17.65 km^2 around the outfall is closed for shellfish harvesting, as a standard Fisheries and Oceans Canada procedure near industrial and sanitary wastewater outfalls. Shellfish closures have a minimum radius around an outfall of 300 m, but closure areas are usually larger near bigger urban centres, such as for the SPTP outfall, where there are other potential sources of bacterial contamination (e.g., stormwater discharges, marinas, septic systems, sewage pumps), in addition to the wastewater outfall.

Extended Monitoring

WQG exceedances were observed for boron in the water column surrounding the SPTP outfall at all stations and sampling events, including at the reference station. These exceedances are expected, as boron is naturally occurring in the environment at higher levels. The CRD will continue to monitor metals in waters around the outfall and the reference station to assess environmental significance.

Nutrients

Nutrient content in receiving water is analyzed to provide a qualitative comparison between outfall and reference stations. There were some seasonal patterns in the nutrient results, which were consistent between the reference and the IDZ stations. Results were within the ranges measured in previous years and those of the pre- and post-discharge assessment programs. As was observed in previous monitoring years, high variability, both spatially and temporally, was evident in the data. Fluctuations in nutrient concentrations are attributed to natural variation in the monitoring areas, rather than to an effect from the SPTP discharge.

SEAFLOOR MONITORING

Seafloor monitoring (i.e., benthic community structure and sediment chemistry) was conducted in 2020. This component is conducted every four years, since before the plant commenced discharging in 2000. The next sampling event is planned for 2024.

OVERALL ASSESSMENT

Based on tests used to monitor effluent quality and surface water in 2022, all components of the Saanich Peninsula Wastewater Treatment Plant were in compliance. Results were similar to previous years. Influent and effluent quality was within expected ranges and met regulatory limits and operating certificate compliance requirements on all sampling dates. All substances, with the exception of bacterial indicators, for which there are BC or Canadian WQG, met these guidelines when the estimated minimum initial environmental dilution of the effluent was factored in, indicating that the predicted levels of substances in the environment were not likely to be at concentrations of concern to aquatic life. Surface water fecal coliform and enterococci data confirmed that the discharge to the receiving environment was in compliance and therefore, considered no or low risk for recreational activities and shellfish consumers. As expected, boron exceeded WQG at every station and sampling depth, including at the reference station, as the natural concentrations of boron are above WQG in the Salish Sea. ENV is working on updating the boron guideline. Surface water nutrient concentrations were within ranges measured in previous monitoring programs and showed no detectable effect from the discharge.

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Terms & Abbreviations

ALK	Alkalinity
AVS	Acid Volatile Sulphide
BC OMRR	Organic Matter Recycling Regulations
BOD	Biochemical Oxygen Demand
CALA	Canadian Association for Laboratory Accreditation
CBOD	Carbonaceous Biochemical Oxygen Demand
CCME	Canadian Council of Ministers of the Environment
CFU	Colony-forming unit
Cl	Chloride
COD	Chemical Oxygen Demand
COND	Conductivity
CSSP	Canadian Shellfish Sanitation Program
ENT	Enterococci
ENV	BC Ministry of Environment and Climate Change Strategy
FC	Fecal Coliform
IDZ	Initial Dilution Zone
LWMP	Liquid Waste Management Program
MMAG	Marine Monitoring Advisory Group
NH_3	Ammonia
NO_2	Nitrite
NO_3	Nitrate
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PDBE	Polybrominated diphenyl ethers
PFOS	Perfluorooctanesulfonic acid
PFHpA	Perfluoroheptanoic acid
PFHxA	Perfluorohexanoic acid
PFNA	Perfluorononanoic acid
PFoSA	Perfluorooctanesulfonamide
PFOA	Perfluorooctanoic acid
PFPeA	Perfluoropentanoic acid
PFBS	Perfluorobutanesulfonic acid
PFHxS	Perfluorohexanesulfonic acid
PPCP	Pharmaceuticals and personal care products
Q+	Quarterly Plus
QA/QC	Quality Assessment/Quality Control
RSCP	Regional Source Control Program
SCADA	Supervisory Control and Data Acquisition
SDI	Swartz Dominance Index
SPTP	Saanich Peninsula Treatment Plant
SQG	Sediment quality guidelines
TA	Total abundance
TDP	Total dissolved phosphorus
TKN	Total Kjeldahl nitrogen
TOC	Total organic carbon
TP	Total phosphorus
TR	Taxa richness
TRC	Total residual chlorine
TSS	Total Suspended Solids
TWQRP	Technical Water Quality Review Panel
UN NH_3	Unionized Ammonia
US EPA	US Environmental Protection Agency

v/v	Volume per volume
WAD	Weak acid dissociable (WAD) cyanide
WMEP	Wastewater Marine Environment Program
WQG	Water Quality Guidelines
WSER	Wastewater Systems Effluent Regulations

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1.0 BACKGROUND

The Saanich Peninsula Treatment Plant (SPTP) started operations in February 2000. This Capital Regional District (CRD) treatment plant serves North Saanich, Central Saanich and the Town of Sidney, as well as the Victoria International Airport, the Institute of Ocean Sciences and Tseycum, Tsartlip, and Pauquachin First Nations communities. It is a conventional secondary level wastewater treatment plant, which has periodically produced Class A biosolids. The treatment facility discharges undisinfected secondary-treated effluent into the marine receiving environment (Bazan Bay) through an outfall located approximately 1,580 m from the shoreline at a depth of 30 m. Residual sludge from the treatment process is currently disposed of at the Hartland Landfill. The Wastewater and Marine Environment Program (WMEP) includes regular monitoring, as stipulated by the BC Ministry of Environment and Climate Change Strategy (ENV), through the Municipal Wastewater Regulation under the *Environmental Management Act* and the federal Wastewater Systems Effluent Regulations (WSER) under the *Fisheries Act*. The facility operates under a Provincial Operational Certificate (#ME-15445), and the Saanich Peninsula Liquid Waste Management Plan (LWMP) (CRD, 2009a).

The Saanich Peninsula LWMP committed the CRD to carry out a pre- and post-discharge assessment program and to develop a long-term monitoring program. The pre-discharge program was conducted from October 1998 to January 2000. The post-discharge program was initiated in February 2000 (when treatment plant operation began) and completed in February 2001. The results presented in Aquametrix Research Ltd. (2000, 2001a and 2001b) guided the development of the long-term monitoring program in consultation with the Marine Monitoring Advisory Group (MMAG). The MMAG consists of university and government scientists with expertise in the fields of marine biology, chemistry, toxicology, oceanography and public health. This independent group historically reviewed CRD marine monitoring and assessment programs and made recommendations.

Subsequently, the long-term monitoring program was revised in collaboration with ENV, and the regular use of the MMAG discontinued. This revised program was implemented in January 2013 and is summarized in Table 2.1.

In addition, the initial Technical Water Quality Review Panel (TWQRP) suggested a number of conditions that would prompt a reevaluation of the need for disinfection at the SPTP, one of which was 10 years of plant operation. This reevaluation was initiated in 2011 with the MMAG receiving formal delegation to undertake the review. In 2015, the MMAG confirmed that disinfection continues to be unnecessary to meet recreational water quality guidelines around the outfall, and requested that the CRD continue to assess the potential benefits of disinfection to nearby shellfish resources in consultation with First Nation and other shellfish stakeholders. In January 2020, staff advised the Saanich Peninsula Wastewater Commission that installation of disinfection at the SPTP does not appear to present any significant benefit to nearby shellfish resources, as the ongoing surface water bacteriological monitoring indicates that levels around the outfall are well below thresholds to protect shellfish harvesting. Staff therefore recommended that disinfection not be installed at that time. Staff continue to meet with W̱SÁNEĆ First Nations and other shellfish stakeholders to assess potential future disinfection need, as well as to identify other areas on the Saanich Peninsula where shellfish harvesting could be restored but are outside the influence of the SPTP.

2.0 INTRODUCTION

The objectives of the SPTP WMEP are to:

- Comply with federal and provincial wastewater regulations.
- Assess the effects of the wastewater discharge on the marine environment and the potential for human health risks (related to the presence of bacteria in surface water).

- Determine waste loads to the marine receiving environment.
- Monitor influent, effluent and sludge quality (both as part of regulatory requirements and to optimize treatment plant performance).
- Supply information to the CRD's Regional Source Control Program (RSCP) and treatment plant operators.
- Provide scientific guidance to wastewater managers regarding the use of the marine environment for the disposal of municipal wastewater.

This report presents the results of the 2022 SPTP WMEP in one integrated report. The components of the current WMEP are presented in Table 2.1. These components, the parameters that are measured for each, and the sampling frequency were determined based on regulatory requirements (i.e., for compliance monitoring), a review of the pre- and post-discharge assessment programs, similar monitoring and assessment programs, and recommendations of the MMAG. The following sections present summaries of the methods used for sample collection and processing, and for data analysis of each component of the 2022 WMEP. Detailed information can be found in any technical reports and independent consultant reports referred to in the individual sections. Methods were selected for each of these components, based on internationally recognized standards, and sampling and analytical protocols.

Outfall and reference stations for the sea surface and seafloor components of the WMEP were chosen by the MMAG, following recommendations by the consultant (Aquametrix) that conducted the pre- and post-discharge monitoring program. The reference station was chosen because oceanographic computer modelling indicated it would be far enough away from the plume effects, while being at a similar depth to the outfall stations.

Table 2.1 SPTP Wastewater and Marine Environment Program Components, Parameters, Frequency and Stations

Component	Parameter	Frequency and Stations
Wastewater Monitoring	compliance monitoring (CBOD, FC, flow, unionized NH_3, pH @ 15°C, TSS)[1]	daily to twice per month at the influent and final effluent sampling points[2] federal – every two weeks provincial – monthly
	treatment plant performance (ALK, CBOD, COD, COND, Cl, NH_3, NO_2, NO_3, BOD, TDP, TKN, TP, TSS)[1]	twice per week to monthly[3] at the influent and final effluent sampling points
	influent and effluent priority substances[4]	quarterly[5] at the influent and effluent sampling points
	chronic toxicity testing	annually at the effluent sampling point (*Ceriodaphnia dubia* survival and reproduction, Rainbow trout embryo-alevin survival and development, echinoderm (*Strongylocentrotus)* fertilization, seven-day Pacific topsmelt survival and growth)
	acute toxicity testing	quarterly at the effluent sampling point (Rainbow trout 96-hour LC50, *Daphnia magna* 48-hour LC50)
Sludge Monitoring	metals, moisture, FC[1]	monitored monthly for informational purposes
Surface Water Monitoring	indicator bacteria (FC, ENT)[1]	10 times a year (5-in-30 samples collected in the winter and in the summer) at 19 stations (14 outfall stations, four IDZ stations and one reference station)
	nutrients (NH_3, NO_2, NO_3, TDP, TKN, TP), COND, salinity, pH, temperature and TOC[1]	10 times a year (5-in-30 samples collected in the winter and in the summer) at five stations (four IDZ stations and one reference station)
	metals	twice yearly (winter and summer) at five stations (four IDZ stations and one reference station)
Seafloor	particle size analysis, TOC[1], AVS[1] and sediment chemistry[4]	every four years at two stations[6] (one outfall terminus station and one reference station)
	benthic community structure (including TA, TR, SDI)[7]	

Notes:

1 ALK - alkalinity, AVS - acid volatile sulphide, CBOD - carbonaceous biochemical oxygen demand, COD - chemical oxygen demand, COND - conductivity, Cl - chloride, FC - fecal coliforms, ENT - enterococci, NH_3 - ammonia, NO_3 - nitrate, NO_2 - nitrite, BOD - biochemical oxygen demand, TDP - total dissolved phosphorus, TKN - total Kjeldahl nitrogen, TOC - total organic carbon, TP - total phosphorus, TSS - total suspended solids

2 Frequency is listed in Appendix A.

3 Frequency depends on the operation of the facility and what the operators need to optimize treatment plant performance.

4 All parameters are listed in Appendix A.

5 January and July additional Q+ sampling conducted one day before and one day after the quarterly sampling event.

6 Conducted in 2020. Next time will be 2024, 2028, etc.

7 TA - total abundance, TR - taxa richness, SDI - Swartz Dominance index

3.0 WASTEWATER MONITORING

3.1 Introduction

The CRD conducts wastewater monitoring on a regular basis at the SPTP to assess compliance with the operational certificate under the LWMP and the federal WSER, to assess treatment plant performance and to profile the physical and chemical constituents of treated wastewater before it is released to the marine receiving environment. These data provide an indication of which components may be of concern in the receiving environment and can be used to direct the efforts of the WMEP and the CRD's RSCP.

Wastewater monitoring at the SPTP consists of quarterly composite analyses for all priority substances, supplemented by additional "quarterly plus" (Q+) composite sampling occurring one day before and one day after the quarterly sampling events in January and July. The Q+ monitoring program is intended to increase the precision of the quarterly sampling events for key substances of interest (Appendix A).

The list of priority substances was adapted from the US Environmental Protection Agency (US EPA) National Recommended Water Quality Criteria; Priority Toxic Pollutants list (US EPA, 2002). The CRD reviews its list on a periodic basis to determine the need to delete or add substances depending on new developments in terms of analytical techniques, potential presence in wastewaters and potential effects on human health and the receiving environment, alignment with the Vancouver Aquarium's Pollution Tracker parameters, and upon ENV review. Influent is analyzed for a subset list of substances (Appendix A).

Detailed statistical trend analyses are undertaken every three to five years to quantitatively assess temporal trends in concentrations and loadings of wastewater parameters. In 2012, Golder Associates (Golder, 2013) updated the previous trend assessment to include the 2009-2011 results, expanding the total SPTP dataset from 2000-2011. Results of this assessment were presented in the 2011 annual report (CRD, 2012). The most recent trend assessment was completed in 2017 (Golder, 2019) and included the next three years of wastewater data (2012-2015). Results were included in the 2016 annual report (CRD, 2017). The next trend assessment for the SPTP is planned for the next one to two years.

3.2 Methods

Information on wastewater sampling and analytical methods is presented below and in any independent consultants' reports referenced in the individual sections. Sampling and analytical methods used for each of these components were based on recognized standards and protocols (APHA, 1992; BC MWLAP, 2003). Samples were either collected as composites (i.e., over a 24-hour period) or individual grabs (i.e., discrete one-time) depending on the parameters that were being analyzed.

3.2.1 Compliance Monitoring and Treatment Plant Performance

The CRD operators and sampling technicians regularly monitor effluent quality and flow, as required by the ENV operational certificate under the SPTP LWMP and federal regulations. Table 3.1 presents parameters, effluent regulatory limits, frequency and sampling methods used to assess compliance.

Influent and effluent samples were also collected periodically to assess the efficiency of the treatment plant processes (see Table 2.1 for a list of parameters and monitoring frequency). Flow was measured continuously with a Supervisory Control and Data Acquisition (SCADA) system.

Operators and technicians collected composite influent and effluent samples using on-site automated ISCO™ samplers (http://www.isco.com). Influent samples were collected from a sampling point situated where the wastewater had entered the treatment plant and been screened to <6mm, but prior to transfer to the settling tanks (i.e., before primary treatment). Effluent samples were collected from a sampling port situated where the final effluent is discharged to the marine receiving environment. Sub-samples (consisting of 400 mL) were collected every 30 minutes and composited into one sample representing the 24-hour period. Grab samples (i.e., one-time discrete samples) were collected for the analysis of parameters not suited to composite sampling, such as fecal coliforms, pH, oil and grease, and volatile organic compounds. Laboratory analyses including parameters required by WSER were conducted at Bureau Veritas Laboratories Inc. (Burnaby, BC) a Canadian Association for Laboratory Accreditation (CALA) certified lab. SGS AXYS Analytical Services (Sidney, BC) was engaged for high-resolution analysis.

Table 3.1 SPTP Effluent Compliance Monitoring Parameters, Regulatory Limits, Frequency and Sampling Methods

Parameter	Effluent Regulatory Limit	Required Frequency of Monitoring[4]	Sampling Method
CBOD	provincial – 45 mg/L maximum federal – 25 mg/L average	provincial – 2x per week federal – 2x per month	24-hr composite
TSS[1]	provincial – 45 mg/L maximum federal – 25 mg/L average	provincial – 2x per week federal – 2x per month	24-hr composite
flow[1]	24,953 m^3/day (average daily)[2] 56,000 m^3/day (maximum daily)	continuously	SCADA[3]
pH[1]	6-9	2x per week	grab
unionized ammonia[1], pH @ 15°C	provincial – required, but no limit federal –1.25 mg/L maximum	provincial – monthly federal – 2x per month	24-hr composite
fecal coliforms	required, but no limit	provincial – monthly	grab
total residual chlorine	federal – 0.02 mg/L average	only when used as part of the treatment process[5]	grab

Notes:
1 Parameters which are also analyzed in influent.
2 Limit determined on an annual basis = [12,200 m^3/d * $(1.0316^{\text{calendar year—1999}})$]
3 SCADA system
4 As described in the operating certificate or the federal WSER.
5 Chlorine was not used as part of the SPTP treatment process in 2022. As such, total residual chlorine was not monitored.
CBOD = carbonaceous biochemical oxygen demand; TSS = total suspended solids; FC = fecal coliforms

3.2.2 Priority Substances

CRD technicians collected influent and effluent samples, using methods similar to those used for compliance parameters, but with the following adaptations:

- Sampling equipment (i.e., hoses, sieves and carboys) was cleaned thoroughly prior to use by an external private laboratory (SGS AXYS Analytical Services), following trace cleaning procedures, including triple rinses with solvents, acids and distilled water.
- The CRD WMEP automated ISCO™ samplers (different from the on-site SPTP automated ISCO™ samplers used by the operators for the compliance and treatment plant performance monitoring) were used to collect influent and effluent composite samples. Two different samplers were used: one for influent and one for effluent. Sub-samples (consisting of 400 mL) were collected every 30 minutes and composited into one sample representing the 24-hour period.
- Composite samples were collected into a fluorinated, pre-cleaned 20 L carboy and continuously and thoroughly mixed before and during sample splitting to ensure sample homogeneity.

- Grab samples were collected using the ISCO™ sampler manual pumping setting (i.e., at the end of each composite sample interval) and transferred into appropriate sample bottles on site.

Sampling technicians immediately dispatched the samples to qualified laboratories (i.e., certified by the Canadian Association for Laboratory Accreditation) to conduct chemical analyses. Bureau Veritas (Burnaby, BC) conducted analyses for conventional parameters including federally regulated parameters (i.e., pH @ 15°C, unionized ammonia, TSS, CBOD) and priority substances; and SGS AXYS Analytical Services conducted analyses for high-resolution parameters. Laboratory and CRD staff chose analytical methods to ensure that method detection limits were low enough for comparisons to ENV approved (BCMoE&CCS, 2019) and working (BCMoE&CCS, 2017) WQG and the Canadian Council of Ministers of the Environment (CCME 2003) *Canadian Water Quality Guidelines for the Protection of Aquatic Life*.

Wastewater was analyzed for a comprehensive list of priority substances that included conventional variables (included for the assessment of potential effects on the marine receiving environment and for comparison to the compliance treatment plant performance results), metals, halogenated compounds, polycyclic aromatic hydrocarbons, polybrominated diphenyl ethers, polychlorinated biphenyls, pesticides, pharmaceuticals and personal care products, nonylphenols and fluorinated compounds (Appendix A).

DATA QUALITY ASSESSMENT

The CRD and laboratory staff followed rigorous quality assessment/quality control (QA/QC) procedures for both field sampling and laboratory analyses. Within each batch that was analyzed quarterly (i.e., four batches in 2022 that included samples from McLoughlin Point WWTP), one sample was randomly chosen for laboratory triplicate analysis, one sample was randomly chosen for field triplicate analysis, and one sample for a matrix spike. Both Bureau Veritas and SGS AXYS Analytical also conducted internal QA/QC analysis, including method analyte spikes, method blanks and standard reference materials.

DATA ANALYSIS

Percent frequencies of detection were determined for each substance by adding the number of times the compound was detected, dividing it by the total number of samples collected in the year and multiplying it by 100. A frequency of greater than 50% was selected as a percentage above which meaningful statistical analyses could be conducted. For non-detectable results (i.e., less than the method detection limits), a value of half the method detection limit was used for calculating the substance mean concentrations. For those substances detected greater than 50% of the time in the effluent, predictions of substance concentrations in the receiving environment were made by dividing maximum substance concentrations in effluent by the estimated minimum initial dilution factor of 153:1 (Hayco, 2005). This estimated minimum initial dilution factor was determined by a receiving environment dye study undertaken December 7-9, 2004, and was determined to occur within approximately 50 m south of the outfall at a depth of 24.4 m at slack tide (Hayco 2005). Predicted environmental concentrations, as well as the original sample concentrations (i.e., without the initial dilution factor), were compared to:

- ENV approved (BCMoE&CCS, 2019) and working (BCMoE&CCS, 2017) WQG,
- CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Lif*e (CCME, 2003), and
- Health Canada guidelines for the protection of human health (Health Canada, 2012).

These comparisons give an indication of the potential for receiving environment effects.

Annual loadings were determined by first calculating the quarterly loadings (January, April, July and October), averaging these values and multiplying by the number of days in the year. Quarterly loadings were calculated by averaging the total flow over the two sampling days and multiplying the average flow by the concentration of each substance measured that quarter. Loadings were calculated only for substances detected in >50% of sampling events.

Substances for which minimum initial dilution and loading calculations were not appropriate were noted as n/a (not applicable). For example, pH, conductivity and hardness do not lend themselves to loading calculations (e.g., pH is a discrete measurement and calculating a loading over time is not appropriate).

3.2.3 Toxicity Testing

Acute toxicity testing refers to the assessment of adverse effects of a substance resulting from either a single exposure or from multiple exposures to a substance in a short period of time (usually less than 24 hours). Acute toxicity testing was conducted by Nautilus Environmental (Burnaby, BC) on a quarterly basis using effluent collected from the SPTP in January, April, July and October. Tests consisted of a 96-hour Rainbow trout LC50 and a 48-hour *Daphnia magna* LC50. The LC50 test measures the lethal concentration that kills 50% of organisms over the test period. Anything less than 100% v/v is a fail.

Chronic toxicity testing refers to the assessment of adverse health effects from repeated exposures, often at lower levels, to a substance over a longer period of time (weeks or years). Chronic toxicity results are reported as either the LC50, which is the concentration at which 50% of the test organisms die during the test period, or as the EC50 or EC25, which are the concentrations at which a negative impact is observed on 50% or 25%, respectively, of the organisms in the specified test period (e.g., decreased fertilization or growth). Chronic toxicity testing was conducted by Nautilus Environmental using effluent collected from the SPTP in November and December. Tests consisted of a seven-day *Oncorhynchus mykiss* (Rainbow trout) embryo-alevin, a seven-day *Atherinops affinis* (Topsmelt) survival and growth, a six-day *Ceriodaphnia* survival and reproduction, and an echinoid fertilization test.

3.3 Results and Discussion

3.3.1 Compliance Monitoring and Treatment Plant Performance

Flow data are presented in Appendix B1. Flow measurements indicate that the mean daily flow in 2022 was slightly lower than in 2021 (9,833 m^3/d in 2022 versus 10,073 m^3/d in 2021). There were no exceedances of the permitted average or maximum daily allowable flow in 2022.

Figure 3.1 presents the SPTP flows from 2011-2022 indicating that flows are not increasing significantly over time. Provincial wastewater compliance monitoring and treatment plant performance monitoring results are summarized in Table 3.2. Federal wastewater compliance parameters are summarized in Table 3.3. The complete raw data sets are presented in Appendices B2 (influent) and B3 (effluent).

In 2022, all SPTP effluent results were below provincial and federal regulatory limits.

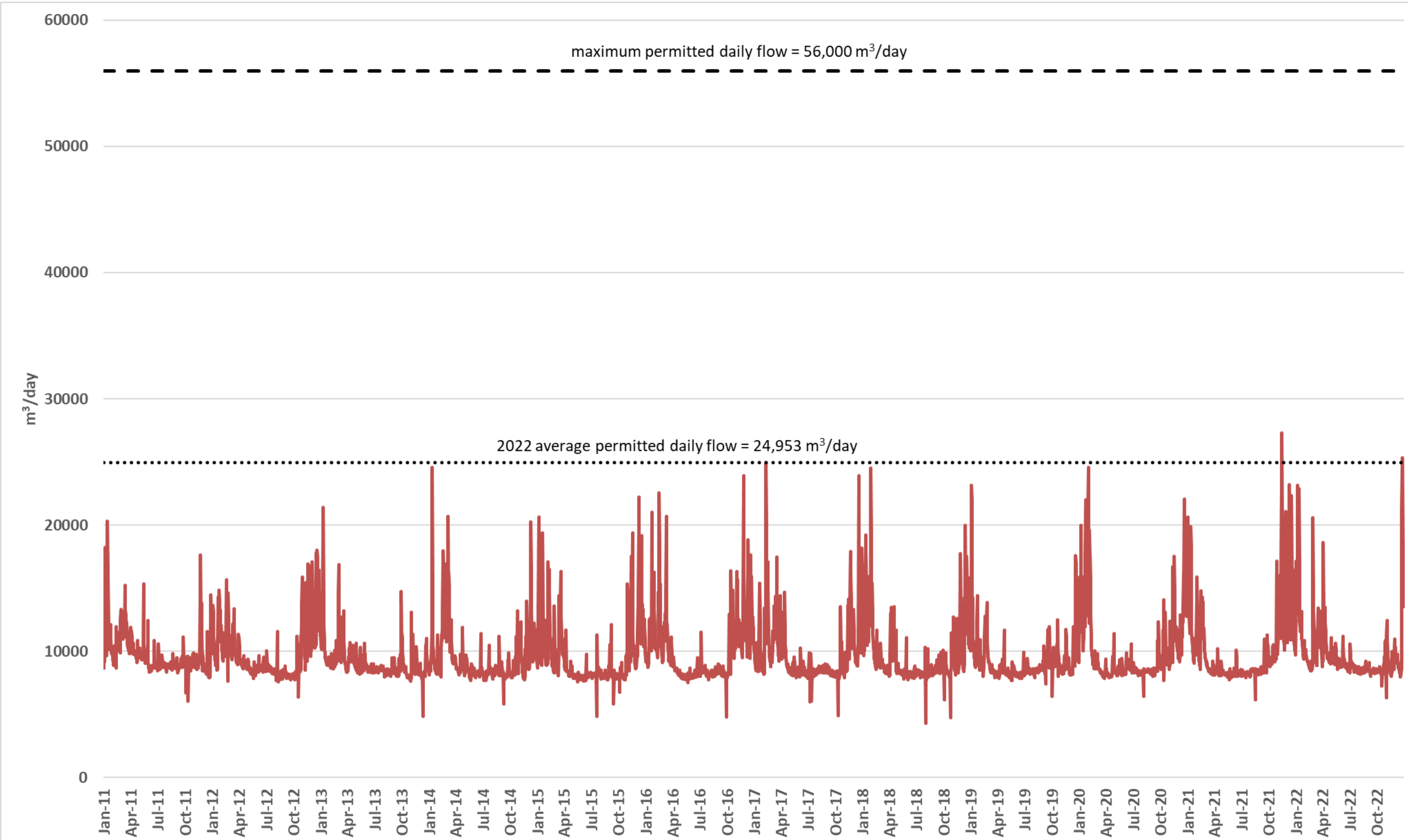


Figure 3.1 SPWTP Effluent flows from 2011-2022

Table 3.2 SPTP 2022 Provincial Compliance Monitoring and Treatment Plant Performance Results

Parameter and Unit	Effluent Regulatory Limit	Influent				Effluent			
		n	Mean	Min	Max	*n*	Mean	Min	Max
CBOD (mg/L)	45 maximum	4	223	190	250	111	5	1	37
TSS (mg/L)	45 maximum	4	149	56	240	28	10	1.6	21
Flow (m^3/d)	24,953 average daily 56,000 maximum daily	---	---	---	---	365	9,833	6,357	25,364
pH (pH units)	6-9	32	7.38	7.1	7.84	32	7.19	6.9	7.72
NH_3 (mg/L N)	required, but no limit	32	30.4	0.44	45	31	3.7	0.02	12.8
Fecal coliform (CFU/100 mL)	required, but no limit	8	10,500,000	1,600,000	47,000,000	32	449,057	720	9,900,000
Alkalinity (mg/L)	*	12	214	178	237	12	57	23.7	88
Chloride (mg/L)	*	7	96	71	120	7	94	75	140
COD (mg/L)	*	56	1,440	222	11,000	56	803	33	4,250
BOD (mg/L)	*	56	243	62.9	382	105	15	3.6	39.4
Nitrate (mg/L N)	*	28	0.44	0.01	11.3	28	12.2	7.2	15.4
Nitrite (mg/L N)	*	32	1.42	0.001	42	32	46	0.032	785
TKN (mg/L N)	*	28	44.1	14.9	64.9	28	338	0.2	7,650
TP (mg/L P)	*	20	5.8	2.4	11	20	3	0.171	6.47

Notes:
CBOD = carbonaceous biochemical oxygen demand, COD = chemical oxygen demand, FC = fecal coliforms, NH_3 = ammonia, BOD = biochemical oxygen demand, TDP = total dissolved phosphorus, TKN = total Kjeldahl nitrogen, TP = total phosphorus, TSS = total suspended solids
Average daily flows limit determined on an annual basis = [12,200 m^3/d * ($1.0316^{\text{calendar year} - 1999}$)].
* Measured to assess treatment plant performance.
Shaded value indicates exceedance to permitted maximum.

Table 3.3 Saanich Peninsula Treatment Plant Federal Wastewater Compliance Results 2022

Saanich Peninsula Treatment Plant Secondary Effluent				
	CBOD (mg/L)	Unionized ammonia (mg/L N)	pH @ 15°C	TSS (mg/L)
Federal Limit	25 average	1.25 max	---	25 average
	n=111	*n*=28	*n*=28	*n*=28
January	4.4	0.0003	6.5	7.3
February	4.2	0.05	6.4	7.5
March	3.5	0.05	6.8	11.0
April	4.0	0.05	6.9	7.0
May	9.7	0.05	6.8	17.0
June	3.0	0.05	6.9	5.0
July	3.8	0.03	6.6	7.9
August	4.4	0.05	7.0	9.0
September	2.9	0.05	6.8	8.5
October	5.1	0.04	6.7	10.9
November	6.1	0.05	6.4	12.5
December	4.4	0.05	6.7	16.5

3.3.2 Priority Substances

Over 550 priority substances were analyzed in the SPTP influent and effluent, including high-resolution substances on a quarterly basis. Approximately 39% of these were detected in effluent in greater than 50% of the samples and are listed in Table 3.4. These include most of the conventional variables (TSS, BOD, CBOD, nutrients, etc.), metals, some organics and high-resolution parameters.

Table 3.4 presents annual mean, minimum and maximum effluent concentrations, and loadings of the priority substances detected in greater than 50% of sampling events. The 1:153 estimated minimum initial dilution factor (Hayco, 2005) was applied to the maximum concentrations and the resulting concentrations were then compared to the ENV approved (BCMoE&CCS, 2019) and working (BCMoE&CCS, 2017) WQG, the CCME *Water Quality Guidelines for the Protection of Aquatic Life* (CCME, 2003), and the Health Canada *Guidelines for Canadian Recreational Water Quality* (Health Canada, 2012) to assess predicted environmental concentrations. It should be noted that not all substances (e.g., alkalinity, conductivity, hardness and pH) discharged to the marine receiving environment could be assessed by extrapolating effluent concentrations using predicted minimum initial dilution. These parameters are not suitable for effluent dilution calculations (e.g., pH of 7.0 cannot be divided by estimated minimum initial dilution of 1:153).

The maximum concentrations of most parameters were below guidelines in undiluted effluent (i.e., prior to discharge). Parameters not meeting WQG in undiluted effluent (maximum concentrations) included: enterococci, WAD cyanide, nitrogen, copper, zinc, and total polychlorinated biphenyls (high-res), (Table 3.4); these exceedances have also been observed in previous years. All results were below WQG after application of the estimated minimum initial dilution factor (i.e., the maximum predicted concentration in the environment), with the exception of enterococci. Effluent concentrations have consistently been below WQG from 2000-2022, after estimated minimum initial dilution has been applied (CRD, 2002-2021). CRD staff will continue to monitor effluent to determine whether exceedances of BC WQG are changing in frequency over time.

3.3.3 Toxicity Testing

Table 3.5 presents the results from the 2022 acute toxicity testing. There was no mortality observed for either acute toxicity test (Rainbow trout or *Daphnia*) in any of the samples (January, April, July and October). Table 3.6 presents the results from the 2022 chronic toxicity testing indicating no impact to organisms when exposed to 100% effluent.

3.4 Overall Assessment

Overall, the 2022 wastewater monitoring results were generally consistent with previous years. There were no exceedances to permitted compliance parameter requirements stipulated under the provincial operational certificate and federal WSER, indicating that wastewaters, from an operational perspective, were as expected. In addition, because all priority substances met applicable WQG in the marine receiving environment (following the application of estimated minimum initial dilution factors), with the exception of bacteriological indicators, it is not likely that significant effects on aquatic life will occur as a result of the substances being discharged. The use of an estimated minimum initial dilution factor allows for a conservative (i.e., protective) estimate of potential effects because the predicted average initial factors are actually much higher in the marine receiving environments around the outfall (Hayco, 2005). Direct risk to human health and shellfish harvesting, as a result of the bacteriological indicator exceedances in effluent, was assessed via surface water and water column monitoring in the receiving environment (see Section 5.0).

Table 3.4 Annual Concentrations and Loadings of Frequently Detected Substances (≥50% of the time) in SPTP Effluent, 2022

Parameter Name	Unit Code	% Freq	Average Concentration	Min	Max	Max Diluted (1:153)	Average Eff Load (kg/year)	WQG
Bacteria								
Enterococci	CFU/100 mL	100	7,574	860	22,933	150	---	35d, 70d
Fecal Coliforms	CFU/100 mL	100	145,049	720	910,000	5,948	---	
Conventionals								
Alkalinity - Bicarbonate	mg/L	100	58.3	43.0	80.0	0.52	---	
Alkalinity - Total - Ph 4.5	mg/L	100	47.5	35.0	66.0	0.43	---	
BOD	mg/L	100	13.73	3.90	19.0	0.12	---	
CBOD	mg/L	75	5.20	2.00	8.20	0.05	---	
COD	mg/L	100	131	40.0	373	2.44	---	
H2S	mg/L	100	0.03	0.03	0.03	0.0002	221	
Hardness (as CaCO3)	mg/L	100	90.3	84.1	105	0.69	---	
N - Nh3 (As N)	mg/L	100	2.23	0.06	4.00	0.03	120,435	19.7
N - Total (As N)	mg/L	100	15.3	12.2	19.3	0.13	635,910	3.7a
Organic Carbon	mg/L	100	561	12.0	2,200	14.4	30,074,742	
P - Po4 - Total (As P)	µg/L	100	2,399	171	5,557	36.3	201,211	
pH	pH	100	7.37	7.16	7.72	0.05	---	7.0-8.7b.c
pH @ 15° C	pH	100	6.53	6.34	6.80	0.04	---	
Sulfide	mg/L	100	0.02	0.02	0.02	0.0002	1,451	
TSS	mg/L	100	5.10	1.60	8.80	0.06	216,236	
Total/SAD Cyanide	mg/L	100	0.003	0.001	0.01	0.00004	301.74	
WAD Cyanide	mg/L	100	0.002	0.001	0.01	0.00004	271	0.001a
Metals								
Aluminum	µg/L	100	21.4	18.4	23.2	0.15	1,815	
Antimony	µg/L	100	0.26	0.22	0.32	0.002	23.3	
Arsenic	µg/L	100	0.27	0.23	0.31	0.002	22.1	12.5a,c
Barium	µg/L	100	7.71	7.08	8.56	0.06	634	
Cadmium	µg/L	100	0.02	0.01	0.03	0.0002	1.52	0.12b,c
Calcium	mg/L	100	21.3	20.5	22.9	0.15	1,812,828	
Chromium	µg/L	100	0.48	0.34	0.61	0.004	38.6	56b,c
Cobalt	µg/L	100	0.27	0.22	0.33	0.002	23.0	
Copper	µg/L	100	10.4	6.18	15.2	0.10	826	<2(lt), 3(st)a
Iron	µg/L	100	107	73.8	148	0.97	8,420	
Lead	µg/L	100	0.36	0.25	0.53	0.003	27.65	<2(lt), 140(st)a

Table 3.4, continued

Parameter Name	Unit Code	% Freq	Average Concentration	Min	Max	Max Diluted (1:153)	Average Eff Load (kg/year)	WQG
Magnesium	mg/L	100	9.01	7.98	11.7	0.08	777,228	
Manganese	µg/L	100	32.9	27.6	37.5	0.24	2,805	100b
Molybdenum	µg/L	100	0.91	0.62	1.20	0.01	79.31	
Nickel	µg/L	100	1.87	1.41	2.44	0.02	159	8.3b
Potassium	mg/L	100	13.4	9.07	17.8	0.12	1,112,205	
Selenium	µg/L	100	0.14	0.12	0.18	0.001	12.1	2a
Silver	µg/L	75	0.02	0.01	0.02	0.0001	1.35	1.5(lt), 3(st)a
Tin	µg/L	100	0.49	0.38	0.64	0.004	41.3	
Zinc	µg/L	100	30.7	23.1	39.1	0.26	2,568	10(lt), 55(st)a
Metals Other								
Monobutyltin	µg/L	67	0.01	0.001	0.03	0.0002	0.37	
Monobutyltin Trichloride	µg/L	100	0.02	0.01	0.05	0.0003	0.66	
Organics								
1,4-Dioxane	µg/L	75	0.38	0.22	0.71	0.005	21.78	
1,7-Dimethylxanthine	ng/L	100	257	231	298	1.95	7.74	
Pentachlorobenzene	ng/L	75	0.05	0.03	0.11	0.001	0.002	
Perfluorobutanoic acid	ng/L	100	20.1	11.7	41.8	0.27	0.90	
Trichloromethane	µg/L	100	1.38	1.20	1.80	0.01	57.9	
Nonylphenols								
4-n-Octylphenol	ng/L	75	1.33	0.77	2.22	0.01	0.06	
4-Nonylphenol Diethoxylates	ng/L	100	201	66.9	433	2.83	9.85	
4-Nonylphenol Monoethoxylates	ng/L	100	456	238	689	4.50	20.01	700b
Np	ng/L	100	57.2	17.4	109	0.71	2.66	700b
High Resolution								
PAH								
1-Methylphenanthrene	ng/L	75	0.97	0.45	1.40	0.01	0.04	
2,3,5-trimethylnaphthalene	ng/L	100	1.75	1.17	2.38	0.02	0.07	
2,6-dimethylnaphthalene	ng/L	100	1.72	0.76	3.32	0.02	0.07	
Dibenzothiophene	ng/L	100	1.72	1.13	2.70	0.02	0.07	
Phenanthrene	ng/L	75	6.68	5.06	10.02	0.07	1.22	
PBDE								
PBDE 12/13	pg/L	75	1.63	0.87	2.80	0.02	0.0001	
PBDE 15	pg/L	100	2.25	1.55	3.14	0.02	0.0001	
PBDE 17/25	pg/L	100	15.8	7.92	26.9	0.18	0.001	
PBDE 28/33	pg/L	100	35.7	16.0	54.9	0.36	0.001	
PBDE 37	pg/L	100	6.74	2.97	9.64	0.06	0.0002	

Table 3.4, continued

Parameter Name	Unit Code	% Freq	Average Concentration	Min	Max	Max Diluted (1:153)	Average Eff Load (kg/year)	WQG
PBDE 47	pg/L	100	1,353	677	2,000	13.1	0.04	
PBDE 49	pg/L	100	31.7	13.9	47.7	0.31	0.001	
PBDE 51	pg/L	100	3.86	1.97	6.07	0.04	0.0001	
PBDE 66	pg/L	100	32.0	17.6	46.4	0.30	0.001	
PBDE 71	pg/L	100	5.21	2.90	7.70	0.05	0.0002	
PBDE 79	pg/L	75	13.9	1.35	41.1	0.27	0.001	
PBDE 85	pg/L	100	55.7	20.5	84.9	0.55	0.002	
PBDE 99	pg/L	100	1,299	539	2,050	13.4	0.04	
PBDE 100	pg/L	100	266	114	418	2.73	0.01	
PBDE 119/120	pg/L	100	3.98	1.88	6.49	0.04	0.0001	
PBDE 138/166	pg/L	100	15.5	5.79	26.7	0.17	0.0005	
PBDE 140	pg/L	100	4.41	1.64	7.63	0.05	0.0001	
PBDE 153	pg/L	100	113	43.2	181	1.18	0.004	
PBDE 154	pg/L	100	87.1	33.0	145	0.95	0.003	
PBDE 155	pg/L	100	7.82	3.71	12.4	0.08	0.0002	
PBDE 183	pg/L	100	15.9	6.38	25.7	0.17	0.0005	
PBDE 203	pg/L	100	13.3	6.10	19.1	0.12	0.0004	
PBDE 206	pg/L	100	61.8	3.80	115	0.75	0.002	
PBDE 207	pg/L	100	105	68.8	156	1.02	0.003	
PBDE 208	pg/L	100	66.1	58.9	84.4	0.55	0.002	
PBDE 209	pg/L	100	1,676	963	2,250	14.7	0.055	
PCB								
PCB 1	pg/L	100	9.30	3.49	22.3	0.15	0.0004	
PCB 2	pg/L	100	3.34	2.24	4.77	0.03	0.0001	
PCB 3	pg/L	100	4.68	3.14	8.32	0.05	0.0002	
PCB 4	pg/L	75	6.01	5.65	6.29	0.04	0.0003	
PCB 6	pg/L	75	3.95	2.69	5.51	0.04	0.0002	
PCB 8	pg/L	100	9.15	5.48	11.6	0.08	0.0004	
PCB 11	pg/L	100	59.5	35.3	83.7	0.55	0.002	
PCB 15	pg/L	100	7.68	4.11	11.3	0.07	0.0003	
PCB 16	pg/L	100	5.51	2.69	8.44	0.06	0.0002	
PCB 17	pg/L	100	4.68	2.47	6.63	0.04	0.0002	
PCB 18/30	pg/L	100	10.0	6.56	14.4	0.09	0.0004	
PCB 19	pg/L	100	2.19	1.78	2.57	0.02	0.0001	
PCB 20/28	pg/L	100	18.5	10.5	26.4	0.17	0.0007	
PCB 21/33	pg/L	100	9.33	5.06	13.2	0.09	0.0004	
PCB 22	pg/L	100	7.30	3.92	10.7	0.07	0.0003	
PCB 26/29	pg/L	100	2.92	1.61	3.77	0.02	0.0001	
PCB 31	pg/L	100	15.04	8.51	22.1	0.14	0.001	

Table 3.4, continued

Parameter Name	Unit Code	% Freq	Average Concentration	Min	Max	Max Diluted (1:153)	Average Eff Load (kg/year)	WQG
PCB 32	pg/L	100	3.44	2.36	5.29	0.03	0.0001	
PCB 35	pg/L	75	1.77	1.19	2.49	0.02	0.0001	
PCB 37	pg/L	100	4.93	2.61	7.56	0.05	0.0002	
PCB 40/41/71	pg/L	100	6.59	3.04	9.95	0.07	0.0003	
PCB 42	pg/L	75	3.17	1.55	5.46	0.04	0.0001	
PCB 44/47/65	pg/L	100	38.2	12.8	60.2	0.39	0.002	
PCB 45/51	pg/L	100	6.46	2.70	12.2	0.08	0.0003	
PCB 48	pg/L	75	2.68	1.13	4.38	0.03	0.0001	
PCB 49/69	pg/L	100	8.11	4.10	12.6	0.08	0.0003	
PCB 50/53	pg/L	100	2.03	1.12	2.80	0.02	0.0001	
PCB 52	pg/L	100	19.4	11.7	28.3	0.18	0.001	
PCB 56	pg/L	100	4.73	2.72	7.12	0.05	0.0002	
PCB 60	pg/L	75	2.93	1.58	4.28	0.03	0.0001	
PCB 61/70/74/76	pg/L	100	20.9	11.0	30.2	0.20	0.001	
PCB 64	pg/L	100	5.95	2.22	8.98	0.06	0.0002	
PCB 66	pg/L	100	9.11	4.42	14.8	0.10	0.0004	
PCB 68	pg/L	75	3.12	1.42	5.71	0.04	0.0001	
PCB 82	pg/L	75	2.61	1.05	3.65	0.02	0.0001	
PCB 83/99	pg/L	100	12.8	7.12	20.2	0.13	0.001	
PCB 84	pg/L	75	5.24	2.65	7.99	0.05	0.0002	
PCB 85/116/117	pg/L	100	4.03	2.28	6.37	0.04	0.0002	
PCB 86/87/97/108/119/125	pg/L	100	16.1	7.91	24.3	0.16	0.001	
PCB 88/91	pg/L	75	3.01	1.79	4.31	0.03	0.0001	
PCB 90/101/113	pg/L	100	19.6	10.5	29.5	0.19	0.001	
PCB 92	pg/L	100	3.83	1.86	6.21	0.04	0.0002	
PCB 93/95/98/100/102	pg/L	100	17.0	9.07	24.2	0.16	0.001	
PCB 105	pg/L	100	6.15	3.21	9.59	0.06	0.0002	900a
PCB 109	pg/L	75	1.50	0.96	2.08	0.01	0.0001	
PCB 110/115	pg/L	100	20.8	11.7	30.4	0.20	0.001	
PCB 118	pg/L	100	18.1	10.6	30.5	0.20	0.001	
PCB 128/166	pg/L	100	2.45	1.71	3.37	0.02	0.0001	
PCB 129/138/160/163	pg/L	100	19.6	13.8	27.8	0.18	0.001	
PCB 132	pg/L	100	6.17	3.58	8.81	0.06	0.0002	
PCB 135/151/154	pg/L	100	6.34	3.78	9.00	0.06	0.0003	
PCB 136	pg/L	75	2.07	0.90	3.38	0.02	0.0001	
PCB 141	pg/L	75	2.85	1.96	3.98	0.03	0.0001	
PCB 144	pg/L	75	1.11	0.74	1.45	0.01	0.00005	
PCB 146	pg/L	100	4.00	2.20	5.97	0.04	0.0002	

Table 3.4, continued

Parameter Name	Unit Code	% Freq	Average Concentration	Min	Max	Max Diluted (1:153)	Average Eff Load (kg/year)	WQG
PCB 147/149	pg/L	100	13.4	6.88	22.4	0.15	0.001	
PCB 153/168	pg/L	100	20.1	13.4	29.6	0.19	0.001	
PCB 155	pg/L	75	1.67	0.87	2.92	0.02	0.0001	
PCB 156/157	pg/L	75	2.37	1.69	3.26	0.02	0.0001	
PCB 158	pg/L	75	1.74	0.87	2.46	0.02	0.0001	
PCB 164	pg/L	75	1.35	1.05	1.62	0.01	0.0001	
PCB 170	pg/L	100	3.41	2.27	4.56	0.03	0.0001	
PCB 174	pg/L	100	3.31	1.85	4.63	0.03	0.0001	
PCB 177	pg/L	100	2.09	1.53	2.66	0.02	0.0001	
PCB 179	pg/L	75	1.60	0.79	2.34	0.02	0.0001	
PCB 180/193	pg/L	100	9.61	6.42	13.1	0.09	0.0004	
PCB 183/185	pg/L	75	2.62	1.37	3.81	0.02	0.0001	
PCB 184	pg/L	100	2.42	1.38	4.07	0.03	0.0001	
PCB 187	pg/L	100	6.10	3.45	10.1	0.07	0.0002	
PCB 194	pg/L	75	1.76	1.02	2.10	0.01	0.0001	
PCB 198/199	pg/L	75	1.98	1.26	2.84	0.02	0.0001	
PCB 203	pg/L	75	1.59	1.05	2.17	0.01	0.0001	
PCB 206	pg/L	75	2.29	1.29	3.74	0.02	0.0001	
PCB 208	pg/L	75	1.63	1.03	2.51	0.02	0.0001	
PCB 209	pg/L	75	2.15	1.53	3.16	0.02	0.0001	
PCB Teq 3	pg/L	100	0.01	0.01	0.01	0.0001	0.0000001	
PCB Teq 4	pg/L	100	0.88	0.88	0.88	0.01	0.00001	
PCBs Total	pg/L	100	465	192	697	4.56	0.02	100a
PCDD								
1,2,3,4,6,7,8-HPCDD	pg/L	75	0.84	0.53	1.06	0.01	0.00004	
OCDD	pg/L	100	3.16	2.49	4.39	0.03	0.0001	
Total Hepta-Dioxins	pg/L	75	0.79	0.53	0.90	0.01	0.00003	
PFOS								
Perfluorodecanoic acid (PFDA)	ng/L	100	1.13	0.79	1.55	0.01	0.05	
Perfluoroheptanoic Acid (PFHpA)	ng/L	100	2.40	1.84	3.48	0.02	0.11	
Perfluorohexanoic Acid (PFHxA)	ng/L	100	9.36	7.30	12.5	0.08	0.40	
Perfluorononanoic Acid (PFNA)	ng/L	75	0.83	0.55	1.20	0.01	0.04	
Perfluorooctanesulfonic acid (PFOS)	ng/L	100	3.66	3.03	4.33	0.03	0.16	
Perfluorooctanoic acid (PFOA)	ng/L	100	4.78	4.05	5.47	0.04	0.21	
Perfluoropentanoic Acid (PFPeA)	ng/L	100	13.9	10.2	22.0	0.14	0.61	
PFBS	ng/L	100	2.48	1.20	4.22	0.03	0.12	
PFHxS	ng/L	100	3.45	1.85	4.42	0.03	0.16	
Pesticides								
2,4-DDD	ng/L	100	3.55	1.30	5.67	0.04	0.14	

Table 3.4, continued

Parameter Name	Unit Code	% Freq	Average Concentration	Min	Max	Max Diluted (1:153)	Average Eff Load (kg/year)	WQG
4,4-DDE	ng/L	75	0.12	0.06	0.21	0.001	0.01	
Beta-Endosulfan	ng/L	100	0.53	0.37	0.79	0.01	0.02	1.6b
Beta-Hch Or Beta-Bhc	ng/L	75	0.11	0.06	0.21	0.001	0.005	
Hch, Gamma	ng/L	75	0.13	0.07	0.21	0.001	0.01	
Hexachlorobenzene	ng/L	75	0.05	0.03	0.11	0.001	0.00	
PPCP								
2-Hydroxy-Ibuprofen	ng/L	100	1,875	364	3,820	25.0	68.8	
Acetaminophen	ng/L	100	480	7.21	784	5.12	15.2	
Androstenedione	ng/L	100	6.02	3.54	7.89	0.05	0.25	
Azithromycin	ng/L	100	358	203	590	3.86	11.4	
Bisphenol A	ng/L	75	89.6	9.67	199	1.30	3.32	900b
Caffeine	ng/L	100	243	148	428	2.80	7.84	
Carbamazepine	ng/L	100	521	487	566	3.70	15.3	
Ciprofloxacin	ng/L	100	194	136	251	1.64	5.54	
Clarithromycin	ng/L	100	131	122	138	0.90	3.89	
Dehydronifedipine	ng/L	100	13.4	9.07	17.4	0.11	0.38	
Diltiazem	ng/L	100	420	361	490	3.20	12.4	
Diphenhydramine	ng/L	100	489	283	604	3.95	13.7	
Erythromycin-H2O	ng/L	100	41.0	5.70	81.6	0.53	1.18	
Estrone	ng/L	75	71.7	2.84	159	1.04	2.84	
Fluoxetine	ng/L	100	29.7	12.4	44.0	0.29	0.82	
Furosemide	ng/L	100	414	219	650	4.25	19.0	
Gemfibrozil	ng/L	100	25.4	5.85	63.5	0.42	0.98	
Glyburide	ng/L	100	2.64	1.69	3.87	0.03	0.11	
Hydrochlorothiazide	ng/L	100	1,978	1,210	2,640	17.3	80.8	
Ibuprofen	ng/L	100	480	86.3	1,240	8.10	22.9	
Lincomycin	ng/L	67	1.44	0.66	2.66	0.02	0.05	
Miconazole	ng/L	100	1.39	0.62	2.08	0.01	0.04	
Naproxen	ng/L	100	501	324	717	4.69	21.3	
Ofloxacin	ng/L	100	20.9	14.0	28.8	0.19	0.59	
Sulfamethoxazole	ng/L	100	355	307	419	2.74	10.4	
Sulfanilamide	ng/L	100	101	101	101	0.66	19.8	
Thiabendazole	ng/L	100	24.2	19.9	29.2	0.19	0.70	
Triclosan	ng/L	100	17.5	15.8	19.4	0.13	0.76	
Trimethoprim	ng/L	100	344	228	446	2.92	9.79	
Tylosin	ng/L	100	6.50	4.41	9.39	0.06	0.20	
Warfarin	ng/L	100	3.97	1.78	5.47	0.04	0.16	

Table notes next page.

Table 3.4, continued

Notes:

[1] As determined by Hayco (2005); n/a=not applicable; ND=not detected; --- parameter does not lend itself to calculating loading, e.g., pH.

a=BC Approved Water Quality Guideline; b=BC Working Water Quality Guideline; c=CCME Water Quality Guideline for the protection of Aquatic Life; d=Health Canada Guidelines for Recreational Water Quality.

*Concentrations are incorporated into compliance monitoring mean values presented in Table 3.2 and Table 3.3. ^loadings for NH_3 and TSS were calculated using available daily/weekly data rather than quarterly data only, in order to increase accuracy.

Shaded cells indicate an exceedance of one or more WQG. Note that this table does not include the results of the compliance and treatment plant performance monitoring, as discussed in Section 3.3.1 and presented in Table 3.2.

Table 3.5 2022 Acute Toxicity Results

Wastewater Concentration	Rainbow trout LC50 96-hour (*Onchorhynchus mykiss*)				Daphnia magna LC50 48-hour			
%v/v	mortality # (96-hr)				mortality # (48-hr)			
	Jan	Apr	Aug	Oct	Jan	Apr	Aug	Oct
0	0	0	0	0	0	0	0	0
6.25	0	0	0	0	0	0	0	0
12.5	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0

Table 3.6 2022 Chronic Toxicity Results

Test	Endpoint (%v/v)	
	EC50 or LC50	EC25 or LC25
Rainbow trout (*Onchorhynchus mykiss*) embryo/alevin test		
• embryo survival	>100	>100
• embryo viability	>100	>100
7-day Topsmelt (*Atherinops affinis*) survival and growth test		
• survival	>100	---
• growth	>100	>100
6-day *Ceriodaphnia* test		
• survival	>100	---
• reproduction	>100	>100
Echinoid fertilization (*Strongylocentrotus purpuratus*)	>100	>100

Notes:
EC50 = Concentration that causes an observable effect in 50% of the test organisms.
EC25 = Concentration that causes an observable effect in 25% of the test organisms.
LC25 = Lethal Concentration to 25% of organisms in the test duration.
LC50 = Lethal Concentration to 50% of organisms in the test duration.
v/v = volume per volume
-- Not tested

4.0 BIOSOLIDS MONITORING

4.1 Introduction

In the SPTP LWMP, the CRD and its partner municipalities on the Saanich Peninsula made a commitment to implement a biosolids management plan, based on the following specific commitments:

- Pursue an effective and diversified program for the beneficial use of Class A biosolids that incorporates an economically viable and long-term solution.
- Mitigate nuisances associated with the production and application of biosolids, including odour, noise, truck traffic and dust.
- Manage biosolids to ensure that detrimental effects to public health and the environment are avoided.

The SPTP can produce Class A biosolids, in accordance with the pathogen reduction and vector attraction reduction processes in the ENV (BC MoE, 2002) *Organic Matter Recycling Regulations* (BC OMRR). These regulations define process and quality criteria for biosolids production and establish land application and distribution requirements. The regulations are set to protect human and environmental health.

In 2008, the CRD developed the PenGrow program to produce a soil enhancer product from the Class A biosolids. Biosolids were an end product of the sewage treatment process and were produced when solids (i.e., sludge) were treated. The product was cured and stored at the CRD's Hartland Landfill and the PenGrow program was intermittently in production until early 2011.

In July 2011, the PenGrow program was put on hold following CRD Board motions that "[ended] the production, storage and distribution of biosolids for land application at all CRD facilities and parks", including Hartland Landfill, and indicated the region "does not support the application of biosolids on farmland in the CRD under any circumstances." These restrictions were subsequently relaxed slightly to allow for non-agricultural land application in the short term. CRD staff are currently investigating a number of longer-term beneficial use options for the biosolids and sludge. Until markets for the biosolids can be developed and implemented, all sludge will be disposed of as controlled waste at the Hartland Landfill. The SPTP generated 3,837 tonnes of dewatered sludge in 2022.

Starting in 2013, the CRD commenced monitoring the sludge to help inform the RSCP on the partitioning behaviour of some wastewater contaminants between the solid and liquid phases of the treatment processes. Metals were of primary interest, as they fall under the RSCP's regulatory regime.

4.2 Methods

Sludge was produced at the SPTP and analyzed for similar parameters as previous years (Table 4.1). Sludge was collected monthly, with replicate samples collected in February and September.

4.3 Results and Discussion

In 2022, 40 parameters were monitored in the SPTP sludge. For those parameters that are BC OMRR regulated, all results were far below the Class A biosolids limit (Table 4.1), similar to previous years.

4.4 Overall Assessment

No biosolids were produced at the SPTP in 2022. It is unknown if or when production will recommence. However, the sludge monitoring data collected to inform the CRD's RSCP showed that all OMRR regulated parameters continue to be far below Class A biosolids limits. The sludge will continue to be disposed of as controlled waste at the Hartland Landfill until their long-term use is determined.

Table 4.1 SPTP Sludge Monitoring, 2022

Parameter	Units	Class A Biosolids Limit (mg/kg)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Regulated Parameters															
Arsenic	mg/kg dry	75	0.46	0.7	0.96	0.93	1.23	---	0.86	1.08	0.78	0.95	0.85	0.68	0.9
Cadmium	mg/kg dry	20	0.306	0.618	0.616	0.599	0.731	---	0.614	0.733	0.737	0.788	0.555	0.775	0.6
Chromium	mg/kg dry	1,060	4.5	5.5	8.1	6.92	8.89	---	7.59	8.37	7.17	6.28	5.67	4.52	6.7
Cobalt	mg/kg dry	151	0.71	0.79	1.19	1.07	1.11	---	0.94	1.28	1.03	1.05	1.0	0.84	1.0
Copper	mg/kg dry	757	110	143	190	180	178	---	225	265	320	350	254	167	217
Lead	mg/kg dry	505	3.49	5.57	13.5	7.29	8.03	---	8.85	8.5	8.24	9.28	8.27	5.96	7.9
Mercury	mg/kg dry	5	0.156	0.194	0.288	0.216	0.307	---	0.299	0.246	0.287	0.401	0.265	0.232	0.3
Molybdenum	mg/kg dry	20	2.32	2.77	3.56	3.35	3.07	---	3.12	3.31	3.79	4.18	2.94	2.68	3.2
Nickel	mg/kg dry	181	4.2	5.14	7.08	6.37	6.58	---	6	7.34	7.81	6.13	4.79	4.15	6.0
Selenium	mg/kg dry	14	1.16	1.5	1.75	1.88	1.88	---	1.95	1.88	1.95	2.13	1.88	1.57	1.8
Thallium	mg/kg dry	5	<0.1	<0.1	<0.1	<0.05	<0.05	---	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.03
Vanadium	mg/kg dry	656	2.1	2.8	4	4.7	4	---	2.6	3.8	2.5	2.3	4	2.8	3.2
Zinc	mg/kg dry	1,868	147	176	226	266	304	---	358	387	400	397	308	248	292
Unregulated Parameters															
Aluminum	mg/kg dry	n/a	1,280	1,080	1,900	1,810	1,320	---	1,090	1,330	932	955	1,400	1,070	1,288
Antimony	mg/kg dry	n/a	0.36	0.54	0.71	0.66	0.75	---	0.71	1.46	0.94	0.99	0.6	0.57	0.8
Barium	mg/kg dry	n/a	20.9	33.1	47.3	50.1	45.5	---	33.1	83.3	45.8	50.9	41.4	30.9	43.8
Beryllium	mg/kg dry	n/a	<0.1	<0.1	<0.1	<0.2	<0.2	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.1
Bismuth	mg/kg dry	n/a	6.37	10.7	14.8	14.8	14.9	---	14.9	14	15	16.8	13.7	13.3	13.6
Boron	mg/kg dry	n/a	11.7	21.9	27.2	15.8	9.7	---	9.6	14	18.8	38.5	14.2	7.3	17.2
Calcium	mg/kg dry	n/a	3,830	5,140	5,940	5,790	5,710	---	6,080	5,700	4,750	4,950	5,390	4,830	5,283
Iron	mg/kg dry	n/a	1,920	1,830	2,750	2,640	3,500	---	2,090	2,720	2,030	2,120	2,470	1,940	2,365
Lithium	mg/kg dry	n/a	0.7	0.52	0.98	0.88	0.61	---	0.52	1.06	<0.50	<0.50	0.63	<0.50	0.6
Magnesium	mg/kg dry	n/a	2,530	3,120	3,930	4,070	3,980	---	2,590	2,330	2,180	3,370	2,410	2,000	2,955
Manganese	mg/kg dry	n/a	43.3	46.2	65.4	49.1	50.9	---	42.5	44.9	35.8	38.7	40.9	36.7	44.9
Moisture	%	n/a	78.7	76.6	76	78	75	---	75	73	75	77	73	71	75.3
Potassium	mg/kg dry	n/a	3,120	3,440	4,770	5,050	4,760	---	3,700	2,760	2,830	4,220	2,920	2,750	3,665
Silver	mg/kg dry	n/a	0.69	0.71	0.92	0.891	1.06	---	1.04	0.991	1.11	1.39	0.87	0.894	1.0
Sodium	mg/kg dry	n/a	254	303	434	371	371	---	392	427	415	439	346	397	377
Strontium	mg/kg dry	n/a	14.3	18.2	20.8	19.8	17	---	19.7	21.4	17.1	19.8	17.7	16.5	18.4
Tin	mg/kg dry	n/a	5.23	7.15	8.86	9.74	9.45	---	8.72	9.69	9.52	10.4	8.62	8.25	8.7

Table 4.1, continued

Parameter	Units	Class A Biosolids Limit (mg/kg)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Titanium	mg/kg dry	n/a	5.5	23.2	41.9	33.8	24.7	---	19.8	16.5	20.1	16.3	21.2	16.8	21.8
Total Solids	%	n/a	21.3	21	24.7	22.4	25.5	---	25.3	26.8	25.5	22.6	26.9	29.5	24.7
Tungsten	mg/kg dry	n/a	0.21	0.29	0.41	0.25	0.55	---	0.25	0.25	0.25	0.25	0.25	0.25	0.3
Uranium	mg/kg dry	n/a	0.261	0.302	0.4	0.473	0.388	---	0.285	0.371	0.222	0.222	0.34	0.288	0.3
WAD Cyanide	mg/kg dry	n/a	2.35	2.14	2.05	---	0.071	---	0.19	0.067	0.047	0.32	0.097	0.067	0.7
Zirconium	mg/kg dry	n/a	1.0	2.0	3.1	2.02	1.79	---	1.01	1.53	0.57	4.5	2.21	3.07	2.1

Notes:

*From Organic Matter Recycling Regulation (B.C. Reg. 18/2002, Schedule 4 Section 3, February 28, 2019), which references Trade Memorandum T-4-93 'Safety Guidelines for Fertilizers and Supplements' (Sept 1997) and contains maximum acceptable metal concentrations based on annual application rates (mg metal/kg product) 4,400 kg/ha – yr.

FR1 and FR2 indicate two samples (field replicates) collected that month as part of QA/QC protocols.

--- Indicates data not available / sample not collected.

5.0 RECEIVING ENVIRONMENT MONITORING

Receiving environment monitoring is undertaken to assess human health and environmental impacts of the SPTP outfall. In addition, the results are used to verify the environmental concentrations of parameters that are predicted using wastewater concentration data and the 1:153 minimum initial dilution factor determined during the 2004 dye study (Hayco, 2005) (discussed in Section 3.0).

5.1 Introduction

The CRD conducts receiving environment monitoring adjacent to the SPTP wastewater discharge to assess the potential for human health risk for those participating in recreational activities (e.g., swimmers, kayakers) at the surface near the outfall (see Appendix C1 for site coordinates). In addition, monitoring data are used to assess potential risks to shellfish harvesting in the vicinity of the SPTP outfall, although there is no commitment in the LWMP to meet this standard outside of shellfish growing areas. Finally, surface waters are monitored to ensure that the outfall diffuser is functioning as expected and a minimum initial dilution of 153:1 is being achieved.

A review of the SPTP WMEP was conducted in 2011/2012, in partnership with ENV, including the surface water component. As a result of the review, the surface water sampling program was revised. Beginning in 2013, the fecal coliform sampling was switched from monthly to twice yearly, 5-in-30 sampling (Table 2.1) in order to align more closely with the ENV fecal coliform guideline, based on the geometric mean of 5 samples collected in 30 days not exceeding 200 CFU/100 mL. In addition, enterococci were analysed along with fecal coliforms, as they are a more persistent tracer of human waste in the marine environment, and have a more direct correlation with adverse human health impacts. Metal and conventional parameter concentrations were also added as extended analyses to the surface water monitoring program (Appendix C2) to confirm environmental concentrations that were previously only predicted by using wastewater data (Section 3.0) and applied minimum initial dilution factors.

5.2 Methods

The CRD sampling technicians sampled surface waters and the water column over two sampling periods ("winter", i.e., January/February 2022 and "summer", i.e., June/July 2022) using a 5 m research vessel positioned by global positioning system.

Each sampling period consisted of five individual sampling days occurring over a 30-day period ("5-in-30"). Nineteen stations at different distances from the outfall terminus were sampled. Sampling stations consisted of 14 outfall stations, one reference station located near Sidney Island, and four variable stations located at the edge of the IDZ (Figure 5.1). Station codes describe the distance from the outfall terminus in metres with compass direction (i.e., 100N = 100 m north of the outfall). The variable IDZ stations were selected at the time of sampling based on a computer model prediction (Lorax, 2021) of what depth and direction the effluent plume would most likely be trapped due to tides, current flow and direction. See Appendix C1 for a list of stations and coordinates.

Surface samples were collected at a depth of 1 m using a sampling pole. Sterile wide-mouth bottles were placed in the pole holder with the lid removed, submerged to collection depth, brought to the surface, and then excess water poured off before the lid was screwed on tightly.

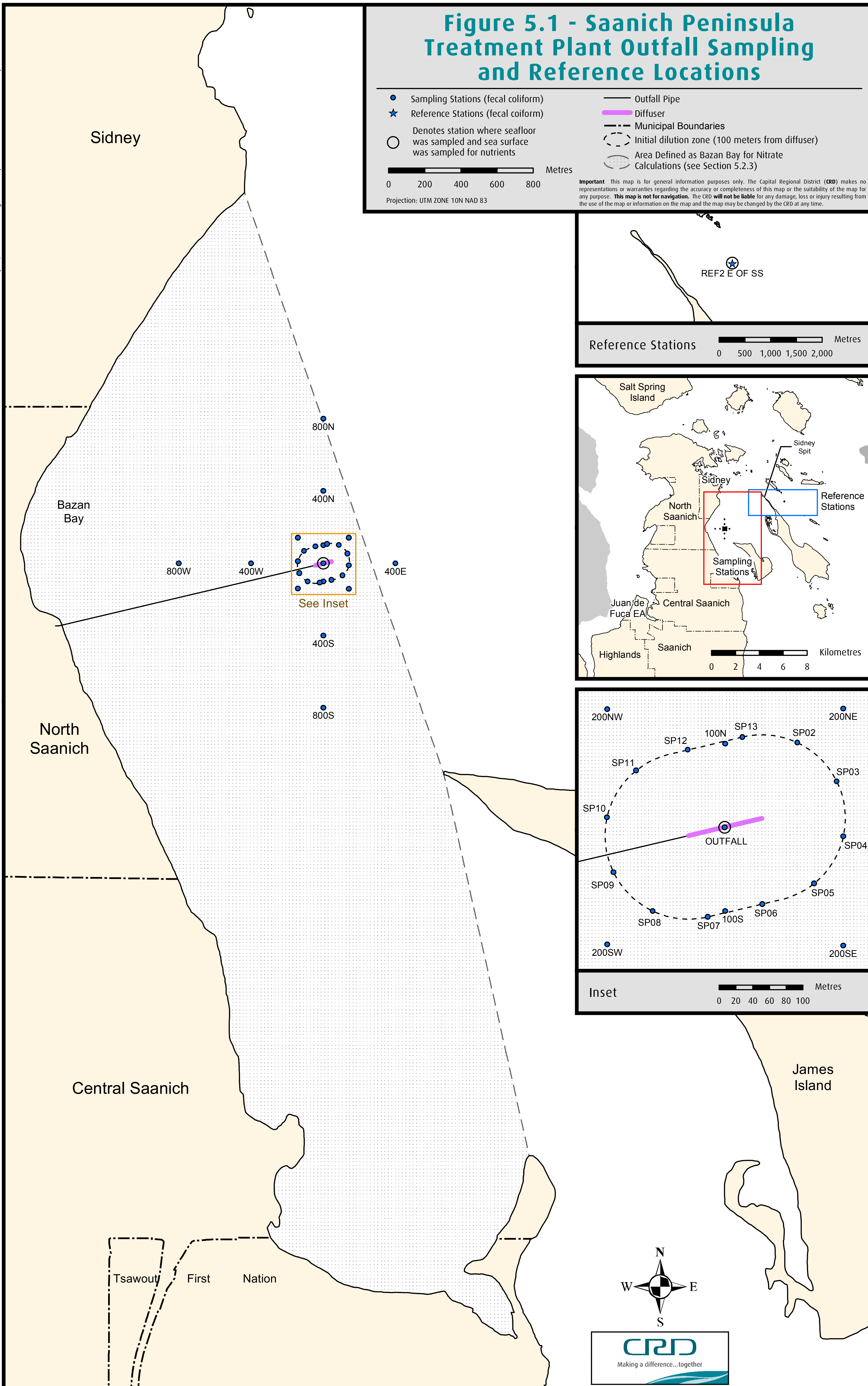
IDZ samples and reference station samples were collected at three depths for each station: "top" (1 m below the surface), "middle" (calculated trapping depth from the computer model prediction), and "bottom" (1 m above the seafloor). An open, set, horizontal Niskin sampling bottle was deployed to the appropriate depth and closed using a weighted messenger. The bottle was then pulled back to the surface and decanted into the required sample containers. All samples were stored in coolers with ice until delivery to the analytical laboratory.

Surface water samples were analyzed by Bureau Veritas Laboratories Inc. (Burnaby, BC) for various parameters, depending on the sampling site and the sampling day. A larger list of parameters, including metals, was analyzed on a single day of each five-day sampling series and results compared to applicable BC WQG. Metals analysis was conducted by ALS Environmental (Victoria, BC). See Appendix A for the list of surface water parameters and the analytical frequency for each.

Bacteriology results were averaged as geometric means and compared to the provincial and federal enterococci guidelines of 35 CFU/100 mL and to the single sample maximum of 70 CFU/100 mL (BCMoE&CCS, 2019, Health Canada, 2012). In addition, results were compared to Canadian Shellfish Sanitation Program (CSSP) guidelines for shellfish harvesting, which require that the geomean of fecal coliform results not exceed 14 CFU/100 mL and not more than 10% of the samples exceed 43 CFU/100 mL (CSSP, 2019).

IDZ samples were analysed for parameters that reflect the suite of nutrients in the SPTP Wastewater Monitoring Program. Both programs monitor ammonia, total Kjeldahl nitrogen (TKN), nitrate, nitrite, total phosphorus, conductivity, pH, salinity, and total organic carbon. While some parameters may not be relevant in the marine receiving environment (e.g., ammonia is measured in wastewater, but is primarily found in the ammonium form in marine waters), they are still monitored to allow for direct comparison of the two sets of results. This suite of nutrients has also been monitored since before the SPTP commenced discharging into Bazan Bay, as part of the pre-discharge monitoring program.

Figure 5.1 - Saanich Peninsula Treatment Plant Outfall Sampling and Reference Locations



5.3 Results and Discussion

Bacteriology

Results show that all stations had very low concentrations of fecal coliforms and enterococci for both the summer and winter 5-in-30 sampling programs (Figure 5.2, Table 5.1, Table 5.2, Table 5.3 and Table 5.4). Figure 5.2 utilizes the maximum value detected for each sampling depth on each sampling event for the calculated geomeans. No single sample or geomean was over the respective human recreation or shellfish harvesting guidelines at the surface water (1 m depth) stations throughout the water column, with a maximum geomean of 2 CFU/100 mL recorded for fecal coliforms and 1 CFU/100mL for enterococci (Table 5.1 and Table 5.2). The IDZ stations had a maximum geomean of 2 CFU/100 mL for fecal coliform and 1 CFU/100 mL for enterococci (Table 5.3 and Table 5.4).

All surface water fecal coliform concentrations were well below the conservatively predicted environmental concentration of 5,948 CFU/100 mL, after the minimal initial dilution (1:153) (Hayco, 2005) was applied to the maximum effluent fecal coliform concentration of 910,000 CFU/100 mL (Table 3.4). Similar observations were made for enterococci, where surface water results were well below the 150 CFU/100 mL that was predicted using the maximum effluent enterococci concentration of 22,933 CFU/100 mL and the 153:1 dilution factor.

These results are generally consistent with previous years and previous studies (CRD, 2002-2020), including Island Health's summer beach sampling program that involves monitoring the nearshore environment in Bazan Bay, targeting beaches that are most commonly used for recreation.

Overall, the bacteriological sampling results, and previous dye study results (Hayco, 2005), indicate that the plume was predominantly trapped below the surface and that adverse health effects from recreational primary contact activities or the consumption of shellfish are not likely. There were no enterococci or fecal coliform geomean results or single sample results that exceeded the BC or Health Canada guidelines for the protection of human health, or the CSSP guidelines for shellfish harvesting. The values in Figure 5.2 use the maximum concentrations for each sampling day and depth to build a "worst case" scenario, e.g., a geomean of 3 CFU/100mL for summer middle depth fecal coliform.

As a conservative measure by the federal government, an area of approximately 17.65 km^2 around the outfall is closed for shellfish harvesting, as a standard Fisheries and Oceans Canada procedure near industrial and sanitary wastewater outfalls. Shellfish closures have a minimum radius around an outfall of 300 m, but closure areas are usually larger near bigger urban centres, such as for the SPTP outfall, where there are other potential sources of bacterial contamination (e.g., stormwater discharges, marinas, septic systems, sewage pumps), in addition to the wastewater outfall.

Metals

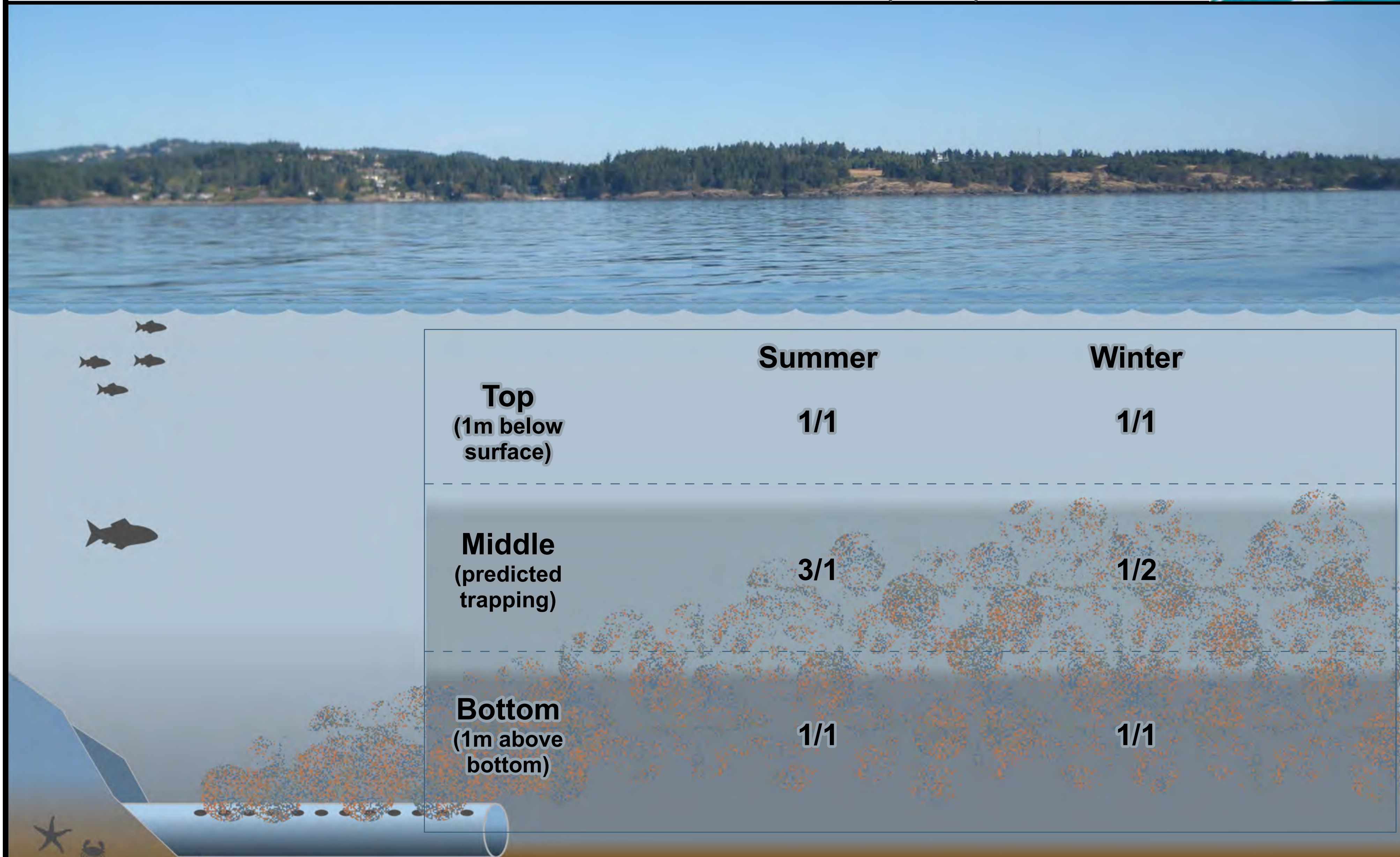
The extended suite of metals was analyzed at the four IDZ sites and a reference site on one day of sampling for each round of 5-in-30 sampling. Results are detailed in Appendix C2. For those parameters that were detected and had relevant BC and CCME WQG, only boron had WQG exceedances. Boron exceeded WQG at every station and every sampling event, including the reference station. This is a common occurrence, as the natural concentrations of boron are above WQG in the Salish Sea. ENV is working on updating the boron guideline.

CRD - Parks & Environmental Services - Facilities Management & Engineering Services - Apr 12, 2023 - Technologist: sruliancich - Map Document: SaanPenWaterColumn2022.mxd

CRD
Making a difference...together

Figure 5.2 - Saanich Peninsula Waste Water Treatment Plant Water Column Sampling

Fecal Coliform and Enterococci Results (5 in 30)



	Summer	Winter
Top (1m below surface)	1/1	1/1
Middle (predicted trapping)	3/1	1/2
Bottom (1m above bottom)	1/1	1/1

Fecal Coliform — **10/41** — Enterococci

Saanich Peninsula Waste Water Treatment Plant IDZ station geometric means of fecal coliform and enterococci counts CFU/100mL (maximum concentrations).

Notes:

Each value is the geometric mean of each maximum value detected at each sampling event (i.e. n=5)
Sampled 5 times in 30 days during each season.
Geometric mean count shown in red if fecal count exceeds 200 CFU/100mL or enterococci count exceeds 20 CFU/100mL.

Table 5.1 SPTP Surface Sites 5 Sampling Events in 30 Days Fecal Coliform 2022

Station		Winter Fecal coliforms (CFU/100mL)						Summer Fecal coliforms (CFU/100mL)					
		1	2	3	4	5	Geomean	1	2	3	4	5	Geomean
Outfall Sites	Outfall	2	8	1	<1	<1	1	6	5	1	<1	1	2
	100N	1	<1	<1	<1	<1	1	2	1	<1	<1	<1	1
	100S	2	<1	<1	1	<1	1	2	1	<1	<1	<1	1
	200NE	<1	<1	<1	1	<1	1	<1	<1	3	<1	1	1
	200NW	<1	<1	<1	<1	<1	1	4	6	<1	<1	<1	1
	200SE	1	<1	<1	<1	<1	1	4	2	<1	<1	<1	1
	200SW	1	2	<1	<1	1	1	<1	1	2	<1	2	1
	400E	2	<1	<1	<1	1	1	1	1	<1	<1	<1	1
	400N	3	<1	1	<1	1	1	<1	<1	1	<1	1	1
	400S	<1	<1	<1	<1	<1	1	<1	1	3	<1	<1	1
	400W	<1	<1	<1	<1	<1	1	3	4	<1	<1	<1	1
	800N	1	<1	1	<1	<1	1	1	<1	<1	<1	<1	1
	800S	1	<1	<1	<1	1	1	1	<1	<1	<1	1	1
	800W	<1	<1	<1	<1	1	1	1	<1	<1	<1	3	1
Reference Site	Reference 2	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1

Notes:
Shaded cells exceed BC Approved WQG = 200 CFU/100 mL (geometric mean over 5 samples).
<1 replaced with 0.5 for Geomean calculation.

Table 5.2 SPTP Surface Sites 5 Sampling Events in 30 Days Enterococci 2022

Station		Winter Enterococci (CFU/100mL)						Summer Enterococci (CFU/100mL)					
		1	2	3	4	5	Geomean	1	2	3	4	5	Geomean
Outfall Sites	Outfall	1	6	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	100N	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	100S	<1	<1	<1	<1	<1	1	<1	2	<1	<1	<1	1
	200NE	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	200NW	1	1	1	<1	<1	1	<1	<1	<1	<1	<1	1
	200SE	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	200SW	1	6	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	400E	1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	400N	<1	<1	1	1	<1	1	<1	<1	<1	<1	<1	1
	400S	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	1
	400W	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	800N	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	1	1
	800S	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	800W	1	<1	<1	<1	<1	1	<1	1	<1	<1	<1	1
Reference Site	Reference 2	<1	1	<1	1	<1	1	<1	<1	<1	<1	<1	1

Notes:
Shaded cells exceed BC Approved WQG = 20 CFU/100 mL (geometric mean over 5 samples).
<1 replaced with 0.5 for Geomean calculation.

Table 5.3 SPTP IDZ Sites 5 Sampling Events in 30 Days Fecal Coliform 2022

Station		Winter Fecal coliforms (CFU/100mL)						Summer Fecal coliforms (CFU/100mL)					
		Day 1	Day 2	Day 3	Day 4	Day 5	Geomean	Day 1	Day 2	Day 3	Day 4	Day 5	Geomean
Reference	Top	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	Middle	<1	<1	<1	<1	1	1	<1	<1	<1	<1	<1	1
	Bottom	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	2	1
Station 1	Top	<1	1	<1	<1	<1	1	1	<1	<1	<1	<1	1
	Middle	1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	Bottom	1	<1	1	<1	<1	1	<1	<1	2	<1	1	1
Station 2	Top	<1	3	<1	<1	<1	1	1	1	<1	<1	<1	1
	Middle	20	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	Bottom	2	1	1	<1	<1	1	1	<1	1	<1	<1	1
Station 3	Top	3	<1	<1	<1	<1	1	2	1	1	<1	3	1
	Middle	3	<1	1	<1	<1	1	2	2	4	11	<1	2
	Bottom	2	<1	<1	1	<1	1	2	<1	<1	<1	<1	1
Station 4	Top	<1	<1	<1	<1	1	1	<1	<1	<1	<1	1	1
	Middle	<1	<1	<1	<1	<1	1	<1	4	<1	<1	<1	1
	Bottom	1	<1	<1	<1	<1	1	1	2	<1	<1	1	1

Notes:
Shaded cells exceed BC Approved WQG = 200 CFU/100 mL (geometric mean over 5 samples).
<1 replaced with 0.5 for Geomean calculation.
--- Indicates incomplete sampling due to adverse weather conditions.

Table 5.4 SPTP IDZ Sites 5 Sampling Events in 30 Days Enterococci 2022

Station		Winter Enterococci (CFU/100mL)						Summer Enterococci (CFU/100mL)					
		Day 1	Day 2	Day 3	Day 4	Day 5	Geomean	Day 1	Day 2	Day 3	Day 4	Day 5	Geomean
Reference	Top	<1	1	<1	1	<1	1	<1	<1	<1	<1	<1	1
	Middle	<1	1	<1	1	<1	1	<1	<1	<1	<1	<1	1
	Bottom	1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
Station 1	Top	<1	<1	<1	1	<1	1	<1	<1	<1	<1	<1	1
	Middle	<1	<1	3	<1	<1	1	<1	<1	<1	<1	1	1
	Bottom	<1	<1	<1	<1	1	1	<1	<1	<1	<1	<1	1
Station 2	Top	1	6	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	Middle	4	4	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	Bottom	1	<1	1	1	<1	1	<1	<1	<1	<1	1	1
Station 3	Top	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	1	1
	Middle	1	<1	1	<1	<1	1	<1	1	3	<1	<1	1
	Bottom	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
Station 4	Top	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	1
	Middle	<1	<1	1	<1	<1	1	<1	1	<1	<1	<1	1
	Bottom	1	<1	1	<1	<1	1	1	1	<1	<1	<1	1

Notes:
Shaded cells exceed BC Approved WQG = 20 CFU/100 mL (geometric mean over 5 samples).
<1 replaced with 0.5 for Geomean calculation.
--- Indicates incomplete sampling due to adverse weather conditions.

Nutrients

The potential effects of the SPTP discharge on nutrient concentrations in the marine receiving environment were assessed by qualitatively comparing the 2022 IDZ and reference station data. Data are presented in Appendix C3.

The 2022 mean concentrations of nutrients, and other measured parameters (i.e., ammonia, TKN, nitrite, nitrate, total phosphorus, dissolved phosphorus), exhibited no consistent (qualitative) differences between outfall and reference stations (Appendix C4). The average concentrations of nutrients in 2022 were also within the ranges measured during the pre- and post-discharge studies (Aquametrix Research Ltd., 2000 and 2001a), and were consistent with recent monitoring years and the concentrations expected in Juan de Fuca Strait. The average surface water result for nitrate was 0.32 mg/L N at the reference station and 0.29 mg/L N at the IDZ stations. For comparison, ambient nitrate concentrations in the Juan de Fuca Strait area are typically in the order of 0.140-0.420 mg/L N (Lewis, 1974 and 1978, as cited in Harrison *et al*., 1994).

Figure 5.3 and Figure 5.4 present 2013-2022 total nitrogen and nitrate results from the reference area and outfall monitoring stations, compared to the Mackas and Harrison (1997) study of background concentrations in the area. The comparison indicates that the monitoring results are well within background concentrations.

Similar to previous years (CRD, 2002-2021), nutrient concentrations in 2022 exhibited high natural spatial and temporal variability, which is typical of the Strait of Georgia and the Juan de Fuca and Haro straits (Mackas and Harrison, 1997). Nutrient concentrations are expected to vary due to seasonal physiochemical and biological cycles in marine waters. From autumn through spring, surface-layer nitrogen concentrations are generally high in the Strait of Georgia and Juan de Fuca and Haro straits because of reduced stratification, sustained tidal and wind mixing and low phytoplankton productivity. In summer, nitrogen concentrations are much lower, coinciding with low salinity and high temperatures influenced by surface water from the Fraser River freshet (Mackas and Harrison, 1997). Ammonia values show a seasonal variation, with total nitrogen and nitrate (Figure 5.3 and Figure 5.4, Appendix C3) lower in the summer and higher in the winter and TKN and nitrite (Appendix C3) higher in the summer and lower in the winter.

Nutrient monitoring results from 2002-2022 have shown no indication of potential for anthropogenic eutrophication due to the outfall. Mackas and Harrison (1997) indicate that the potential for eutrophication of the Strait of Georgia and Juan de Fuca and Haro straits is low for two reasons: first, high ambient nitrate and ammonia concentrations make total primary productivity relatively insensitive to moderate changes; second, the exchange of water by currents is rapid, and water entering the Strait of Georgia and Juan de Fuca Strait carries naturally high nutrient concentrations. Natural nitrogen inputs into the straits from estuarine circulation are estimated to be an order of magnitude higher than all anthropogenic and atmospheric inputs combined (Mackas and Harrison, 1997). SPTP outfall loadings of nitrogen-based nutrients to Bazan Bay were approximately 636 tonnes N/year in 2022 (Table 3.4) (note that the 2022 value is an order of magnitude larger than previous years, due to an updated and corrected calculation method); whereas, the net natural nitrogen input to the Juan de Fuca Strait/Strait of Georgia/Puget Sound estuarine system totals approximately 400-600 tonnes N/day (i.e., 146,000-219,000 tonnes N/year) (Mackas and Harrison, 1997).

Finally, Bazan Bay naturally contains 15-46 tonnes of nitrate alone, if one uses the typical ambient nitrate concentrations in the Juan de Fuca Strait area (0.140-0.420 mg/L N; Lewis 1974, 1978, as cited in Harrison *et al.*, 1994) and an assumed volume of 110,105,000 m^3 (volume calculated for the area enclosed by Sidney to James Island to Cordova Spit; Figure 5.1). Bazan Bay is also well flushed, as is evidenced by the fact that the 2022 surface water nitrate concentrations (Appendix C3) remained within the ambient Juan de Fuca nitrate concentrations. Overall, the 2022 surface water data showed no evidence of any significant effect of the SPTP discharge on nutrients in the Bazan Bay receiving environment.

The conditions that could trigger the re-evaluation of the need for a comprehensive nutrient monitoring program (Section 5.1) were not applied to the 2022 data, as none of the triggers were met. Regardless, the program review with ENV has led to a revised SPTP WMEP, including the surface water monitoring program, which began in 2013. The nutrient component will soon be reviewed by the TWQRP as the review of the need for disinfection has been completed, as per Trigger #4, Section 5.1.

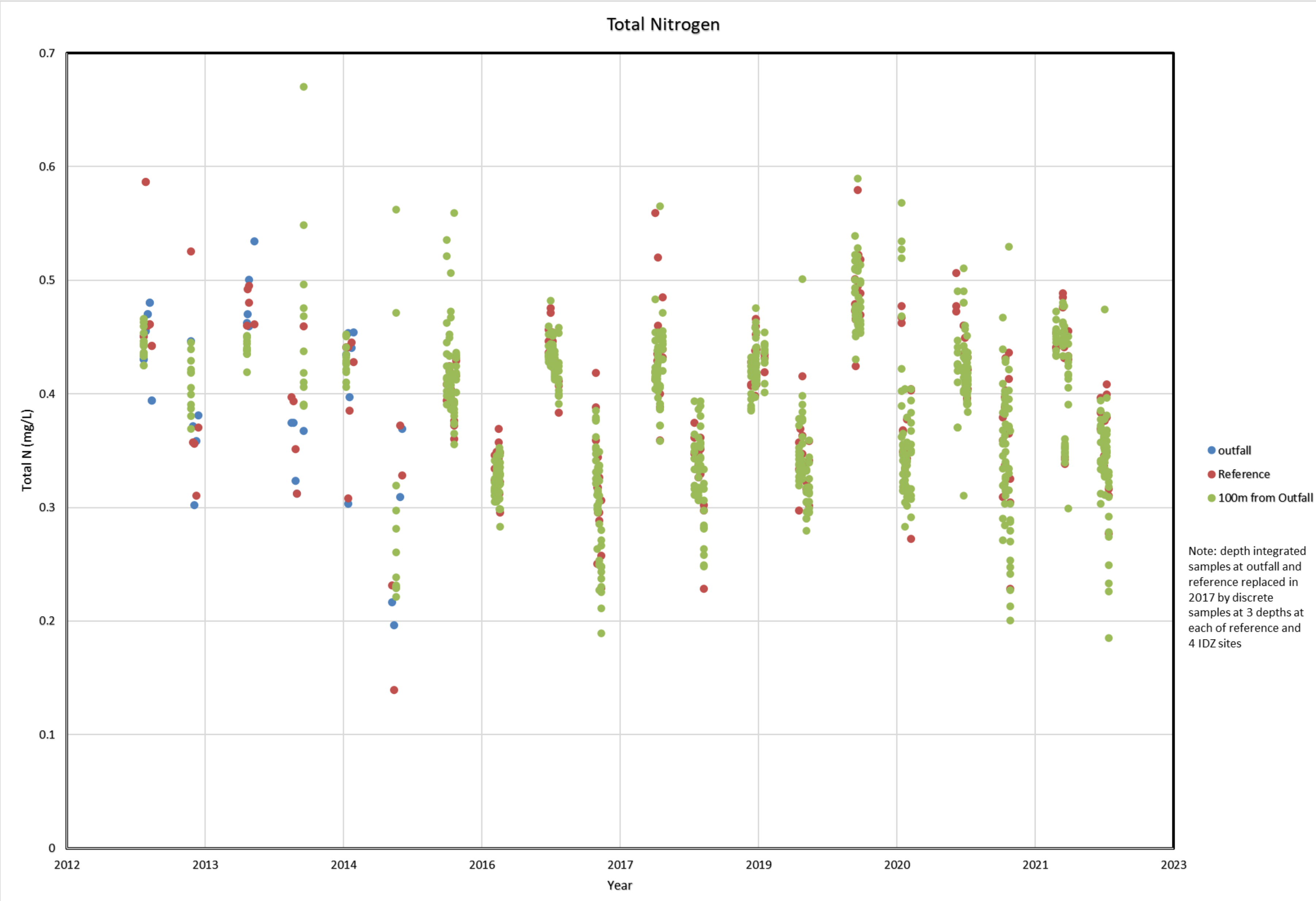


Figure 5.3 SPTP Total Nitrogen Sampling Results 2013-2022

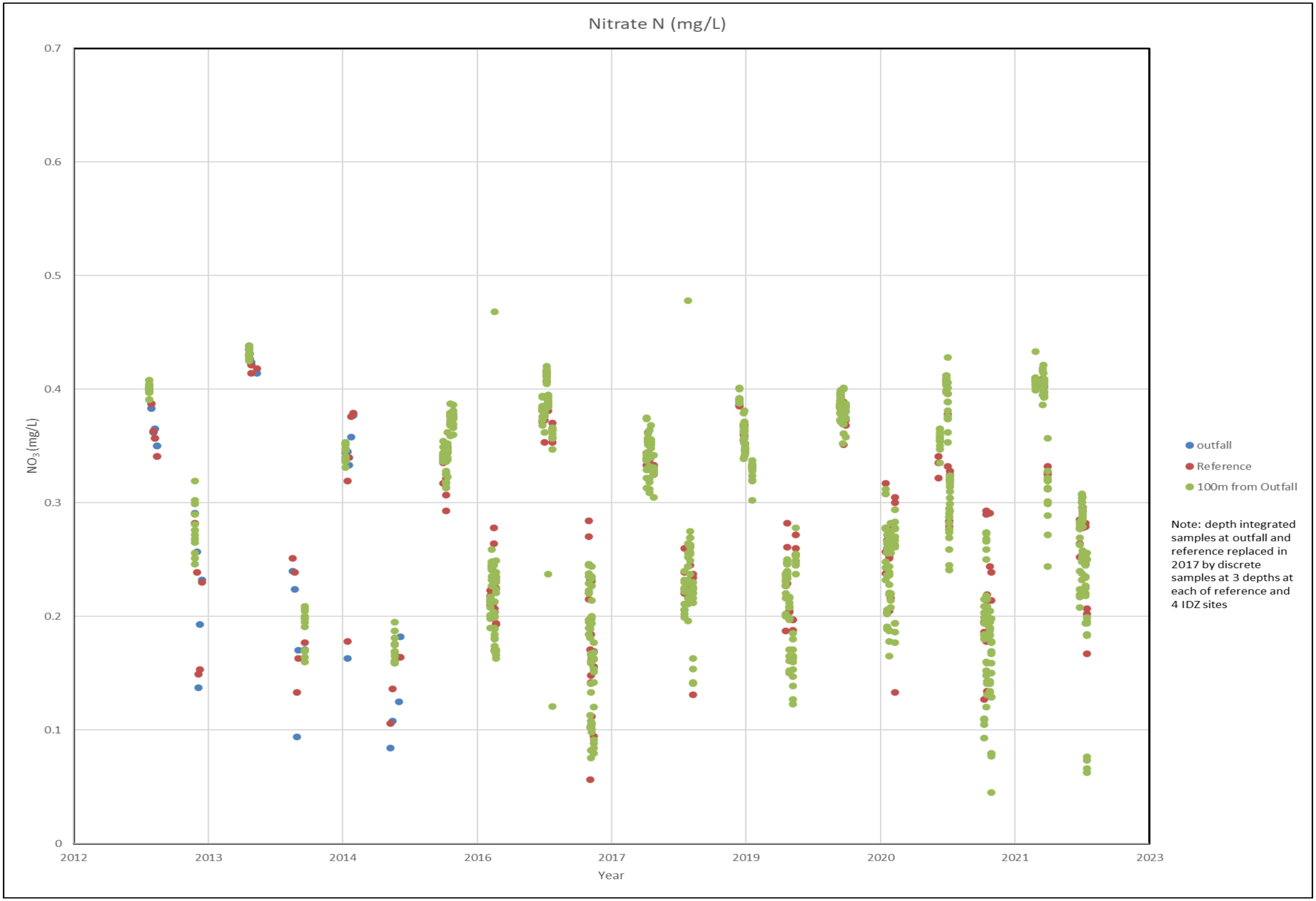


Figure 5.4 SPWTP Nitrate Sampling Results 2013-2022

5.4 Overall Assessment

Overall, the 2022 bacteriology results indicated that the outfall plume was predominantly trapped below the ocean surface. In addition, the potential for human exposure to high bacterial concentrations from the wastewater discharge was low around the outfalls, as demonstrated by geometric mean results that were below thresholds used to assess potential human health risks in surface waters. Effects on shellfish consumers were not expected. Most extended analysis monitoring parameters were either non-detect or below applicable WQG, except for boron, which exceeded WQG at every station and sampling event, including the reference station. The CRD will continue to monitor metals in waters around the outfall to assess environmental significance.

The 2022 nutrient results were consistent with previous years and there was no evidence of an effect on nutrient concentrations in the receiving environment from the SPTP discharge. There were no qualitative differences between the reference and IDZ stations, and results were within the ranges measured in previous years and ambient measurements throughout Juan de Fuca Strait and the Strait of Georgia.

6.0 SEAFLOOR MONITORING

The WMEP monitors the effects of the SPTP wastewater discharge on the seafloor at the end of the outfall once every four years. Seafloor sampling was last conducted in 2020 and will next be conducted in 2024. Results from the 2020 seafloor monitoring program are found in CRD (2021).

7.0 OVERALL CONCLUSIONS

Overall, the results of the WMEP monitoring conducted in 2022 did not indicate any significant negative effects from the SPTP discharge on the Bazan Bay receiving environment.

The CRD conducted wastewater monitoring on a regular basis to profile the chemical and physical constituents of influent and effluent. Influent and effluent quality was within expected ranges and met provincial and federal compliance requirements and treatment plant operational objectives. All priority substances, for which there are BC and Canadian WQG, met these guidelines after estimated minimum initial dilution of the effluent was factored in, except for bacteriological indicators. This indicates that the substances measured in the effluent were not likely at concentrations high enough to be of concern to aquatic life after discharge to the marine environment.

Effluent toxicity testing resulted in no acute toxicity, and no chronic impairment to survival and reproductive endpoints.

No biosolids were generated in 2022 but monitoring of dewatered sludge was undertaken to inform the CRD’s RSCP. Monitoring results of the SPTP sludge showed that all BC OMRR regulated parameters were far below Class A biosolids limits.

Surface water monitoring was used to assess the human and environmental effects of the SPTP discharge and to confirm the minimum initial dilution factor of 1:153 determined during the 2004 dye study. Results from 2022 showed that most stations had very low concentrations of fecal coliforms and enterococci, even though environmental concentrations were predicted to be higher, based on effluent bacterial concentrations and the 1:153 dilution factor. Bacterial station geometric means were 3 or less CFU/100 mL for all stations and depths in 2022 indicating adverse health effects from recreational primary contact activities or shellfish consumption were not expected.

Boron exceeded WQG at all IDZ stations, as well as at the reference station, and is naturally found at high levels in Bazan Bay.

There was some seasonality (winter vs. summer sampling events) observed in nutrient concentrations in 2022, but these were consistent between the outfall IDZ stations and the reference station. As was observed in previous monitoring years, high temporal and spatial variation was evident in the data. Monitoring results were within the ranges measured in previous monitoring years and in ambient samples collected throughout the Strait of Juan de Fuca and the Strait of Georgia. Overall, there was no evidence of nutrient enrichment in the receiving environment resulting from the SPTP discharge.

8.0 REFERENCES

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APPENDIX A

Parameter List for the Saanich Peninsula Wastewater and Marine Environment Program 2022

Appendix A Parameter List for the Saanich Peninsula Wastewater and Marine Environment Program 2022

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
CONVENTIONAL VARIABLES				
alkalinity	minimum twice per week to monthly	√		
biochemical oxygen demand	influent - weekly; effluent - 3 times/week	√		
carbonaceous biochemical oxygen demand	minimum 2 times/week	√		
chemical oxygen demand	weekly	√		
chloride	1 time/month	√		
conductivity	4-5 times/month	√		√
cyanide (strong acid dissociable)		√		
cyanide (weak acid dissociable)		√		
fecal coliform	weekly	√	√	√
enterococci			√	√
hardness (as $CaCO_3$)		√		
hardness (as $CaCO_3$), dissolved		√		
ammonia	2-3 times/month	√	√	√
total Kjeldahl nitrogen	2-3 times/month	√	√	√
nitrate	2-3 times/month	√	√	√
nitrite	2-3 times/month	√	√	√
nitrogen, total		√	√	√
oil & grease, mineral		√		
oil & grease, total		√		
organic carbon, total		√	√	√
pH	daily	√	√	√
phosphate, dissolved	1 time/month		√	√
phosphate, total	1 time/month		√	√
salinity		√		√
sulphate		√		√
sulphide		√		√
suspended solids, total	daily	√		√
temperature		√		√

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
METALS TOTAL		√		
aluminum		√	√	
antimony		√	√	
arsenic		√	√	
barium		√	√	
beryllium		√	√	
bismuth			√	
cadmium		√	√	
calcium		√	√	
chromium		√	√	
chromium VI		√	√	
cobalt		√	√	
copper		√	√	
iron		√	√	
lead		√	√	
magnesium		√	√	
manganese		√	√	
mercury		√	√	
molybdenum		√	√	
nickel		√	√	
phosphorus		√	√	
potassium		√	√	
selenium		√	√	
silver		√	√	
sodium			√	
thallium		√	√	
tin		√	√	
zinc		√	√	

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
METALS - OTHER				
dibutyltin		√		
dibutyltin dichloride		√		
monobutyltin		√		
monobutyltin trichloride		√		
tributyltin		√		
tributyltin chloride		√		
methyl mercury		√		
METALS DISSOLVED				
aluminum		√		
antimony		√		
arsenic		√		
barium		√		
beryllium		√		
cadmium		√		
calcium		√		
chromium		√		
cobalt		√		
copper		√		
iron		√		
lead		√		
magnesium		√		
manganese		√		
mercury		√		
molybdenum		√		
nickel		√		
phosphorus		√		
potassium		√		
selenium		√		
silver		√		
thallium		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
tin		√		
zinc		√		
ALDEHYDES				
acrolein		√		
PHENOLIC COMPOUNDS				
total phenols		√		
2-chlorophenol		√		
2,4 & 2,5 -dichlorophenol		√		
2,4,6-trichlorophenol		√		
4-chloro-3-methylphenol		√		
pentachlorophenol		√		
2,4-dimethylphenol		√		
2,4-dinitrophenol		√		
2-methyl-4,6-dinitrophenol		√		
2-nitrophenol		√		
4-nitrophenol		√		
phenol		√		
2,4-DDD		√		
ORGANOCHLORINE PESTICIDES				
2,4-DDE		√		
2,4-DDT		√		
4,4-DDD		√		
4,4-DDE		√		
4,4-DDT		√		
aldrin		√		
alpha-chlordane		√		
alpha-endosulfan		√		
alpha-HCH		√		
beta-endosulfan		√		
beta-HCH		√		
chlordane		√		
delta-HCH		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
dieldrin		√		
endosulfan sulphate		√		
endrin		√		
endrin aldehyde		√		
gamma-chlordane		√		
gamma-HCH		√		
heptachlor		√		
heptachlor epoxide		√		
methoxyclor		√		
mirex		√		
octachlorostyrene		√		
total endosulfan		√		
toxaphene		√		
POLYCYCLIC AROMATIC HYDROCARBONS				
2-chloronaphthalene		√		
2-methylnaphthalene		√		
acenaphthene		√		
acenaphthylene		√		
anthracene		√		
benzo(a)anthracene		√		
benzo(a)pyrene		√		
benzo(b)fluoranthene		√		
benzo(g,h,i)perylene		√		
benzo(k)fluoranthene		√		
chrysene		√		
dibenzo(a,h)anthracene		√		
fluoranthene		√		
fluorene		√		
indeno(1,2,3-c,d)pyrene		√		
naphthalene		√		
phenanthrene		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
pyrene		√		
total high molecular weight – PAH		√		
total low molecular weight – PAH		√		
total PAH		√		
SEMIVOLATILE ORGANICS				
bis(2-ethylhexyl)phthalate		√		
butylbenzyl phthalate		√		
diethyl phthalate		√		
dimethyl phthalate		√		
di-n-butyl phthalate		√		
di-n-octyl phthalate		√		
MISCELLANEOUS SEMIVOLATILE ORGANICS				
1,2,4-trichlorobenzene		√		
1,2-diphenylhydrazine		√		
2,4-dinitrotoluene		√		
2,6-dinitrotoluene		√		
3,3-dichlorobenzidine		√		
4-bromophenyl phenyl ether		√		
4-chlorophenyl phenyl ether		√		
benzidine		√		
bis(2-chloroethoxy)methane		√		
bis(2-chloroethyl)ether		√		
bis(2-chloroisopropyl)ether		√		
hexachlorobenzene		√		
hexachlorobutadiene		√		
hexachlorocyclopentadiene		√		
hexachloroethane		√		
isophorone		√		
nitrobenzene		√		
N-nitrosodimethylamine		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
N-nitrosodi-n-propylamine		√		
N-nitrosodiphenylamine		√		
VOLATILE ORGANICS				
Monocyclic Aromatic Hydrocarbons				
1,2-dichlorobenzene		√		
1,3-dichlorobenzene		√		
1,4-dichlorobenzene		√		
1,2-dibromoethane		√		
1,4-dioxane		√		
4,6-dinitro-2-methylphenol		√		
benzene		√		
carbon tetrachloride		√		
chlorobenzene		√		
dichlorodifluoromethane		√		
ethylbenzene		√		
styrene		√		
toluene		√		
m & p xylenes		√		
o-xylene		√		
xylenes		√		
Aliphatic				
acrylonitrile		√		
methyl tertiary butyl ether		√		
Chlorinated Aliphatic				
1,1,1,2-tetrachloroethane		√		
1,1,1-trichloroethane		√		
1,1,2,2-tetrachloroethane		√		
1,1,2-trichloroethane		√		
1,1-dichloroethane		√		
1,1-dichloroethene		√		
1,2-dichloroethane		√		
1,2-dichloropropane		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
2-chloroethylvinyl ether		√		
bromomethane		√		
chloroethane		√		
chloroethene		√		
chloromethane		√		
cis-1,2-dichloroethene		√		
cis-1,3-dichloropropene		√		
dibromoethane		√		
dibromomethane		√		
dichloromethane		√		
tetrabromomethane		√		
tetrachloroethene		√		
tetrachloromethane		√		
trans-1,2-dichloroethene		√		
trans-1,3-dichloropropene		√		
trichloroethene		√		
trichlorofluoromethane		√		
Trihalomethanes				
bromodichloromethane		√		
bromoform		√		
chlorodibromomethane		√		
tribromomethane		√		
trichloromethane		√		
vinyl Chloride		√		
Ketones				
4-methyl-2 pentanone		√		
dimethyl ketone		√		
endrin ketone		√		
methyl ethyl ketone		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
TERPENES				
alpha-terpineol		√		
TOXICITY				
acute toxicity	quarterly	√		
chronic toxicity	annually	√		
HIGH RESOLUTION ANALYSES				
Nonylphenols				
4-Nonylphenols		√		
4-Nonylphenol monoethoxylates		√		
4-Nonylphenol diethoxylates		√		
Octylphenol		√		
PAHs				
Naphthalene		√		
Acenaphthylene		√		
Acenaphthene		√		
Fluorene		√		
Phenanthrene		√		
Anthracene		√		
Fluoranthene		√		
Pyrene		√		
Benz[a]anthracene		√		
Chrysene		√		
Benzo[b]fluoranthene		√		
Benzo[j,k]fluoranthenes		√		
Benzo[e]pyrene		√		
Benzo[a]pyrene		√		
Perylene		√		
Dibenz[a,h]anthracene		√		
Indeno[1,2,3-cd]pyrene		√		
Benzo[ghi]perylene		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
2-Methylnaphthalene		√		
2,6-Dimethylnaphthalene		√		
2,3,5-Trimethylnaphthalene		√		
1-Methylphenanthrene		√		
Dibenzothiophene		√		
PBDEs		√		
PCBs		√		
Pesticides				
1,3-Dichlorobenzene		√		
1,4-Dichlorobenzene		√		
1,2-Dichlorobenzene		√		
1,3,5-Trichlorobenzene		√		
1,2,4-Trichlorobenzene		√		
1,2,3-Trichlorobenzene		√		
1,2,4,5-/1,2,3,5-Tetrachlorobenzene		√		
1,2,3,4-Tetrachlorobenzene		√		
Pentachlorobenzene		√		
Hexachlorobutadiene		√		
Hexachlorobenzene		√		
HCH, alpha		√		
HCH, beta		√		
HCH, gamma		√		
Heptachlor		√		
Aldrin		√		
Octachlorostyrene		√		
Chlordane, oxy-		√		
Chlordane, gamma (trans)		√		
Chlordane, alpha (cis)		√		
Nonachlor, trans-		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
Nonachlor, cis-		√		
2,4'-DDD		√		
4,4'-DDD		√		
2,4'-DDE		√		
4,4'-DDE		√		
2,4'-DDT		√		
4,4'-DDT		√		
Mirex		√		
HCH, delta		√		
Heptachlor Epoxide		√		
alpha-Endosulphan		√		
Dieldrin		√		
Endrin		√		
beta-Endosulphan		√		
Endosulphan Sulphate		√		
Endrin Aldehyde		√		
Endrin Ketone		√		
Methoxychlor		√		
PFOS				
Perfluoroheptanoic Acid (PFHpA)		√		
Perfluorohexanoic Acid (PFHxA)		√		
Perfluorononanoic Acid (PFNA)		√		
Perfluorooctane Sulfonamide (PFOSA)		√		
Perfluorooctanesulfonic acid		√		
Perfluorooctanoic acid (PFOA)		√		
Perfluoropentanoic Acid (PFPeA)		√		
PFBS		√		
PFDoA		√		
PFHxS		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
PFUnA		√		
PCDD				
1,2,3,4,6,7,8-HPCDD		√		
1,2,3,4,6,7,8-HPCDF		√		
1,2,3,4,7,8,9-HPCDF		√		
1,2,3,4,7,8-HXCDD		√		
1,2,3,4,7,8-HXCDF		√		
1,2,3,6,7,8-HXCDD		√		
1,2,3,6,7,8-HXCDF		√		
1,2,3,7,8,9-HXCDD		√		
1,2,3,7,8,9-HXCDF		√		
1,2,3,7,8-PECDD		√		
1,2,3,7,8-PECDF		√		
2,3,4,6,7,8-HXCDF		√		
2,3,4,7,8-PECDF		√		
2,3,7,8-TCDD		√		
2,3,7,8-TCDF		√		
OCDD		√		
OCDF		√		
TOTAL HEPTA-DIOXINS		√		
TOTAL HEPTA-FURANS		√		
TOTAL HEXA-DIOXINS		√		
TOTAL HEXA-FURANS		√		
TOTAL PENTA-DIOXINS		√		
TOTAL PENTA-FURANS		√		
TOTAL TETRA-DIOXINS		√		
TOTAL TETRA-FURANS		√		
PPCPs				
2-Hydroxy-Ibuprofen		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
Acetaminophen		√		
Azithromycin		√		
Bisphenol A		√		
Caffeine		√		
Carbadox		√		
Carbamazepine		√		
Cefotaxime		√		
Ciprofloxacin		√		
Clarithromycin		√		
Clinafloxacin		√		
Cloxacillin		√		
Dehydronifedipine		√		
Digoxigenin		√		
Digoxin		√		
Diltiazem		√		
Diphenhydramine		√		
Enrofloxacin		√		
Erythromycin-H2O		√		
Flumequine		√		
Fluoxetine		√		
Furosemide		√		
Gemfibrozil		√		
Glipizide		√		
Glyburide		√		
Hydrochlorothiazide		√		
Ibuprofen		√		
Lincomycin		√		
Lomefloxacin		√		
Miconazole		√		

Appendix A, continued

Parameter	Compliance Monitoring and Treatment Plant Performance	Wastewater Priority Substances	Receiving Environment	
	Influent and Effluent - Sampling Frequency	Sampled Quarterly	5 Samples in 30 Days (summer and winter) 1st day	5 Samples in 30 Days (summer and winter) 2nd-5th day
Naproxen		√		
Norfloxacin		√		
Norgestimate		√		
Ofloxacin		√		
Ormetoprim		√		
Oxacillin		√		
Oxolinic Acid		√		
Penicillin G		√		
Penicillin V		√		
Roxithromycin		√		
Sarafloxacin		√		
Sulfachloropyridazine		√		
Sulfadiazine		√		
Sulfadimethoxine		√		
Sulfamerazine		√		
Sulfamethazine		√		
Sulfamethizole		√		
Sulfamethoxazole		√		
Sulfanilamide		√		
Sulfathiazole		√		
Thiabendazole		√		
Triclocarban		√		
Triclosan		√		
Trimethoprim		√		
Tylosin		√		
Virginiamycin		√		
Warfarin		√		
PFAS		√		

APPENDIX B

Wastewater Monitoring

Appendix B1 Saanich Peninsula Treatment Plant Effluent Flow (m^3) in 2022

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	9,716	9,772	15,084	10,273	10,186	8,882	8,456	8,804	8,658	8,309	9,111	9,347
2	13,808	9,698	13,227	9,254	9,998	8,750	8,283	8,621	8,873	8,595	6,357	9,052
3	17,158	10,168	11,744	10,513	9,617	8,904	10,588	8,565	8,592	8,590	11,319	10,328
4	14,955	9,807	10,783	18,600	9,617	8,835	9,778	8,537	8,459	8,520	12,431	9,622
5	12,927	9,494	10,148	13,485	10,301	9,247	9,106	8,489	9,138	8,588	9,770	9,139
6	14,872	9,569	9,975	11,512	9,910	8,985	8,882	8,176	8,593	8,558	10,810	9,240
7	23,177	9,518	9,832	10,655	9,498	8,843	9,219	8,431	8,557	8,535	9,839	9,357
8	15,947	9,278	9,389	10,333	9,519	8,799	8,909	8,657	8,475	8,414	9,596	9,682
9	14,723	9,219	9,126	9,964	9,516	11,207	8,727	8,509	8,279	8,359	9,116	9,400
10	14,564	9,095	9,295	13,491	9,165	10,385	8,817	8,557	8,030	8,766	8,894	9,748
11	20,389	9,154	9,221	12,245	9,037	9,323	9,039	8,494	8,366	8,437	8,633	9,345
12	22,868	8,900	9,264	11,598	9,181	9,367	8,883	8,513	8,502	8,601	8,443	9,063
13	16,789	9,181	8,935	10,797	8,969	9,370	8,738	8,228	8,354	8,406	8,423	8,723
14	13,834	9,018	11,279	10,257	9,121	8,900	8,827	8,419	8,405	8,362	8,579	8,612
15	12,329	8,686	11,760	9,969	10,653	9,013	8,779	8,723	8,476	8,187	8,356	8,592
16	11,803	9,009	10,513	9,568	10,144	9,112	8,382	8,493	8,450	8,449	8,135	8,416
17	11,569	8,620	13,416	9,451	9,417	9,038	8,615	8,439	8,277	8,447	8,224	8,313
18	12,233	8,592	12,316	9,792	9,694	8,666	8,922	8,567	8,303	7,241	8,046	8,359
19	11,852	8,455	11,139	9,441	9,402	8,865	8,760	8,629	8,696	8,545	8,004	8,373
20	13,170	8,472	10,526	9,543	9,128	9,061	8,720	8,306	8,430	8,544	8,282	7,991
21	11,630	9,210	12,330	9,621	8,790	8,991	8,639	8,555	8,370	8,275	8,324	8,252
22	10,968	8,679	12,873	9,331	8,576	8,935	8,628	8,856	8,477	8,215	9,972	8,361
23	10,773	8,482	13,190	9,114	9,153	8,794	8,347	8,742	8,353	8,543	8,789	8,610
24	10,487	8,744	12,278	9,387	8,972	8,642	8,436	9,224	8,247	8,989	8,501	19,202
25	10,027	8,600	10,248	9,961	8,930	8,428	8,774	8,622	8,538	8,683	8,977	21,407
26	9,667	9,031	10,465	9,426	9,263	8,650	8,730	8,643	8,432	8,487	8,740	24,959
27	9,415	11,964	10,194	9,321	9,424	8,970	8,617	8,402	8,510	9,616	8,991	25,364
28	9,407	20,611	10,665	9,176	8,719	8,780	8,739	8,543	8,359	9,350	8,567	17,810
29	9,494	---	10,064	9,035	9,031	8,659	8,726	8,841	8,331	8,568	9,456	13,835
30	10,852	---	9,825	11,077	8,912	8,729	8,290	8,718	8,619	10,760	10,974	17,046
31	10,243	---	8,807	---	8,847	---	8,257	8,630	---	10,924	---	13,546
TOTAL Flow (m3/day)	411,646	269,026	337,911	316,190	290,690	271,130	272,613	265,933	254,149	268,863	271,659	359,094
Average	13,279	9,608	10,900	10,540	9,377	9,038	8,794	8,578	8,472	8,673	9,055	11,584
Maximum	23,177	20,611	15,084	18,600	10,653	11,207	10,588	9,224	9,138	10,924	12,431	25,364
Minimum	9,407	8,455	8,807	9,035	8,576	8,428	8,257	8,176	8,030	7,241	6,357	7,991
n	31	28	31	30	31	30	31	31	30	31	30	31
											Annual Average	**9,833**

Appendix B2 Compliance and Treatment Plant Performance Influent Results 2022

Date 2022	ALK	BOD	CBOD	CL	COD	FC	NH_3	Unionized NH_3	NO_2	NO_3	TKN	PO_4	pH	pH@15	TSS
units	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
4-Jan	---	---	---	---	---	---	22	---	<0.005	<0.02	26	3.6	7.3	---	---
6-Jan	---	182	---	---	427	---	---	---	---	---	---	---	---	---	---
13-Jan	---	63	---	---	222	---	---	---	---	---	---	---	---	---	---
18-Jan	---	---	---	---	---	1,600,000	28.00	---	<0.002	---	---	4.9	7.5	---	---
18-Jan	178	---	---	75	---	---	25	---	<0.005	0.14	35	---	7.4	---	---
19-Jan	---	220	200	71	483	2,900,000	27	0.03	<0.005	<0.02	29	4.2	7.4	6.7	---
20-Jan	---	---	---	---	---	11,000,000	27	---	<0.002	---	---	5.0	7.5	---	---
20-Jan	---	180	---	---	459	---	---	---	---	---	---	---	---	---	---
26-Jan	---	205	---	---	501	---	---	---	---	---	---	---	---	---	---
3-Feb	---	259	---	---	1,500	---	---	---	---	---	---	---	---	---	---
8-Feb	---	---	---	---	---	---	32	---	<0.005	<0.02	48	5.8	7.5	---	---
10-Feb	---	197	---	---	2,120	---	---	---	---	---	---	---	---	---	---
17-Feb	---	251	---	---	2,130	---	---	---	---	---	---	---	---	---	---
22-Feb	205	---	---	---	---	---	36	---	<0.05	0.20	50	---	7.3	---	---
24-Feb	---	268	---	---	2,140	---	---	---	---	---	---	---	---	---	---
2-Mar	---	162	---	---	1,562	---	---	---	---	---	---	---	---	---	---
8-Mar	---	---	---	---	---	---	34	---	<0.005	<0.02	43	5.4	7.4	---	---
10-Mar	---	211	---	---	1,940	---	---	---	---	---	---	---	---	---	---
17-Mar	---	197	---	---	2,176	---	---	---	---	---	---	---	---	---	---
22-Mar	185	---	---	94	---	---	28	---	<0.005	<0.02	34	---	7.4	---	---
24-Mar	---	172	---	---	1,710	---	---	---	---	---	---	---	---	---	---
31-Mar	---	261	---	---	1,530	---	---	---	---	---	---	---	---	---	---
5-Apr	---	---	---	---	---	---	20	---	<0.05	<0.2	22	2.4	7.2	---	---
6-Apr	---	190	190	78	11,000	12,000,000	26	0.03	<0.05	<0.2	34	3.7	7.6	6.6	---
7-Apr	---	177	---	---	1,804	---	---	---	---	---	---	---	---	---	---
13-Apr	---	219	---	---	1,552	---	---	---	---	---	---	---	---	---	---
19-Apr	209	---	---	116	---	---	33	---	<0.05	<0.2	15	---	7.1	---	---
21-Apr	---	241	---	---	1,800	---	---	---	---	---	---	---	---	---	---
28-Apr	---	281	---	---	1,860	---	---	---	---	---	---	---	---	---	---
3-May	---	---	---	---	---	---	32	---	<0.05	<0.2	41	5.5	7.4	---	---
5-May	---	324	---	---	570	---	---	---	---	---	---	---	---	---	---
12-May	---	265	---	---	1,990	---	---	---	---	---	---	---	---	---	---
17-May	207	---	---	---	---	---	35	---	<0.05	<0.2	40	---	7.3	---	---
19-May	---	230	---	---	1,840	---	---	---	---	---	---	---	---	---	---
26-May	---	230	---	---	1,790	---	---	---	---	---	---	---	---	---	---
2-Jun	---	200	---	---	1,430	---	---	---	---	---	---	---	---	---	---
7-Jun	---	---	---	---	---	---	35	---	<0.005	<0.02	50	5.8	7.2	---	---

Appendix B2, continued

Date 2022	ALK	BOD	CBOD	CL	COD	FC	NH_3	Unionized NH_3	NO_2	NO_3	TKN	PO_4	pH	pH@15	TSS
units	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
9-Jun	---	262	---	---	1,350	---	---	---	---	---	---	---	---	---	---
16-Jun	---	198	---	---	1,480	---	---	---	---	---	---	---	---	---	---
21-Jun	214	---	---	---	---	---	35	---	<0.05	<0.2	48	---	7.4	---	---
23-Jun	---	239	---	---	1,460	---	---	---	---	---	---	---	---	---	---
29-Jun	---	245	---	---	1,604	---	---	---	---	---	---	---	---	---	---
5-Jul	---	---	---	---	---	---	32	---	<0.005	<0.02	47	6.0	7.3	---	---
6-Jul	---	242	---	---	804	---	---	---	---	---	---	---	---	---	---
12-Jul	---	---	---	---	---	2,500,000	1	---	<0.002	---	---	9.1	7.4	---	---
13-Jul	---	270	250	120	865	3,200,000	2	0.00	2.76	11.30	41	6.6	7.8	6.4	---
14-Jul	---	---	---	---	---	3,800,000	0	---	0.06	---	---	6.9	7.3	---	---
14-Jul	---	245	---	---	564	---	---	---	---	---	---	---	---	---	---
19-Jul	233	---	---	---	---	---	40	---	<0.005	<0.02	57	---	7.3	---	---
21-Jul	---	257	---	---	866	---	---	---	---	---	---	---	---	---	---
28-Jul	---	214	---	---	618	---	---	---	---	---	---	---	---	---	---
4-Aug	---	253	---	---	854	---	---	---	---	---	---	---	---	---	---
9-Aug	---	---	---	---	---	---	35	---	<0.005	<0.02	50	6.5	7.3	---	---
11-Aug	---	269	---	---	1,330	---	---	---	---	---	---	---	---	---	---
18-Aug	---	246	---	---	1,327	---	---	---	---	---	---	---	---	---	---
23-Aug	221	---	---	---	---	---	38	---	<0.005	<0.02	44	---	7.3	---	---
25-Aug	---	202	---	---	1,580	---	---	---	---	---	---	---	---	---	---
31-Aug	---	282	---	---	1,722	---	---	---	---	---	---	---	---	---	---
6-Sep	---	---	---	---	---	---	37	---	<0.005	<0.02	51	6.5	7.3	---	---
8-Sep	---	274	---	---	591	---	---	---	---	---	---	---	---	---	---
15-Sep	---	237	---	---	605	---	---	---	---	---	---	---	---	---	---
20-Sep	221	---	---	---	---	---	37	---	<0.005	<0.02	48	---	7.4	---	---
21-Sep	---	268	---	---	1,283	---	---	---	---	---	---	---	---	---	---
29-Sep	---	375	---	---	1,710	---	---	---	---	---	---	---	---	---	---
4-Oct	---	---	---	---	---	---	39	---	<0.005	<0.02	53	11.0	7.2	---	---
6-Oct	---	276	---	---	1,450	---	---	---	---	---	---	---	---	---	---
13-Oct	---	382	---	---	850	---	---	---	---	---	---	---	---	---	---
18-Oct	237	---	---	---	---	---	45	---	<0.005	<0.02	65	---	7.4	---	---
20-Oct	---	378	---	---	1,640	---	---	---	---	---	---	---	---	---	---
27-Oct	---	240	250	120	706	47,000,000	43	0.07	<0.005	<0.02	58	6.4	7.7	6.8	---
27-Oct	---	304	---	---	1,410	---	---	---	---	---	---	---	---	---	---
3-Nov	---	245	---	---	806	---	---	---	---	---	---	---	---	---	---
8-Nov	---	---	---	---	---	---	36	---	<0.005	<0.02	49	5.5	7.4	---	---
10-Nov	---	227	---	---	1,108	---	---	---	---	---	---	---	---	---	---
17-Nov	---	270	---	---	1,116	---	---	---	---	---	---	---	---	---	---

Appendix B2, continued

Date 2022	ALK	BOD	CBOD	CL	COD	FC	NH_3	Unionized NH_3	NO_2	NO_3	TKN	PO_4	pH	pH@15	TSS
units	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-Nov	234	---	---	---	---	---	41	---	<0.05	<0.02	53	---	7.2	---	---
24-Nov	---	351	---	---	1,496	---	---	---	---	---	---	---	---	---	---
30-Nov	---	253	---	---	540	---	---	---	---	---	---	---	---	---	---
6-Dec	---	---	---	---	---	---	37	---	<0.005	<0.02	56	5.9	7.3	---	---
8-Dec	---	273	---	---	1,340	---	---	---	---	---	---	---	---	---	---
13-Dec	224	---	---	---	---	---	39	---	42.30	<0.02	50	---	7.5	---	---
15-Dec	---	282	---	---	1,300	---	---	---	---	---	---	---	---	---	---
22-Dec	---	232	---	---	1,100	---	---	---	---	---	---	---	---	---	---
29-Dec	---	143	---	---	616	---	---	---	---	---	---	---	---	---	---
Mean	214	243	223	96	1,440	10,500,000	30	0.03	1.42	0.4	44	5.8	7.4	6.6	---
Min	178	63	190	71	222	1,600,000	0	0.001	0.001	0.010	15	2.4	7.1	6.4	---
Max	237	382	250	120	11,000	47,000,000	45	0.07	42	11.3	65	11.0	7.8	6.8	---
n	12	56	4	7	56	8	32	4	32	28	28	20	32	4	---

Notes: ALK-alkalinity, BOD-total biochemical oxygen demand, COD-chemical oxygen demand, CL-chloride, COND-conductivity, NH_3-ammonia, UNION NH_3-unionized ammonia
NO_3-nitrate, NO_2-nitrite, TDP-total dissolved phosphorus, TP-total phosphorous, TKN-total Kjeldahl nitrogen, CBOD- carbonaceous biochemical oxygen demand, TRC-total residual chlorine, TSS-total suspended solids

Appendix B3 Compliance and Treatment Plant Performance Effluent Results 2022

Date 2022	ALK	BOD	CBOD	CL	COD	FC	NH_3	Unionized NH_3	NO_2	NO_3	TKN	PO_4	pH	pH@15	TRC	TSS
units	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
permitted max			45										6-9			45
4-Jan	---	---	3	---	---	720	0.02	<0.0005	0.06	13	1	1.0	7.1	6.9	0.41	10.0
5-Jan	---	9	3	---	---	---	---	---	---	---	---	---	---	---	---	---
6-Jan	---	9.9	3.7	---	37	---	---	---	---	---	---	---	---	---	---	---
12-Jan	---	6.0	5.9	---	---	---	---	---	---	---	---	---	---	---	---	---
13-Jan	---	5.6	4.8	---	33	---	---	---	---	---	---	---	---	---	---	---
18-Jan	---	---	---	---	---	14,000	0.10	---	0.04	---	---	0.7	7.2	---	---	---
18-Jan	34	---	2.5	75	---	27000	0.04	<0.0005	0.03	14	1	---	7.1	6.2	0.02	6.0
19-Jan	---	3.9	<2	77	40	9,500	0.04	<0.0005	0.03	13.9	<0.4	0.3	7.1	6.3	---	6.0
19-Jan	---	18.9	8.7	---	---	---	---	---	---	---	---	---	---	---	---	---
20-Jan	---	---	---	---	---	9,900,000	0.04	---	0.05	---	---	0.9	7.1	---	---	---
20-Jan	---	16.8	7.6	---	47	---	---	---	---	---	---	---	---	---	---	---
25-Jan	---	3.6	4.4	---	---	---	---	---	---	---	---	---	---	---	---	---
26-Jan	---	---	3.0	---	43	---	---	---	---	---	---	---	---	---	---	---
2-Feb	---	9.3	3.6	---	---	---	---	---	---	---	---	---	---	---	---	---
3-Feb	---	11	4	---	1100	---	---	---	---	---	---	---	---	---	---	---
8-Feb	---	---	---	---	---	9,500	---	<0.1	0.06	15.4	0.5	2.2	7.4	6.6	0.03	5.0
9-Feb	---	5.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---
10-Feb	---	6.2	2	---	286	---	---	---	---	---	---	---	---	---	---	---
16-Feb	---	8.5	3	---	---	---	---	---	---	---	---	---	---	---	---	---
17-Feb	---	12.1	5	---	1670	---	---	---	---	---	---	---	---	---	---	---
22-Feb	45	---	---	---	---	390,000	4.38	<0.1	0.70	14.6	5.5	---	7.3	6.2	0.02	10.0
23-Feb	---	14.6	7.4	---	---	---	---	---	---	---	---	---	---	---	---	---
24-Feb	---	12.9	6.1	---	1400	---	---	---	---	---	---	---	---	---	---	---
1-Mar	---	6.6	3.8	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Mar	---	6.6	<2.7	---	1397	---	---	---	---	---	---	---	---	---	---	---
8-Mar	---	---	---	---	---	---	<0.1	<0.1	0.05	15.4	1.2	2.4	7.0	6.7	---	8.0
9-Mar	---	8.2	3.2	---	---	---	---	---	---	---	---	---	---	---	---	---
9-Mar	---	---	---	---	---	3,000	---	---	---	---	---	---	---	---	---	---
10-Mar	---	13.9	3.2	---	1260	---	---	---	---	---	---	---	---	---	---	---
16-Mar	---	9.1	2.9	---	---	---	---	---	---	---	---	---	---	---	---	---
17-Mar	---	9.5	3.3	---	1558	---	---	---	---	---	---	---	---	---	---	---
22-Mar	86	---	---	79	---	910,000	12.80	<0.1	0.73	10.7	12.8	---	7.3	6.9	0.01	14.0
23-Mar	---	11.5	4.8	---	---	---	---	---	---	---	---	---	---	---	---	---
24-Mar	---	13.1	4.1	---	1480	---	---	---	---	---	---	---	---	---	---	---
30-Mar	---	14.8	4.5	---	---	---	---	---	---	---	---	---	---	---	---	---
31-Mar	---	16.2	3.7	---	1230	---	---	---	---	---	---	---	---	---	---	---
5-Apr	---	---	---	---	---	38,000	5.67	<0.1	1.01	8.6	5.1	0.2	7.1	7.0	---	6.0
6-Apr	---	15.0	4.8	76	373	15,000	4.00	0	1.49	8.9	<2	0.2	7.7	6.8	---	4.0
6-Apr	---	11.5	3.1	---	---	---	---	---	---	---	---	---	---	---	---	---
7-Apr	---	10.5	2.7	---	1544	---	---	---	---	---	---	---	---	---	---	---
12-Apr	---	17.8	5.5	---	---	---	---	---	---	---	---	---	---	---	---	---
13-Apr	---	19.1	6.4	---	904	---	---	---	---	---	---	---	---	---	---	---
19-Apr	88	---	---	94	---	390,000	10.90	0.100	3.18	7.2	10.5	---	7.2	6.8	0.01	11.0
20-Apr	---	10.3	3	---	---	---	---	---	---	---	---	---	---	---	---	---
21-Apr	---	12.9	3.2	---	1320	---	---	---	---	---	---	---	---	---	---	---
27-Apr	---	20.4	4.7	---	---	---	---	---	---	---	---	---	---	---	---	---
28-Apr	---	14.7	2.8	---	1440	---	---	---	---	---	---	---	---	---	---	---
3-May	---	---	---	---	---	230,000	11.20	<0.1	0.76	10.3	9.5	2.1	7.2	6.8	---	13.0
4-May	---	13.3	3.9	---	---	---	---	---	---	---	---	---	---	---	---	---
5-May	---	3.7	<2	---	1360	---	---	---	---	---	---	---	---	---	---	---

Appendix B3, continued

Date 2022	ALK	BOD	CBOD	CL	COD	FC	NH_3	Unionized NH_3	NO_2	NO_3	TKN	PO_4	pH	pH@15	TRC	TSS
units	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
permitted max			45										6-9			45
11-May	---	13.7	4.3	---	---	---	---	---	---	---	---	---	---	---	---	---
12-May	---	13.6	3.6	---	1430	---	---	---	---	---	---	---	---	---	---	---
17-May	68	---	---	---	---	810,000	7.59	<0.1	653.00	12.0	7.7	---	7.1	6.9	0.02	21.0
17-May	---	37.0	9.5	---	---	---	---	---	---	---	---	---	---	---	---	---
19-May	---	35.0	37.0	---	1160	---	---	---	---	---	---	---	---	---	---	---
25-May	---	27.0	7.6	---	---	---	---	---	---	---	---	---	---	---	---	---
26-May	---	34.0	11.0	---	72	---	---	---	---	---	---	---	---	---	---	---
1-Jun	---	20.0	2.7	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Jun	---	23.0	<2	---	4250	---	---	---	---	---	---	---	---	---	---	---
7-Jun	---	---	---	---	---	3,800	3.27	<0.1	2.02	12.9	3.8	4.4	7.1	6.9	---	6.0
8-Jun	---	19.0	4.6	---	---	---	---	---	---	---	---	---	---	---	---	---
9-Jun	---	18.0	4.8	---	548	---	---	---	---	---	---	---	---	---	---	---
15-Jun	---	5.8	3.5	---	---	---	---	---	---	---	---	---	---	---	---	---
16-Jun	---	5.6	3.0	---	1050	---	---	---	---	---	---	---	---	---	---	---
21-Jun	41	---	---	---	---	2,000	1.76	<0.1	1.13	13.2	2.5	---	7.2	6.9	0.02	4.0
22-Jun	---	8.1	3.1	---	---	---	---	---	---	---	---	---	---	---	---	---
23-Jun	---	10.2	3.3	---	1010	---	---	---	---	---	---	---	---	---	---	---
28-Jun	---	14.3	<2	---	---	---	---	---	---	---	---	---	---	---	---	---
29-Jun	---	14.7	3.0	---	968	---	---	---	---	---	---	---	---	---	---	---
5-Jul	---	---	---	---	---	410,000	5.54	<0.1	1.47	10.1	6.4	3.9	7.2	6.7	0.02	9.0
5-Jul	---	7.6	2.5	---	---	---	---	---	---	---	---	---	---	---	---	---
6-Jul	---	12.6	4.6	---	58	---	---	---	---	---	---	---	---	---	---	---
12-Jul	---	---	---	---	---	16,000	3.40	---	1.78	---	---	6.5	7.1	---	---	---
13-Jul	---	17.0	5.8	140	53	100,000	0.29	<0.0005	2.84	11.4	2.7	5.2	7.2	6.4	---	1.6
13-Jul	---	20.5	3.7	---	---	---	---	---	---	---	---	---	---	---	---	---
14-Jul	---	---	---	---	---	140,000	0.06	---	3.10	---	---	5.0	7.5	---	---	---
14-Jul	---	11.9	3.2	---	1060	---	---	---	---	---	---	---	---	---	---	---
19-Jul	68	---	---	---	---	45,000	6.68	<0.1	1.74	11.9	6.5	---	7.2	6.9	0.02	13.0
20-Jul	---	17.5	5.6	---	590	---	---	---	---	---	---	---	---	---	---	---
21-Jul	---	14.4	5.0	---	---	---	---	---	---	---	---	---	---	---	---	---
27-Jul	---	7.4	2.3	---	---	---	---	---	---	---	---	---	---	---	---	---
28-Jul	---	8.4	1.7	---	360	---	---	---	---	---	---	---	---	---	---	---
3-Aug	---	9.6	5.6	---	---	---	---	---	---	---	---	---	---	---	---	---
4-Aug	---	10.7	3.9	---	568	---	---	---	---	---	---	---	---	---	---	---
9-Aug	---	---	---	---	---	210,000	3.84	<0.1	0.81	11.4	4.3	5.9	7.2	6.9	---	12.0
10-Aug	---	13.4	3.5	---	---	---	---	---	---	---	---	---	---	---	---	---
11-Aug	---	15.0	4.8	---	590	---	---	---	---	---	---	---	---	---	---	---
17-Aug	---	13.8	2.9	---	---	---	---	---	---	---	---	---	---	---	---	---
18-Aug	---	11.3	2.6	---	1150	---	---	---	---	---	---	---	---	---	---	---
23-Aug	75	---	4.2	---	---	550,000	6.91	<0.1	0.65	9.8	6.7	---	7.4	7.0	0.02	6.0
24-Aug	---	---	2.6	---	---	---	---	---	---	---	---	---	---	---	---	---
25-Aug	---	11.1	6.0	---	1310	---	---	---	---	---	---	---	---	---	---	---
30-Aug	---	30.9	7.9	---	---	---	---	---	---	---	---	---	---	---	---	---
31-Aug	---	22.0	5.0	---	812	---	---	---	---	---	---	---	---	---	---	---
6-Sep	---	---	---	---	---	2,400	6.97	<0.1	0.65	10.7	6.7	5.8	7.1	6.8	---	9.0
7-Sep	---	22.4	<4	---	---	---	---	---	---	---	---	---	---	---	---	---
8-Sep	---	25.9	<4	---	1082	---	---	---	---	---	---	---	---	---	---	---
14-Sep	---	---	<4	---	---	---	---	---	---	---	---	---	---	---	---	---
15-Sep	---	16.3	<4	---	50	---	---	---	---	---	---	---	---	---	---	---
20-Sep	60	---	---	---	---	83,000	3.97	<0.1	0.50	11.8	4.7	---	7.0	6.7	0.02	8.0
20-Sep	---	10.2	<4	---	---	---	---	---	---	---	---	---	---	---	---	---

Appendix B3, continued

Date 2022	ALK	BOD	CBOD	CL	COD	FC	NH_3	Unionized NH_3	NO_2	NO_3	TKN	PO_4	pH	pH@15	TRC	TSS
units	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
permitted max			45										6-9			45
21-Sep	---	14.8	4.9	---	815	---	---	---	---	---	---	---	---	---	---	---
28-Sep	---	18.3	4.2	---	---	---	---	---	---	---	---	---	---	---	---	---
29-Sep	---	14.7	4.3	---	1150	---	---	---	---	---	---	---	---	---	---	---
4-Oct	---	---	---	---	---	4,100	3.90	<0.102	0.44	13.6	3.8	4.0	6.9	6.6	0.01	11.0
5-Oct	---	20.6	5.7	---	---	---	---	---	---	---	---	---	---	---	---	---
6-Oct	---	18.3	5.3	---	788	---	---	---	---	---	---	---	---	---	---	---
12-Oct	---	17.9	5.0	---	---	---	---	---	---	---	---	---	---	---	---	---
13-Oct	---	15.1	4.8	---	88	---	---	---	---	---	---	---	---	---	---	---
18-Oct	59	---	---	---	---	28,000	7.35	<0.102	1.96	9.1	9.2	---	7.4	7.1	---	13.0
19-Oct	---	19.2	4.7	---	---	---	---	---	---	---	---	---	---	---	---	---
20-Oct	---	21.9	4.9	---	62	---	---	---	---	---	---	---	---	---	---	---
26-Oct	---	23.1	5.2	---	---	---	---	---	---	---	---	---	---	---	---	---
27-Oct	---	19.0	8.2	120	57	1,200	3.60	0.004	3.63	15.2	0.4	3.2	7.3	6.6	---	8.8
27-Oct	---	23.4	<4	---	304	---	---	---	---	---	---	---	---	---	---	---
2-Nov	---	27.8	10.0	---	---	---	---	---	---	---	---	---	---	---	---	---
3-Nov	---	33.6	4.7	---	642	---	---	---	---	---	---	---	---	---	---	---
8-Nov	---	---	---	---	---	4,200	0.14	<0.1	1.77	14.7	2.1	5.3	7.0	6.4	0.07	18.0
9-Nov	---	20.3	7.0	---	---	---	---	---	---	---	---	---	---	---	---	---
10-Nov	---	15.7	6.4	---	772	---	---	---	---	---	---	---	---	---	---	---
16-Nov	---	13.7	6.1	---	---	---	---	---	---	---	---	---	---	---	---	---
17-Nov	---	17.2	5.7	---	694	---	---	---	---	---	---	---	---	---	---	---
22-Nov	24	---	---	---	---	7,100	0.12	<0.1	1.51	14.0	1.4	---	6.9	6.4	0.01	7.0
23-Nov	---	12.8	4.9	---	---	---	---	---	---	---	---	---	---	---	---	---
24-Nov	---	11.9	4.4	---	1026	---	---	---	---	---	---	---	---	---	---	---
29-Nov	---	20.1	6.5	---	---	---	---	---	---	---	---	---	---	---	---	---
30-Nov	---	15.6	5.7	---	68	---	---	---	---	---	---	---	---	---	---	---
6-Dec	---	---	---	---	---	12,000	<0.1	<0.1	0.55	14.7	3.3	3.1	7.1	6.7	---	12.0
7-Dec	---	17.3	5.8	---	---	---	---	---	---	---	---	---	---	---	---	---
8-Dec	---	15.6	<4	---	602	---	---	---	---	---	---	---	---	---	---	---
13-Dec	31	---	---	---	---	4,300	<0.1	<0.1	785	14.2	1.7	---	7.2	6.7	0.02	21.0
14-Dec	---	17.0	<4	---	---	---	---	---	---	---	---	---	---	---	---	---
15-Dec	---	17.1	5.5	---	651	---	---	---	---	---	---	---	---	---	---	---
21-Dec	---	15.4	3.4	---	---	---	---	---	---	---	---	---	---	---	---	---
22-Dec	---	39.4	12.4	---	71	---	---	---	---	---	---	---	---	---	---	---
28-Dec	---	12.0	<4	---	---	---	---	---	---	---	---	---	---	---	---	---
29-Dec	---	11.0	<4	---	491	---	---	---	---	---	---	---	---	---	---	---
Mean	56.6	15.2	4.6	94.4	803	449,057	3.7	0.042	46	12	338	3.1	7.2	6.7	0.0	9.8
Min	23.7	3.6	1.0	75.0	33	720	0.020	0.00025	0.032	7.2	0.2	0.2	6.9	6.2	0.010	1.6
Max	88	39	37	140	4,250	9,900,000	13	0.100	785	15	7,650	6	8	7	0.41	21
n	12	105	111	7	56	32	31	28	32	28	28	20	32	28	16	28

Notes: ALK-alkalinity, BOD-total biochemical oxygen demand, COD-chemical oxygen demand, CL-chloride, COND-conductivity, NH_3-ammonia, union NH_3-unionized ammonia, NO_3-nitrate, NO_2-nitrite, TDP-total dissolved phosphorus, TP-total phosphorus, TKN-total Kjeldahl nitrogen, CBOD- carbonaceous biochemical oxygen demand, UN NH_3-unionized ammonia, TRC-total residual chlorine, TSS-total suspended solids. Shaded value indicates exceedance to permitted maximum.

Appendix B4 Influent and Effluent Priority Substance Concentrations 2022

			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
Parameter			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
Enterococci	TOT	CFU/100 mL	660000	3800	1100	840	4600000	4700	440000	2800	280000	16000	1000000	50000	890000	860
Fecal Coliforms	TOT	CFU/100 mL	1600000	14000	11000000	9900000	12000000	15000	2500000	16000	3200000	100000	3800000	140000	47000000	1200
Alkalinity - Total - Ph 4.5	TOT	mg/L	---	---	---	---	180	66	---	---	240	54	---	---	230	37
Chloride	DIS	mg/L	---	---	---	---	78	76	---	---	120	140	---	---	120	120
Total/SAD Cyanide	TOT	mg/L	0.0149	0.0174	0.00099	0.00077	0.00177	0.00168	0.00217	0.0023	0.00232	0.00187	0.00172	0.00193	<0.0005	0.00093
WAD Cyanide	TOT	mg/L	0.00332	0.0164	0.00145	0.00119	0.0009	0.00107	0.0013	0.00146	0.00088	0.00136	0.00069	0.00125	<0.0005	0.00076
Alkalinity - Bicarbonate	TOT	mg/L	---	---	---	---	220	80	---	---	290	66	---	---	280	46
Alkalinity - Carbonate	TOT	mg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Alkalinity - Hydroxide	TOT	mg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Alkalinity - Phenolphthalein - Ph 8.3	TOT	mg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Hardness (as CaCO3)	DIS	mg/L	82.7	86.5	80.7	85.9	88.7	83.5	104	102	90.4	101	88.1	104	81.8	92.7
Hardness (as CaCO3)	TOT	mg/L	87.6	86.8	90.9	88.1	95.2	84.1	116	101	104	102	98.8	113	94.3	85.9
Sulphate	DIS	mg/L	---	---	---	---	29	28	---	---	32	42	---	---	29	34
N - Nh3 (As N)	TOT	mg/L	28	0.099	27	0.039	26	4	0.57	3.4	1.8	0.29	0.44	0.06	43	3.6
N - Nh3 (As N)- Unionized	TOT	mg/L	---	---	---	---	0.031	0.007	---	---	0.0014	<0.0005	---	---	0.071	0.0037
N - No2 (As N)	DIS	mg/L	<0.002	0.0377	<0.002	0.0493	<0.05	1.49	<0.002	1.78	2.76	2.84	0.0555	3.1	<0.005	3.63
N - No3 (As N)	DIS	mg/L	---	---	---	---	<0.2	8.93	---	---	11.3	11.4	---	---	<0.02	15.2
N - No3 + No2 (As N)	DIS	mg/L	---	---	---	---	<0.2	10.4	---	---	14	14.2	---	---	<0.02	18.9
N - Tkn (As N)	TOT	mg/L	---	---	---	---	33.8	<2	---	---	40.8	2.74	---	---	57.7	0.4
N - Total (As N)	TOT	mg/L	---	---	---	---	33.8	12.5	---	---	54.9	17	---	---	57.7	19.3
Organic Carbon	TOT	mg/L	---	---	---	---	2000	2200	---	---	59	16	---	---	58	14
P - Po4 - Ortho (As P)	DIS	mg/L	---	---	---	---	1.9	0.03	---	---	4.2	4.9	---	---	4.1	2.8
P - Po4 - Total (As P)	TOT	µg/L	4880	745	4990	896	3700	171	9100	6500	6590	5190	6940	5010	6430	3210
Oil & Grease, Mineral	TOT	mg/L	<2	<2	3.6	<2	12	<2	2.4	<2	<2	<2	4.8	<2	2.9	<2
Oil & grease, total	TOT	mg/L	14	<1	21	<1	20	<1	15	<1	18	<1	19	1.1	24	<1
BOD	TOT	mg/L	---	---	---	---	190	15	---	---	270	17	---	---	240	19
CBOD	TOT	mg/L	---	---	---	---	190	4.8	---	---	250	5.8	---	---	250	8.2
COD	TOT	mg/L	---	---	---	---	11000	373	---	---	865	53	---	---	706	58
pH	NoRs	pH	7.53	7.24	7.52	7.12	7.64	7.72	---	7.14	7.84	7.22	---	7.46	7.66	7.34
pH	TOT	pH	---	---	---	---	---	---	7.36	---	---	---	7.25	---	---	---
pH @ 15° C	NoRs	pH	---	---	---	---	6.63	6.8	---	---	6.43	6.39	---	---	6.78	6.58
TSS	TOT	mg/L	---	---	---	---	180	4	---	---	120	1.6	---	---	240	8.8
H2S	TOT	mg/L	---	---	---	---	---	---	---	---	---	---	---	---	1.9	0.026
Sulfide	TOT	mg/L	0.1	0.014	0.24	0.017	0.42	0.016	<0.0018	0.015	2.2	0.019	3.4	0.015	1.8	0.024
Tetrabromomethane	TOT	µg/L	---	---	---	---	<50	<50	---	---	<50	<50	---	---	<50	<50
4-Methyl-2-Pentanone	TOT	µg/L	---	---	---	---	<10	<10	---	---	<10	<10	---	---	<10	<10
Dimethyl Ketone	TOT	µg/L	---	---	---	---	43	22	---	---	91	<15	---	---	83	22
Endrin Ketone	TOT	ng/L	---	---	---	---	---	<0.11	---	---	---	<0.534	---	---	---	<0.104
Isophorone	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Potassium	DIS	mg/L	11.6	10.2	11.9	11.4	10.7	8.83	18	17.6	17.1	16.7	16.7	16.7	17.3	17.1
Potassium	TOT	mg/L	12	10.7	12	11.4	11.2	9.07	18.4	17.7	17.5	16.7	17.5	18.9	17.9	16
Barium	DIS	µg/L	6.82	7.23	8.11	6.17	6.72	6.85	6.7	7.05	6.35	6.44	6.76	8.29	7.48	8.15
Barium	TOT	µg/L	12.5	7.58	14.1	6.75	13.5	7.29	26	7.98	17.4	7.98	19.2	7.99	15.3	8.56
Beryllium	DIS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Beryllium	TOT	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	<0.01	<0.01	<0.01	0.026	<0.01	<0.01	<0.01
Calcium	DIS	mg/L	18.9	21	18.7	20.9	20.6	20.2	20.2	22.8	18.8	21.6	18.6	22.5	18.4	22.1
Calcium	TOT	mg/L	20.6	21.4	22	21.6	22.5	20.5	25.2	22.8	23.3	22.1	21.3	23.9	22.7	20.7
Magnesium	DIS	mg/L	8.61	8.25	8.24	8.18	9.02	8.02	12.9	11	10.6	11.4	10.1	11.5	8.67	9.14
Magnesium	TOT	mg/L	8.75	8.08	8.74	8.31	9.46	7.98	12.9	10.8	11.2	11.3	11	13	9.13	8.28
Thallium	DIS	µg/L	0.0037	<0.002	0.0066	0.002	0.0027	<0.002	0.0034	<0.002	<0.002	<0.002	0.0051	0.0055	<0.002	<0.002

Appendix B4, continued

Parameter			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
Thallium	TOT	µg/L	0.0055	<0.002	0.0053	<0.002	0.0052	<0.002	0.0119	0.0049	0.0069	<0.002	0.0082	0.0029	0.005	<0.002
Antimony	DIS	µg/L	0.249	0.336	0.159	0.226	0.225	0.208	0.193	0.279	0.226	0.259	0.427	0.402	0.212	0.264
Antimony	TOT	µg/L	0.336	0.333	0.303	0.234	0.24	0.22	0.35	0.291	0.231	0.266	0.588	0.434	0.226	0.241
Arsenic	DIS	µg/L	0.315	0.222	0.323	0.242	0.43	0.302	0.368	0.273	0.381	0.259	0.377	0.274	0.356	0.27
Arsenic	TOT	µg/L	0.402	0.232	0.485	0.242	0.487	0.314	1.13	0.294	0.44	0.265	0.501	0.286	0.451	0.261
Aluminum	DIS	µg/L	29.3	11.9	35.2	10.3	28.6	12.2	27.8	12.9	33.2	13.3	43.5	17.7	36.7	16.7
Aluminum	TOT	µg/L	251	24.1	325	25.1	174	18.4	313	24.5	213	17.8	267	23	189	23.2
Lead	DIS	µg/L	0.498	0.252	0.435	0.24	0.436	0.217	0.634	0.315	0.722	0.29	0.764	0.328	0.743	0.53
Lead	TOT	µg/L	1.81	0.321	1.67	0.286	1.51	0.247	2.85	0.384	2.54	0.338	3.28	0.346	2.6	0.528
Tin	DIS	µg/L	0.79	0.4	0.62	0.39	0.82	0.41	1	0.7	1.11	0.65	0.92	0.41	0.88	0.7
Tin	TOT	µg/L	1.36	0.49	1.52	0.38	0.79	0.38	1.54	0.71	1.23	0.58	1.51	0.62	1.08	0.53
Phosphorus	DIS	µg/L	2970	573	3520	706	2400	89	5440	6290	4630	5310	4000	4220	4990	3440
Selenium	DIS	µg/L	0.233	0.11	0.276	0.131	0.181	0.106	0.303	0.178	0.234	0.159	0.256	0.159	0.132	0.16
Selenium	TOT	µg/L	0.329	0.118	0.324	0.13	0.206	0.116	0.562	0.207	0.289	0.164	0.48	0.183	0.253	0.147
Chromium III	TOT	mg/L	<0.005	<0.00099	<0.005	<0.00099	<0.005	<0.00099	<0.00099	<0.00099	0.0012	<0.00099	0.0019	<0.00099	<0.005	<0.00099
Chromium VI	TOT	mg/L	<0.005	<0.00099	<0.005	<0.00099	<0.005	<0.00099	0.0047	<0.00099	<0.00099	0.0025	<0.00099	0.0028	<0.005	0.0048
Dibutyltin	TOT	µg/L	---	---	---	---	<0.001	<0.001	---	---	---	---	---	---	<0.001	<0.001
Dibutyltin Dichloride	TOT	µg/L	---	---	---	---	<0.001	<0.001	---	---	---	---	---	---	<0.001	<0.001
Methyl Mercury	TOT	ng/L	---	---	---	---	0.446	<0.023	---	---	<0.05	<0.05	---	---	0.1	<0.05
Monobutyltin	TOT	µg/L	---	---	---	---	0.002	<0.001	---	---	---	---	---	---	0.013	0.028
Monobutyltin Trichloride	TOT	µg/L	---	---	---	---	0.004	0.005	---	---	---	---	---	---	0.02	0.045
Tributyltin	TOT	µg/L	---	---	---	---	<0.001	<0.001	---	---	---	---	---	---	<0.001	<0.001
Tributyltin Chloride	TOT	µg/L	---	---	---	---	<0.001	<0.001	---	---	---	---	---	---	<0.001	<0.001
Cadmium	DIS	µg/L	0.0234	0.0264	0.0375	0.019	0.025	0.0073	0.0259	0.0068	0.0399	<0.005	0.0492	0.0087	0.0327	0.0122
Cadmium	TOT	µg/L	0.232	0.0329	0.243	0.0256	0.116	0.0054	0.281	0.0144	0.2	0.0108	0.29	0.0097	0.162	0.017
Chromium	DIS	µg/L	0.39	0.33	0.54	0.37	0.44	0.33	0.64	0.55	0.63	0.57	0.77	0.54	0.66	0.58
Chromium	TOT	µg/L	1.01	0.37	1.5	0.38	0.72	0.34	2.72	0.62	1.16	0.6	1.92	0.61	1.24	0.61
Cobalt	DIS	µg/L	0.279	0.245	0.276	0.228	0.238	0.214	0.309	0.354	0.34	0.314	0.297	0.275	0.22	0.29
Cobalt	TOT	µg/L	0.414	0.257	0.45	0.246	0.331	0.216	0.613	0.369	0.526	0.318	0.517	0.324	0.395	0.287
Copper	DIS	µg/L	24.9	6.11	19.6	6.79	23.1	4.69	37.6	8.97	45.9	7.69	42.2	10.3	32.8	11.9
Copper	TOT	µg/L	42.2	7.84	46.7	7.89	39.3	6.18	94.8	14	68.1	11.6	84.5	12	58.4	15.2
Iron	DIS	µg/L	167	50.5	291	60.4	143	69.8	161	110	228	112	203	100	390	159
Iron	TOT	µg/L	461	69.5	565	86.3	251	74.6	632	144	479	121	556	136	494	148
Manganese	DIS	µg/L	27.4	28.8	33.3	24.6	25	26.6	31.3	36.7	31.7	34.8	28.2	34.6	29.5	36.1
Manganese	TOT	µg/L	38.4	30.2	43.2	34.6	34.3	27.6	54.5	38	49.3	36	44.1	38.4	39.6	34.7
Mercury	DIS	µg/L	<0.038	<0.0019	<0.038	<0.0019	0.0036	<0.0019	0.005	<0.0019	0.0066	<0.0019	0.0039	<0.0019	0.002	<0.0019
Mercury	TOT	µg/L	<0.038	<0.0019	<0.038	<0.038	<0.019	<0.0019	<0.038	<0.038	<0.038	<0.0019	<0.038	<0.0019	<0.019	0.0025
Molybdenum	DIS	µg/L	1.36	0.867	0.909	1.2	3.55	1.18	1.28	0.702	1.12	0.529	0.716	0.923	0.533	0.645
Molybdenum	TOT	µg/L	1.81	0.877	2.11	1.19	3.14	1.2	2	0.71	0.946	0.545	1.37	1.12	0.71	0.624
Nickel	DIS	µg/L	1.76	1.54	2.48	1.79	1.78	1.31	2.25	2.31	3.91	2.51	2.05	2.14	2.12	2.06
Nickel	TOT	µg/L	2.33	1.66	3.37	1.74	2.43	1.41	4.22	2.37	4.93	2.49	2.95	2.47	2.62	1.99
Silver	DIS	µg/L	0.0346	0.0076	0.0171	<0.005	0.042	0.0069	0.0426	0.0077	0.0504	0.0114	0.0568	0.0085	0.0456	0.0083
Silver	TOT	µg/L	0.366	0.013	0.126	0.013	0.07	0.012	0.3	0.028	0.037	0.016	0.298	0.021	0.037	0.021
Zinc	DIS	µg/L	29.2	33.5	9.64	30.9	26.7	22	29.2	25.5	37	21.7	33.5	21.4	14.9	40.9
Zinc	TOT	µg/L	78.6	34.7	89.7	33	71.6	23.1	167	30.1	164	24.5	132	25.6	106	39.1
1,1,1,2-Tetrachloroethane	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
Dichlorodifluoromethane	TOT	µg/L	---	---	---	---	<2	<2	---	---	<2	<2	---	---	<2	<2
Nitrobenzene	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
N-nitrosodimethylamine	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
N-Nitrosodi-N-Propylamine	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Benzene	TOT	µg/L	---	---	---	---	<0.4	<0.4	---	---	<0.4	<0.4	---	---	<0.4	<0.4

Appendix B4, continued

Parameter			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
Ethylbenzene	TOT	µg/L	---	---	---	---	<0.4	<0.4	---	---	<0.4	<0.4	---	---	<0.4	<0.4
Toluene	TOT	µg/L	---	---	---	---	0.66	<0.4	---	---	0.97	0.79	---	---	1.6	<0.4
Xylenes	TOT	µg/L	---	---	---	---	<0.4	<0.4	---	---	<0.4	<0.4	---	---	<0.4	<0.4
1,2,3,4-Tetrachlorobenzene	TOT	ng/L	---	---	---	---	---	<0.22	---	---	---	<1.07	---	---	---	<0.207
1,3,5-Trichlorobenzene	TOT	ng/L	---	---	---	---	---	<0.22	---	---	---	<1.07	---	---	---	<0.207
1,4-Dioxane	TOT	µg/L	---	---	---	---	0.27	0.31	---	---	<1	<1	---	---	0.21	0.27
1,7-Dimethylxanthine	TOT	ng/L	---	---	---	---	---	---	---	---	36000	231	---	---	37500	241
Acrolein	NoRs	µg/L	---	---	---	---	<2.8	<2.8	---	---	3.1	<2.8	---	---	<2.8	<2.8
Acrylonitrile	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Delta-Hch Or Delta-Bhc	TOT	ng/L	---	---	---	---	---	<0.11	---	---	---	<0.534	---	---	---	<0.104
Dibromomethane	TOT	µg/L	---	---	---	---	<2	<2	---	---	<2	<2	---	---	<2	<2
Pentachlorobenzene	TOT	ng/L	---	---	---	---	---	0.042	---	---	---	<0.107	---	---	---	0.033
Perfluorobutanoic acid	TOT	ng/L	---	---	---	---	15	11.7	---	---	24.1	13.1	---	---	<12	13.7
Tetrachloromethane	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
Trans-Chlordane	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0414
Trans-Nonachlor	TOT	ng/L	---	---	---	---	---	0.091	---	---	---	<0.214	---	---	---	<0.0414
Tribromomethane	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Trichloromethane	TOT	µg/L	---	---	---	---	3.2	1.2	---	---	3.7	1.8	---	---	2.8	1.3
1,2-diphenylhydrazine	TOT	µg/L	---	---	---	---	<0.05	<0.05	---	---	<0.05	<0.05	---	---	<0.05	<0.05
2,4-dinitrotoluene	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
2,6-dinitrotoluene	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
3,3-dichlorobenzidine	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
4-Bromophenyl Phenyl Ether	TOT	µg/L	---	---	---	---	<0.05	<0.05	---	---	<0.05	<0.05	---	---	<0.05	<0.05
4-Chlorophenyl Phenyl Ether	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Hexachlorocyclopentadiene	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Hexachloroethane	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Alpha-Terpineol	TOT	µg/L	---	---	---	---	<5	<5	---	---	6.7	<5	---	---	8.2	<5
1,1,1-trichloroethane	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,1,2,2-tetrachloroethane	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,1,2-trichloroethane	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,1-dichloroethane	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,1-dichloroethene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,2,3-Trichlorobenzene	TOT	ng/L	---	---	---	---	---	<0.22	---	---	---	<1.07	---	---	---	<0.207
1,2,4,5-/1,2,3,5-Tetrachlorobenzene	TOT	ng/L	---	---	---	---	---	<0.22	---	---	---	<1.07	---	---	---	<0.207
1,2,4-trichlorobenzene	TOT	µg/L	---	---	---	---	<0.2	<0.2	---	---	<0.2	<0.2	---	---	<0.2	<0.2
1,2,4-trichlorobenzene	TOT	ng/L	---	---	---	---	---	0.515	---	---	---	<1.07	---	---	---	<0.207
1,2-dibromoethane	TOT	µg/L	---	---	---	---	<0.2	<0.2	---	---	<0.2	<0.2	---	---	<0.2	<0.2
1,2-dichlorobenzene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,2-dichlorobenzene	TOT	ng/L	---	---	---	---	---	<0.459	---	---	---	-999	---	---	---	0.815
1,2-dichloroethane	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,2-dichloropropane	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,3-dichlorobenzene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,3-dichlorobenzene	TOT	ng/L	---	---	---	---	---	1.81	---	---	---	-999	---	---	---	<0.207
1,4-dichlorobenzene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
1,4-dichlorobenzene	TOT	ng/L	---	---	---	---	---	21.5	---	---	---	-999	---	---	---	33.2
Bromodichloromethane	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Bromomethane	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Chlorobenzene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
Chlorodibromomethane	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Chloroethane	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Chloroethene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5

Appendix B4, continued

Parameter			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
Chloromethane	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Cis-1,2-Dichloroethene	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
cis-1,3-dichloropropene	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Hexachlorobutadiene	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Hexachlorobutadiene	TOT	ng/L	---	---	---	---	---	0.17	---	---	---	1.54	---	---	---	0.225
M & P Xylenes	TOT	µg/L	---	---	---	---	<0.4	<0.4	---	---	<0.4	<0.4	---	---	<0.4	<0.4
Methyl Ethyl Ketone	TOT	µg/L	---	---	---	---	<50	<50	---	---	<50	<50	---	---	<50	<50
Methyl Tertiary Butyl Ether	TOT	µg/L	---	---	---	---	<4	<4	---	---	<4	<4	---	---	<4	<4
O-Xylene	TOT	µg/L	---	---	---	---	<0.4	<0.4	---	---	<0.4	<0.4	---	---	<0.4	<0.4
Styrene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
Tetrachloroethene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
Trans-1,2-Dichloroethene	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
trans-1,3-dichloropropene	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Trichloroethene	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
Trichlorofluoromethane	TOT	µg/L	---	---	---	---	<4	<4	---	---	<4	<4	---	---	<4	<4
17 beta-Estradiol 3-benzoate	TOT	ng/L	---	---	---	---	<4.7	<0.741	---	---	<1.93	<0.763	---	---	<12.3	<5.38
Allyl Trenbolone	TOT	ng/L	---	---	---	---	<2.41	<2.88	---	---	<7.28	<1.26	---	---	<10	<1.12
Androstenedione	TOT	ng/L	---	---	---	---	230	3.54	---	---	245	7.89	---	---	296	5.67
Androsterone	TOT	ng/L	---	---	---	---	<228	<202	---	---	54.8	<202	---	---	-999	<303
Desogestrel	TOT	ng/L	---	---	---	---	<1000	<201	---	---	<601	<146	---	---	<2090	<70.5
Mestranol	TOT	ng/L	---	---	---	---	<717	<18.5	---	---	-999	<39.4	---	---	-999	<81.9
Norethindrone	TOT	ng/L	---	---	---	---	<9.12	<7.34	---	---	<3.72	<4.35	---	---	<17.6	<7.19
norgestrel	TOT	ng/L	---	---	---	---	<56.9	<3.22	---	---	<18.1	<4.47	---	---	<36.4	<3.97
Progesterone	TOT	ng/L	---	---	---	---	44.8	<1.04	---	---	26.2	<2.51	---	---	50.6	<0.988
Testosterone	TOT	ng/L	---	---	---	---	57.3	<1.21	---	---	67.6	<1.15	---	---	52	<0.879
Total Phenols	TOT	mg/L	---	---	---	---	0.034	<0.0015	---	---	0.056	<0.0075	---	---	0.058	0.0022
2,4 + 2,5 Dichlorophenol	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
2,4,6-Tribromophenol	TOT	%	---	---	---	---	61	68	---	---	46	102	---	---	54	60
2-Chlorophenol	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
4-Chloro-3-Methylphenol	TOT	µg/L	---	---	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1
Pentachlorophenol	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
2,4-dimethylphenol	TOT	µg/L	---	---	---	---	<2.5	<2.5	---	---	<2.5	<2.5	---	---	<2.5	<2.5
2,4-dinitrophenol	TOT	µg/L	---	---	---	---	<6.5	<6.5	---	---	<6.5	<6.5	---	---	<6.5	<6.5
2-Methyl-4,6-Dinitrophenol	TOT	µg/L	---	---	---	---	<2.5	<2.5	---	---	<2.5	<2.5	---	---	<2.5	<2.5
2-Nitrophenol	TOT	µg/L	---	---	---	---	<2.5	<2.5	---	---	<2.5	<2.5	---	---	<2.5	<2.5
Phenol	TOT	µg/L	---	---	---	---	9.4	<2.5	---	---	11.4	<2.5	---	---	13.2	<2.5
2,4,6-trichlorophenol	TOT	µg/L	---	---	---	---	<0.5	<0.5	---	---	<0.5	<0.5	---	---	<0.5	<0.5
Conductivity	TOT	µS/cm	---	---	---	---	680	510	---	---	1000	790	---	---	960	710
17 alpha-Dihydroequilin	TOT	ng/L	---	---	---	---	<6.32	<1.85	---	---	<1.92	<1.91	---	---	<7.69	<1.87
17 alpha-Estradiol	TOT	ng/L	---	---	---	---	<25.3	<7.41	---	---	<8.34	<7.63	---	---	<30.8	10.2
17 alpha-Ethinyl-Estradiol	TOT	ng/L	---	---	---	---	<15.8	<6.31	---	---	<33.2	<4.77	---	---	<38.2	<9.28
17 beta-Estradiol	TOT	ng/L	---	---	---	---	<20.6	<3.71	---	---	<31.1	<3.81	---	---	<40.1	25.4
Equilenin	TOT	ng/L	---	---	---	---	<3.08	<0.396	---	---	<3.74	<1.18	---	---	12	<1.95
Equilin	TOT	ng/L	---	---	---	---	<6.32	<1.85	---	---	<1.92	<1.91	---	---	<7.69	<1.87
Estriol	TOT	ng/L	---	---	---	---	106	<11.6	---	---	233	<17.4	---	---	166	<20.3
Estrone	TOT	ng/L	---	---	---	---	41.2	74.4	---	---	49.7	50.6	---	---	64.2	159
4-Nitrophenol	TOT	µg/L	---	---	---	---	<2.5	<2.5	---	---	<2.5	<2.5	---	---	<2.5	<2.5
4-n-Octylphenol	TOT	ng/L	---	---	---	---	<3.56	1.22	---	---	<7.38	2.22	---	---	<5.2	0.765
4-Nonylphenol Diethoxylates	TOT	ng/L	---	---	---	---	726	433	---	---	435	75.3	---	---	620	66.9
4-Nonylphenol Monoethoxylates	TOT	ng/L	---	---	---	---	1860	689	---	---	2670	479	---	---	1960	418
Np	TOT	ng/L	---	---	---	---	981	58.8	---	---	1480	43.7	---	---	1040	17.4

Appendix B4, continued

			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
Parameter			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
1-Methylphenanthrene	TOT	ng/L	---	---	---	---	7.42	<0.958	---	---	19.8	1.06	---	---	11.4	1.4
2,3,5-trimethylnaphthalene	TOT	ng/L	---	---	---	---	17.8	1.75	---	---	35.2	2.38	---	---	8.6	1.7
2,6-dimethylnaphthalene	TOT	ng/L	---	---	---	---	26.5	1.59	---	---	66.3	3.32	---	---	9.15	1.2
2-Chloronaphthalene	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
2-Methylnaphthalene	TOT	µg/L	---	---	---	---	0.021	<0.01	---	---	0.038	<0.01	---	---	0.024	<0.01
2-Methylnaphthalene	TOT	ng/L	---	---	---	---	22.4	3.21	---	---	45.9	3.95	---	---	28.6	3.03
Acenaphthene	TOT	µg/L	---	---	---	---	0.018	<0.01	---	---	0.023	<0.01	---	---	0.18	0.018
Acenaphthene	TOT	ng/L	---	---	---	---	22	3.69	---	---	43.1	8.28	---	---	91.6	18.3
Acenaphthylene	TOT	µg/L	---	---	---	---	<0.01	<0.01	---	---	0.021	<0.01	---	---	0.086	<0.01
Acenaphthylene	TOT	ng/L	---	---	---	---	0.65	<0.439	---	---	0.772	0.31	---	---	1.16	0.622
Anthracene	TOT	µg/L	---	---	---	---	<0.01	<0.01	---	---	<0.01	<0.01	---	---	<0.01	<0.01
Anthracene	TOT	ng/L	---	---	---	---	2.79	<0.584	---	---	4.93	<1.19	---	---	6	<0.375
Benzo(B)Fluoranthene + Benzo(J)Fluoranthene	TOT	µg/L	---	---	---	---	<0.01	<0.01	---	---	<0.01	<0.01	---	---	0.047	0.014
Benzo(K)Fluoranthene	TOT	µg/L	---	---	---	---	<0.01	<0.01	---	---	<0.01	<0.01	---	---	<0.01	<0.01
Benzo[a]anthracene	TOT	µg/L	---	---	---	---	<0.01	<0.01	---	---	<0.01	<0.01	---	---	<0.01	<0.01
Benzo[a]anthracene	TOT	ng/L	---	---	---	---	1.87	<0.221	---	---	4.97	<0.156	---	---	4.92	0.217
Benzo[a]pyrene	TOT	µg/L	---	---	---	---	<0.005	<0.005	---	---	<0.005	<0.005	---	---	<0.005	<0.005
Benzo[a]pyrene	TOT	ng/L	---	---	---	---	1.38	<0.53	---	---	3.17	<0.59	---	---	3.67	<0.456
Benzo[b]fluoranthene	TOT	µg/L	---	---	---	---	<0.01	<0.01	---	---	<0.01	<0.01	---	---	0.015	0.014
Benzo[b]fluoranthene	TOT	ng/L	---	---	---	---	1.43	<0.328	---	---	3.94	<0.109	---	---	5.12	0.368
Benzo[e]pyrene	TOT	ng/L	---	---	---	---	2.16	<0.496	---	---	4.66	<0.552	---	---	3.78	<0.438
Benzo[ghi]perylene	TOT	µg/L	---	---	---	---	<0.02	<0.02	---	---	<0.02	<0.02	---	---	<0.02	<0.02
Benzo[ghi]perylene	TOT	ng/L	---	---	---	---	1.18	<0.487	---	---	4.94	<0.7	---	---	4.03	0.268
Benzo[J,K]Fluoranthenes	TOT	ng/L	---	---	---	---	1.28	<0.382	---	---	4.97	<0.435	---	---	4.14	<0.334
Chrysene	TOT	µg/L	---	---	---	---	<0.01	<0.01	---	---	<0.01	<0.01	---	---	<0.01	<0.01
Chrysene	TOT	ng/L	---	---	---	---	2.51	0.411	---	---	4.36	0.486	---	---	11.7	0.785
dibenzo(a,h)anthracene	TOT	µg/L	---	---	---	---	<0.02	<0.02	---	---	<0.02	<0.02	---	---	<0.02	<0.02
dibenzo(a,h)anthracene	TOT	ng/L	---	---	---	---	<1.22	<0.976	---	---	6.75	<0.122	---	---	0.724	<0.238
Dibenzothiophene	TOT	ng/L	---	---	---	---	7.69	1.39	---	---	20.2	1.67	---	---	32.5	2.7
Fluoranthene	TOT	µg/L	---	---	---	---	0.02	<0.01	---	---	0.025	<0.01	---	---	0.079	0.024
Fluoranthene	TOT	ng/L	---	---	---	---	21.8	2.76	---	---	47.2	5.36	---	---	80.2	10.5
Fluorene	TOT	µg/L	---	---	---	---	0.02	<0.01	---	---	0.015	<0.01	---	---	0.091	0.016
Fluorene	TOT	ng/L	---	---	---	---	14.9	2.77	---	---	29.5	3.73	---	---	56.6	8.43
High Molecular Weight PAH`s	TOT	µg/L	---	---	---	---	0.034	<0.02	---	---	0.044	<0.02	---	---	0.18	0.053
Indeno(1,2,3-C,D)Pyrene	TOT	µg/L	---	---	---	---	<0.02	<0.02	---	---	<0.02	<0.02	---	---	<0.02	<0.02
Indeno(1,2,3-C,D)Pyrene	TOT	ng/L	---	---	---	---	2.37	<0.615	---	---	<0.788	0.57	---	---	3.08	0.318
Low Molecular Weight PAH`s	TOT	µg/L	---	---	---	---	0.16	<0.01	---	---	0.22	0.023	---	---	0.82	0.082
Naphthalene	TOT	µg/L	---	---	---	---	0.038	<0.01	---	---	0.037	0.011	---	---	0.15	0.015
Naphthalene	TOT	ng/L	---	---	---	---	32.7	5.66	---	---	66.7	7.77	---	---	127	9.48
Perylene	TOT	ng/L	---	---	---	---	<0.856	<0.515	---	---	<1.25	<0.594	---	---	1.25	<0.461
Phenanthrene	TOT	µg/L	---	---	---	---	0.05	<0.01	---	---	0.059	0.012	---	---	0.22	0.034
Phenanthrene	TOT	ng/L	---	---	---	---	73.4	11.4	---	---	145	11.9	---	---	264	20
Pyrene	TOT	µg/L	---	---	---	---	0.014	<0.01	---	---	0.02	0.014	---	---	0.054	0.015
Pyrene	TOT	ng/L	---	---	---	---	15.4	2.7	---	---	35.8	2.48	---	---	41.7	5.02
Total PAH	TOT	µg/L	---	---	---	---	0.2	<0.02	---	---	0.26	0.037	---	---	1	0.13
Pbde 10	TOT	pg/g	---	---	---	---	---	<1.9	---	---	---	---	---	---	---	---
Pbde 10	TOT	pg/L	---	---	---	---	---	---	---	---	---	<2.97	---	---	---	<0.683
Pbde 100	TOT	pg/g	---	---	---	---	---	157	---	---	---	---	---	---	---	---
Pbde 100	TOT	pg/L	---	---	---	---	---	---	---	---	---	376	---	---	---	418
Pbde 105	TOT	pg/g	---	---	---	---	---	<2.63	---	---	---	---	---	---	---	---
Pbde 105	TOT	pg/L	---	---	---	---	---	---	---	---	---	<2.58	---	---	---	<3.3

Appendix B4, continued

			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
Parameter			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
Pbde 116	TOT	pg/g	---	---	---	---	---	<3.13	---	---	---	---	---	---	---	---
Pbde 116	TOT	pg/L	---	---	---	---	---	---	---	---	---	18.2	---	---	---	<3.55
Pbde 119/120	TOT	pg/g	---	---	---	---	---	3.34	---	---	---	---	---	---	---	---
Pbde 119/120	TOT	pg/L	---	---	---	---	---	---	---	---	---	4.2	---	---	---	6.49
Pbde 12/13	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 12/13	TOT	pg/L	---	---	---	---	---	---	---	---	---	2.8	---	---	---	0.867
Pbde 126	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 126	TOT	pg/L	---	---	---	---	---	---	---	---	---	<1.35	---	---	---	<1.58
Pbde 128	TOT	pg/g	---	---	---	---	---	<2.99	---	---	---	---	---	---	---	---
Pbde 128	TOT	pg/L	---	---	---	---	---	---	---	---	---	<4.18	---	---	---	<2.42
Pbde 138/166	TOT	pg/g	---	---	---	---	---	8.73	---	---	---	---	---	---	---	---
Pbde 138/166	TOT	pg/L	---	---	---	---	---	---	---	---	---	20.6	---	---	---	26.7
Pbde 140	TOT	pg/g	---	---	---	---	---	2.73	---	---	---	---	---	---	---	---
Pbde 140	TOT	pg/L	---	---	---	---	---	---	---	---	---	5.65	---	---	---	7.63
Pbde 15	TOT	pg/g	---	---	---	---	---	1.57	---	---	---	---	---	---	---	---
Pbde 15	TOT	pg/L	---	---	---	---	---	---	---	---	---	3.14	---	---	---	2.74
Pbde 153	TOT	pg/g	---	---	---	---	---	62.2	---	---	---	---	---	---	---	---
Pbde 153	TOT	pg/L	---	---	---	---	---	---	---	---	---	164	---	---	---	181
Pbde 154	TOT	pg/g	---	---	---	---	---	49.5	---	---	---	---	---	---	---	---
Pbde 154	TOT	pg/L	---	---	---	---	---	---	---	---	---	121	---	---	---	145
Pbde 155	TOT	pg/g	---	---	---	---	---	5.23	---	---	---	---	---	---	---	---
Pbde 155	TOT	pg/L	---	---	---	---	---	---	---	---	---	9.95	---	---	---	12.4
Pbde 17/25	TOT	pg/g	---	---	---	---	---	7.92	---	---	---	---	---	---	---	---
Pbde 17/25	TOT	pg/L	---	---	---	---	---	---	---	---	---	26.9	---	---	---	19.9
Pbde 181	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 181	TOT	pg/L	---	---	---	---	---	---	---	---	---	<2.05	---	---	---	<1.37
Pbde 183	TOT	pg/g	---	---	---	---	---	10.7	---	---	---	---	---	---	---	---
Pbde 183	TOT	pg/L	---	---	---	---	---	---	---	---	---	20.9	---	---	---	25.7
Pbde 190	TOT	pg/g	---	---	---	---	---	<1.88	---	---	---	---	---	---	---	---
Pbde 190	TOT	pg/L	---	---	---	---	---	---	---	---	---	<3.93	---	---	---	<2.44
Pbde 203	TOT	pg/g	---	---	---	---	---	9.77	---	---	---	---	---	---	---	---
Pbde 203	TOT	pg/L	---	---	---	---	---	---	---	---	---	19.1	---	---	---	18.2
Pbde 206	TOT	pg/g	---	---	---	---	---	3.8	---	---	---	---	---	---	---	---
Pbde 206	TOT	pg/L	---	---	---	---	---	---	---	---	---	115	---	---	---	69.4
Pbde 207	TOT	pg/g	---	---	---	---	---	103	---	---	---	---	---	---	---	---
Pbde 207	TOT	pg/L	---	---	---	---	---	---	---	---	---	156	---	---	---	90.6
Pbde 208	TOT	pg/g	---	---	---	---	---	58.9	---	---	---	---	---	---	---	---
Pbde 208	TOT	pg/L	---	---	---	---	---	---	---	---	---	84.4	---	---	---	61.8
Pbde 209	TOT	pg/g	---	---	---	---	---	963	---	---	---	---	---	---	---	---
Pbde 209	TOT	pg/L	---	---	---	---	---	---	---	---	---	2050	---	---	---	2250
Pbde 28/33	TOT	pg/g	---	---	---	---	---	21.6	---	---	---	---	---	---	---	---
Pbde 28/33	TOT	pg/L	---	---	---	---	---	---	---	---	---	50.2	---	---	---	54.9
Pbde 30	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 30	TOT	pg/L	---	---	---	---	---	---	---	---	---	<2.75	---	---	---	<1.2
Pbde 32	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 32	TOT	pg/L	---	---	---	---	---	---	---	---	---	<2.09	---	---	---	<0.94
Pbde 35	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 35	TOT	pg/L	---	---	---	---	---	---	---	---	---	<1.89	---	---	---	<0.853
Pbde 37	TOT	pg/g	---	---	---	---	---	5.07	---	---	---	---	---	---	---	---
Pbde 37	TOT	pg/L	---	---	---	---	---	---	---	---	---	9.64	---	---	---	9.27
Pbde 47	TOT	pg/g	---	---	---	---	---	784	---	---	---	---	---	---	---	---

Parameter			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
Pbde 47	TOT	pg/L	---	---	---	---	---	---	---	---	---	1950	---	---	---	2000
Pbde 49	TOT	pg/g	---	---	---	---	---	20.7	---	---	---	---	---	---	---	---
Pbde 49	TOT	pg/L	---	---	---	---	---	---	---	---	---	47.7	---	---	---	44.3
Pbde 51	TOT	pg/g	---	---	---	---	---	1.97	---	---	---	---	---	---	---	---
Pbde 51	TOT	pg/L	---	---	---	---	---	---	---	---	---	5.39	---	---	---	6.07
Pbde 66	TOT	pg/g	---	---	---	---	---	18.7	---	---	---	---	---	---	---	---
Pbde 66	TOT	pg/L	---	---	---	---	---	---	---	---	---	45.1	---	---	---	46.4
Pbde 7	TOT	pg/g	---	---	---	---	---	<1.78	---	---	---	---	---	---	---	---
Pbde 7	TOT	pg/L	---	---	---	---	---	---	---	---	---	2.83	---	---	---	3.21
Pbde 71	TOT	pg/g	---	---	---	---	---	3.45	---	---	---	---	---	---	---	---
Pbde 71	TOT	pg/L	---	---	---	---	---	---	---	---	---	6.8	---	---	---	7.7
Pbde 75	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 75	TOT	pg/L	---	---	---	---	---	---	---	---	---	3.96	---	---	---	3.55
Pbde 77	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 77	TOT	pg/L	---	---	---	---	---	---	---	---	---	<1.35	---	---	---	0.855
Pbde 79	TOT	pg/g	---	---	---	---	---	5.66	---	---	---	---	---	---	---	---
Pbde 79	TOT	pg/L	---	---	---	---	---	---	---	---	---	<1.35	---	---	---	7.65
Pbde 8/11	TOT	pg/g	---	---	---	---	---	<1.39	---	---	---	---	---	---	---	---
Pbde 8/11	TOT	pg/L	---	---	---	---	---	---	---	---	---	2.22	---	---	---	0.703
Pbde 85	TOT	pg/g	---	---	---	---	---	32.7	---	---	---	---	---	---	---	---
Pbde 85	TOT	pg/L	---	---	---	---	---	---	---	---	---	84.6	---	---	---	84.9
Pbde 99	TOT	pg/g	---	---	---	---	---	745	---	---	---	---	---	---	---	---
Pbde 99	TOT	pg/L	---	---	---	---	---	---	---	---	---	1860	---	---	---	2050
Decachloro Biphenyl	TOT	pg/L	---	---	---	---	---	<-999	---	---	---	2.24	---	---	---	3.16
PCB	TOT	pg/L	---	---	---	---	---	6.47	---	---	---	4.93	---	---	---	22.3
PCB 10	TOT	pg/L	---	---	---	---	---	<2.81	---	---	---	<2.19	---	---	---	<1.56
PCB 103	TOT	pg/L	---	---	---	---	---	0.724	---	---	---	<0.749	---	---	---	<0.835
PCB 104	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 105	TOT	pg/L	---	---	---	---	---	4.32	---	---	---	9.59	---	---	---	7.48
PCB 106	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.704	---	---	---	<1.11
PCB 107/124	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	0.88	---	---	---	<1.19
PCB 109	TOT	pg/L	---	---	---	---	---	0.956	---	---	---	2.08	---	---	---	1.52
PCB 11	TOT	pg/L	---	---	---	---	---	38.2	---	---	---	80.7	---	---	---	83.7
PCB 110/115	TOT	pg/L	---	---	---	---	---	11.7	---	---	---	30.4	---	---	---	28.5
PCB 111	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.713
PCB 112	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.672
PCB 114	TOT	pg/L	---	---	---	---	---	0.96	---	---	---	0.991	---	---	---	<1.18
PCB 118	TOT	pg/L	---	---	---	---	---	10.6	---	---	---	30.5	---	---	---	20.4
PCB 12/13	TOT	pg/L	---	---	---	---	---	<2.99	---	---	---	<2.14	---	---	---	4.2
PCB 120	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.667
PCB 121	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.728
PCB 122	TOT	pg/L	---	---	---	---	---	<0.783	---	---	---	<0.771	---	---	---	<1.25
PCB 123	TOT	pg/L	---	---	---	---	---	<0.802	---	---	---	1.26	---	---	---	<1.31
PCB 126	TOT	pg/L	---	---	---	---	---	<0.82	---	---	---	<0.806	---	---	---	<1.23
PCB 127	TOT	pg/L	---	---	---	---	---	<0.708	---	---	---	<0.701	---	---	---	<1.17
PCB 128/166	TOT	pg/L	---	---	---	---	---	1.71	---	---	---	3.37	---	---	---	2.89
PCB 129/138/160/163	TOT	pg/L	---	---	---	---	---	13.8	---	---	---	27.8	---	---	---	22.1
PCB 130	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.92	---	---	---	2.69
PCB 131	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.847	---	---	---	<1.38
PCB 132	TOT	pg/L	---	---	---	---	---	4.36	---	---	---	8.81	---	---	---	7.94
PCB 133	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.79	---	---	---	<1.34

Appendix B4, continued

			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
Parameter			**Influent Q+**	**Effluent Q+**	**Influent Quarterly**	**Effluent Quarterly**	**Influent Q+**	**Effluent Q+**	**Influent Quarterly**	**Effluent Quarterly**	**Influent Q+**	**Effluent Q+**	**Influent Quarterly**	**Effluent Quarterly**	**Influent Quarterly**	**Effluent Quarterly**
PCB 134/143	TOT	pg/L	---	---	---	---	---	0.738	---	---	---	1.38	---	---	---	<1.41
PCB 135/151/154	TOT	pg/L	---	---	---	---	---	3.78	---	---	---	9	---	---	---	8.04
PCB 136	TOT	pg/L	---	---	---	---	---	1.01	---	---	---	2.99	---	---	---	3.38
PCB 137	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.61	---	---	---	2.32
PCB 139/140	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.76	---	---	---	<1.32
PCB 14	TOT	pg/L	---	---	---	---	---	<2.85	---	---	---	<2.08	---	---	---	<1.54
PCB 141	TOT	pg/L	---	---	---	---	---	1.99	---	---	---	3.98	---	---	---	3.45
PCB 142	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.793	---	---	---	<1.44
PCB 144	TOT	pg/L	---	---	---	---	---	0.738	---	---	---	1.15	---	---	---	1.45
PCB 145	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 146	TOT	pg/L	---	---	---	---	---	2.2	---	---	---	5.97	---	---	---	4.14
PCB 147/149	TOT	pg/L	---	---	---	---	---	8.23	---	---	---	22.4	---	---	---	15.9
PCB 148	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.689
PCB 15	TOT	pg/L	---	---	---	---	---	4.11	---	---	---	9.21	---	---	---	11.3
PCB 150	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 152	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 153/168	TOT	pg/L	---	---	---	---	---	13.4	---	---	---	29.6	---	---	---	23.5
PCB 155	TOT	pg/L	---	---	---	---	---	0.993	---	---	---	1.89	---	---	---	2.92
PCB 156157	TOT	pg/L	---	---	---	---	---	1.69	---	---	---	2.6	---	---	---	3.26
PCB 158	TOT	pg/L	---	---	---	---	---	0.872	---	---	---	2.46	---	---	---	2.19
PCB 159	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<1.01
PCB 16	TOT	pg/L	---	---	---	---	---	2.69	---	---	---	8.44	---	---	---	5.84
PCB 161	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<1.04
PCB 162	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<1.02
PCB 164	TOT	pg/L	---	---	---	---	---	1.05	---	---	---	1.62	---	---	---	1.22
PCB 165	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<1.13
PCB 167	TOT	pg/L	---	---	---	---	---	1.08	---	---	---	<0.677	---	---	---	1.16
PCB 169	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<1.04
PCB 17	TOT	pg/L	---	---	---	---	---	2.47	---	---	---	6.63	---	---	---	5.41
PCB 170	TOT	pg/L	---	---	---	---	---	2.27	---	---	---	4.06	---	---	---	4.56
PCB 171/173	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	1.42
PCB 172	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.26	---	---	---	0.82
PCB 175	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 176	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	0.718	---	---	---	<0.66
PCB 177	TOT	pg/L	---	---	---	---	---	1.53	---	---	---	2.52	---	---	---	2.66
PCB 178	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.84	---	---	---	1.36
PCB 179	TOT	pg/L	---	---	---	---	---	0.793	---	---	---	2.34	---	---	---	2.23
PCB 18/30	TOT	pg/L	---	---	---	---	---	6.56	---	---	---	14.4	---	---	---	11.1
PCB 180/193	TOT	pg/L	---	---	---	---	---	6.42	---	---	---	11.9	---	---	---	13.1
PCB 181	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 182	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 183/185	TOT	pg/L	---	---	---	---	---	1.97	---	---	---	3.81	---	---	---	3.34
PCB 184	TOT	pg/L	---	---	---	---	---	1.41	---	---	---	2.81	---	---	---	4.07
PCB 186	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 187	TOT	pg/L	---	---	---	---	---	3.77	---	---	---	10.1	---	---	---	7.09
PCB 188	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 189	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.855
PCB 19	TOT	pg/L	---	---	---	---	---	2.13	---	---	---	2.57	---	---	---	1.78
PCB 190	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	0.909
PCB 191	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 192	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66

Appendix B4, continued

Parameter			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
PCB 194	TOT	pg/L	---	---	---	---	---	1.02	---	---	---	1.97	---	---	---	1.94
PCB 195	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	0.722	---	---	---	0.814
PCB 196	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.11	---	---	---	1.31
PCB 197/200	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	1.03
PCB 198/199	TOT	pg/L	---	---	---	---	---	1.26	---	---	---	2.26	---	---	---	2.84
PCB 2	TOT	pg/L	---	---	---	---	---	2.24	---	---	---	3.16	---	---	---	4.77
PCB 20/28	TOT	pg/L	---	---	---	---	---	10.5	---	---	---	26.4	---	---	---	25.9
PCB 201	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 202	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.33	---	---	---	1.17
PCB 203	TOT	pg/L	---	---	---	---	---	1.05	---	---	---	2.17	---	---	---	1.6
PCB 204	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 205	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 206	TOT	pg/L	---	---	---	---	---	1.29	---	---	---	1.78	---	---	---	2.36
PCB 207	TOT	pg/L	---	---	---	---	---	<0.738	---	---	---	<0.737	---	---	---	<0.66
PCB 208	TOT	pg/L	---	---	---	---	---	1.28	---	---	---	1.03	---	---	---	1.68
PCB 209	TOT	pg/L	---	---	---	---	---	1.65	---	---	---	2.24	---	---	---	3.16
PCB 21/33	TOT	pg/L	---	---	---	---	---	5.06	---	---	---	13.2	---	---	---	12.8
PCB 22	TOT	pg/L	---	---	---	---	---	3.92	---	---	---	10.7	---	---	---	10.2
PCB 23	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 24	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 25	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.82	---	---	---	1.59
PCB 26/29	TOT	pg/L	---	---	---	---	---	1.61	---	---	---	3.77	---	---	---	3.65
PCB 27	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.21	---	---	---	0.858
PCB 3	TOT	pg/L	---	---	---	---	---	3.24	---	---	---	4.02	---	---	---	8.32
PCB 31	TOT	pg/L	---	---	---	---	---	8.51	---	---	---	22.1	---	---	---	19.8
PCB 32	TOT	pg/L	---	---	---	---	---	2.4	---	---	---	5.29	---	---	---	3.69
PCB 34	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 35	TOT	pg/L	---	---	---	---	---	1.19	---	---	---	2.12	---	---	---	2.49
PCB 36	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 37	TOT	pg/L	---	---	---	---	---	2.67	---	---	---	6.87	---	---	---	7.56
PCB 38	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 4	TOT	pg/L	---	---	---	---	---	6.04	---	---	---	6.29	---	---	---	6.06
PCB 40/41/71	TOT	pg/L	---	---	---	---	---	3.83	---	---	---	9.95	---	---	---	9.53
PCB 42	TOT	pg/L	---	---	---	---	---	1.55	---	---	---	5.46	---	---	---	3.89
PCB 43	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.25	---	---	---	1.02
PCB 44/47/65	TOT	pg/L	---	---	---	---	---	42.1	---	---	---	37.8	---	---	---	60.2
PCB 46	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.51	---	---	---	1.07
PCB 48	TOT	pg/L	---	---	---	---	---	1.13	---	---	---	4.38	---	---	---	3.51
PCB 49/69	TOT	pg/L	---	---	---	---	---	4.1	---	---	---	12.6	---	---	---	10.7
PCB 5	TOT	pg/L	---	---	---	---	---	<3.26	---	---	---	<2.36	---	---	---	<1.7
PCB 50/53	TOT	pg/L	---	---	---	---	---	1.12	---	---	---	2.8	---	---	---	2.05
PCB 52	TOT	pg/L	---	---	---	---	---	11.7	---	---	---	28.3	---	---	---	24.7
PCB 54	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 55	TOT	pg/L	---	---	---	---	---	<1.04	---	---	---	<0.776	---	---	---	<0.66
PCB 56	TOT	pg/L	---	---	---	---	---	3.01	---	---	---	7.12	---	---	---	6.07
PCB 57	TOT	pg/L	---	---	---	---	---	<1.03	---	---	---	<0.729	---	---	---	<0.66
PCB 58	TOT	pg/L	---	---	---	---	---	<1.07	---	---	---	<0.745	---	---	---	<0.66
PCB 59/62/75	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	1.98	---	---	---	1.54
PCB 6	TOT	pg/L	---	---	---	---	---	<2.69	---	---	---	4.3	---	---	---	3.28
PCB 60	TOT	pg/L	---	---	---	---	---	1.58	---	---	---	4.19	---	---	---	4.28
PCB 61/70/74/76	TOT	pg/L	---	---	---	---	---	12.5	---	---	---	30.2	---	---	---	29.7

Appendix B4, continued

			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
Parameter			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
PCB 63	TOT	pg/L	---	---	---	---	---	<0.982	---	---	---	0.971	---	---	---	0.797
PCB 64	TOT	pg/L	---	---	---	---	---	2.22	---	---	---	8.98	---	---	---	7.98
PCB 66	TOT	pg/L	---	---	---	---	---	5.01	---	---	---	14.8	---	---	---	12.2
PCB 67	TOT	pg/L	---	---	---	---	---	<0.892	---	---	---	<0.677	---	---	---	<0.66
PCB 68	TOT	pg/L	---	---	---	---	---	3.01	---	---	---	2.33	---	---	---	5.71
PCB 7	TOT	pg/L	---	---	---	---	---	3.26	---	---	---	<2.07	---	---	---	1.67
PCB 72	TOT	pg/L	---	---	---	---	---	<0.986	---	---	---	<0.692	---	---	---	<0.66
PCB 73	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB 77	TOT	pg/L	---	---	---	---	---	<1.23	---	---	---	1.47	---	---	---	1.6
PCB 78	TOT	pg/L	---	---	---	---	---	<1.12	---	---	---	<0.75	---	---	---	<0.66
PCB 79	TOT	pg/L	---	---	---	---	---	<0.899	---	---	---	<0.677	---	---	---	<0.66
PCB 8	TOT	pg/L	---	---	---	---	---	5.48	---	---	---	11.6	---	---	---	11.1
PCB 80	TOT	pg/L	---	---	---	---	---	<0.952	---	---	---	<0.682	---	---	---	<0.66
PCB 81	TOT	pg/L	---	---	---	---	---	<1.16	---	---	---	<0.801	---	---	---	<0.66
PCB 82	TOT	pg/L	---	---	---	---	---	1.05	---	---	---	3.65	---	---	---	3.17
PCB 83/99	TOT	pg/L	---	---	---	---	---	7.12	---	---	---	20.2	---	---	---	15.9
PCB 84	TOT	pg/L	---	---	---	---	---	2.98	---	---	---	7.99	---	---	---	7.33
PCB 85/116/117	TOT	pg/L	---	---	---	---	---	2.32	---	---	---	6.37	---	---	---	5.16
PCB 86/87/97/108/119/125	TOT	pg/L	---	---	---	---	---	7.91	---	---	---	24.3	---	---	---	22.6
PCB 88/91	TOT	pg/L	---	---	---	---	---	1.79	---	---	---	4.31	---	---	---	3.59
PCB 89	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.87	---	---	---	<0.971
PCB 9	TOT	pg/L	---	---	---	---	---	<2.82	---	---	---	<2.08	---	---	---	<1.52
PCB 90/101/113	TOT	pg/L	---	---	---	---	---	10.5	---	---	---	29.5	---	---	---	26.2
PCB 92	TOT	pg/L	---	---	---	---	---	1.86	---	---	---	6.21	---	---	---	4.59
PCB 93/95/98/100/102	TOT	pg/L	---	---	---	---	---	9.07	---	---	---	24.1	---	---	---	24.2
PCB 94	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.901	---	---	---	<1.01
PCB 96	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB174	TOT	pg/L	---	---	---	---	---	1.85	---	---	---	3.79	---	---	---	4.63
PCB39	TOT	pg/L	---	---	---	---	---	<0.697	---	---	---	<0.677	---	---	---	<0.66
PCB45/51	TOT	pg/L	---	---	---	---	---	4.73	---	---	---	6.22	---	---	---	12.2
Dichloro Biphenyls	TOT	pg/L	---	---	---	---	---	43.7	---	---	---	112	---	---	---	111
Heptachloro Biphenyls	TOT	pg/L	---	---	---	---	---	17	---	---	---	36.5	---	---	---	36.7
Hexachloro biphenyls	TOT	pg/L	---	---	---	---	---	41.3	---	---	---	119	---	---	---	85.2
Monochloro Biphenyls	TOT	pg/L	---	---	---	---	---	12	---	---	---	12.1	---	---	---	27.1
Nonachloro Biphenyls	TOT	pg/L	---	---	---	---	---	<-999	---	---	---	1.03	---	---	---	2.36
Octachloro Biphenyls	TOT	pg/L	---	---	---	---	---	1.26	---	---	---	4.22	---	---	---	3.11
Pentachloro Biphenyls	TOT	pg/L	---	---	---	---	---	30.3	---	---	---	173	---	---	---	131
Tetrachloro Biphenyls	TOT	pg/L	---	---	---	---	---	94.3	---	---	---	121	---	---	---	186
Trichloro Biphenyls	TOT	pg/L	---	---	---	---	---	33.6	---	---	---	116	---	---	---	111
PCB Teq 3	TOT	pg/L	---	---	---	---	0.156	0.00926	---	---	0.193	0.00465	---	---	0.123	0.00442
PCB Teq 4	TOT	pg/L	---	---	---	---	1.02	0.948	---	---	1.06	0.901	---	---	0.998	0.92
PCBs Total	TOT	pg/L	---	---	---	---	---	273	---	---	---	697	---	---	---	696
1,2,3,4,6,7,8-HPCDD	TOT	pg/L	---	---	---	---	7.71	0.901	---	---	9.24	<0.533	---	---	11.7	1.06
1,2,3,4,6,7,8-HPCDF	TOT	pg/L	---	---	---	---	1.43	<0.557	---	---	1.57	<0.533	---	---	1.72	<0.544
1,2,3,4,7,8,9-HPCDF	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
1,2,3,4,7,8-HXCDD	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
1,2,3,4,7,8-HXCDF	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
1,2,3,6,7,8-HXCDD	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	0.948	<0.533	---	---	0.79	<0.544
1,2,3,6,7,8-HXCDF	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
1,2,3,7,8,9-HXCDD	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
1,2,3,7,8,9-HXCDF	TOT	pg/L	---	---	---	---	0.714	0.646	---	---	<0.533	<0.533	---	---	<0.519	<0.544

Parameter			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
1,2,3,7,8-PECDD	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
1,2,3,7,8-PECDF	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	0.707	<0.544
2,3,4,6,7,8-HXCDF	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
2,3,4,7,8-PECDF	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
2,3,7,8-TCDD	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
2,3,7,8-TCDF	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
HEPTA-DIOXINS	TOT	pg/L	---	---	---	---	14.4	0.901	---	---	16.7	<0.533	---	---	20.4	0.873
Hepta-Furans	TOT	pg/L	---	---	---	---	1.42	<0.557	---	---	1.41	<0.533	---	---	1.38	<0.544
HEXA-DIOXINS	TOT	pg/L	---	---	---	---	1.34	<0.557	---	---	0.948	<0.533	---	---	3.19	<0.544
HEXA-FURANS	TOT	pg/L	---	---	---	---	0.714	<0.557	---	---	<0.533	<0.533	---	---	0.582	<0.544
OCDD	TOT	pg/L	---	---	---	---	70.5	2.49	---	---	62.6	3.05	---	---	58.1	4.39
OCDF	TOT	pg/L	---	---	---	---	2.52	<0.557	---	---	<1.24	<0.554	---	---	2.4	0.732
Penta-Dioxins	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	0.835	<0.533	---	---	1.18	<0.544
Penta-Furans	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
Tetra-Dioxins	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
Tetra-Furans	TOT	pg/L	---	---	---	---	<0.526	<0.557	---	---	<0.533	<0.533	---	---	<0.519	<0.544
2,4-DDD	TOT	ng/L	---	---	---	---	---	2.27	---	---	---	5.67	---	---	---	4.94
2,4-DDE	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0414
2,4-DDT	TOT	ng/L	---	---	---	---	---	<0.214	---	---	---	<0.214	---	---	---	<0.0414
4,4-DDD	TOT	ng/L	---	---	---	---	---	<0.2	---	---	---	<0.214	---	---	---	<0.0414
4,4-DDE	TOT	ng/L	---	---	---	---	---	0.156	---	---	---	<0.214	---	---	---	0.058
4,4-DDT	TOT	ng/L	---	---	---	---	---	<0.254	---	---	---	<0.214	---	---	---	<0.0425
ABHC	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0414
Aldrin	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0414
Alpha Chlordane	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0414
Alpha-Endosulfan	TOT	ng/L	---	---	---	---	---	0.127	---	---	---	<0.534	---	---	---	<0.104
Beta-Endosulfan	TOT	ng/L	---	---	---	---	---	0.575	---	---	---	0.794	---	---	---	0.373
Beta-Hch Or Beta-Bhc	TOT	ng/L	---	---	---	---	---	0.103	---	---	---	<0.214	---	---	---	0.069
Bis(2-Chloroethoxy)Methane	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Bis(2-Chloroethyl)Ether	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Bis(2-Chloroisopropyl)Ether	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Cis-Nonachlor	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0414
Dieldrin	TOT	ng/L	---	---	---	---	---	0.159	---	---	---	<0.534	---	---	---	0.108
Endosulfan Sulfate	TOT	ng/L	---	---	---	---	---	<0.11	---	---	---	<0.534	---	---	---	<0.104
Endrin	TOT	ng/L	---	---	---	---	---	<0.11	---	---	---	<0.534	---	---	---	<0.104
Endrin Aldehyde	TOT	ng/L	---	---	---	---	---	<0.11	---	---	---	<0.534	---	---	---	<0.104
HCH, Gamma	TOT	ng/L	---	---	---	---	---	0.127	---	---	---	<0.214	---	---	---	0.068
Heptachlor	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0414
Heptachlor Epoxide	TOT	ng/L	---	---	---	---	---	<0.11	---	---	---	<0.534	---	---	---	<0.104
Hexachlorobenzene	TOT	ng/L	---	---	---	---	---	0.041	---	---	---	<0.107	---	---	---	0.035
Methoxyclor	TOT	ng/L	---	---	---	---	---	<0.376	---	---	---	<1.07	---	---	---	<0.207
Mirex	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0414
Octachlorostyrene	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	0.004
Oxychlordane	TOT	ng/L	---	---	---	---	---	<0.0441	---	---	---	<0.214	---	---	---	<0.0923
3:3 FTCA	TOT	ng/L	---	---	---	---	<3.16	<2.94	---	---	---	---	---	---	<12	<4.8
4:2 FTS	TOT	ng/L	---	---	---	---	<3.16	<2.94	---	---	---	---	---	---	<12	<4.8
5:3 FTCA	TOT	ng/L	---	---	---	---	<19.7	<18.4	---	---	---	---	---	---	<75	<30
6:2 FTS	TOT	ng/L	---	---	---	---	<2.84	<2.65	---	---	---	---	---	---	<10.8	<4.33
7:3 FTCA	TOT	ng/L	---	---	---	---	<19.7	<18.4	---	---	---	---	---	---	<75	<30
8:2 FTS	TOT	ng/L	---	---	---	---	<2.68	<2.5	---	---	---	---	---	---	<10.2	<4.08
ADONA	TOT	ng/L	---	---	---	---	<3.16	<2.94	---	---	---	---	---	---	<12	<4.8

Appendix B4, continued

			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
Parameter			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
HFPO-DA	TOT	ng/L	---	---	---	---	<3.16	<2.94	---	---	---	---	---	---	<12	<4.8
MeFOSAA	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	1.8
N-EtFOSA	TOT	ng/L	---	---	---	---	<2.21	<2.06	---	---	---	---	---	---	<8.4	<3.36
N-EtFOSAA	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	<1.2
N-EtFOSE	TOT	ng/L	---	---	---	---	<7.89	<7.34	---	---	---	---	---	---	<30	<12
NFDHA	TOT	ng/L	---	---	---	---	<1.58	<1.47	---	---	---	---	---	---	<6	<2.4
N-MeFOSA	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	<1.2
N-MeFOSE	TOT	ng/L	---	---	---	---	<7.89	<7.34	---	---	---	---	---	---	<30	<12
PFBS	TOT	ng/L	---	---	---	---	3.72	4.22	---	---	<3.12	1.71	---	---	<3	1.2
PFDA	TOT	ng/L	---	---	---	---	<0.789	0.983	---	---	<3.12	1.2	---	---	<3	1.55
PFDoA	TOT	ng/L	---	---	---	---	<0.631	<0.587	---	---	<2.5	<0.302	---	---	<2.4	<0.96
PFDoS	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	<1.2
PFDS	TOT	ng/L	---	---	---	---	0.798	<0.734	---	---	---	---	---	---	<3	<1.2
PFEESA	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	<1.2
PFHpA	TOT	ng/L	---	---	---	---	2.56	2.24	---	---	3.34	1.84	---	---	<3	2.05
PFHpS	TOT	ng/L	---	---	---	---	0.842	<0.734	---	---	---	---	---	---	<3	<1.2
PFHxA	TOT	ng/L	---	---	---	---	6.24	7.3	---	---	8.7	12.5	---	---	4.21	7.93
PFHxS	TOT	ng/L	---	---	---	---	4.68	4.41	---	---	6.22	3.11	---	---	<3	1.85
PFMBA	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	<1.2
PFMPA	TOT	ng/L	---	---	---	---	<1.58	<1.47	---	---	---	---	---	---	<6	<2.4
PFNA	TOT	ng/L	---	---	---	---	<0.789	0.83	---	---	<3.12	0.552	---	---	<3	<1.2
PFNS	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	<1.2
PFOA	TOT	ng/L	---	---	---	---	4.07	5.47	---	---	3.83	4.05	---	---	<3	4.2
PFOS	TOT	ng/L	---	---	---	---	7.66	4.33	---	---	11.7	3.03	---	---	8.44	3.04
PFOSA	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	<3.12	<0.378	---	---	<3	<1.2
PFPeA	TOT	ng/L	---	---	---	---	9.54	10.2	---	---	14.9	12.2	---	---	<6	11
PFPeS	TOT	ng/L	---	---	---	---	<0.793	<0.738	---	---	---	---	---	---	<3.02	<1.21
PFTeDA	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	<1.2
PFTrDA	TOT	ng/L	---	---	---	---	<0.789	<0.734	---	---	---	---	---	---	<3	<1.2
Bis(2-Ethylhexyl)Phthalate	TOT	µg/L	---	---	---	---	<5	<5	---	---	<5	<5	---	---	<5	<5
Butylbenzyl Phthalate	TOT	µg/L	---	---	---	---	<2.5	<2.5	---	---	<2.5	<2.5	---	---	<2.5	<2.5
Diethyl Phthalate	TOT	µg/L	---	---	---	---	0.33	<0.25	---	---	1	<0.25	---	---	0.94	<0.25
Dimethyl Phthalate	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
Di-N-Butyl Phthalate	TOT	µg/L	---	---	---	---	<2.5	<2.5	---	---	<2.5	<2.5	---	---	<2.5	<2.5
Di-N-Octyl Phthalate	TOT	µg/L	---	---	---	---	<0.25	<0.25	---	---	<0.25	<0.25	---	---	<0.25	<0.25
2-Hydroxy-Ibuprofen	TOT	ng/L	---	---	---	---	23700	3820	---	---	28700	1440	---	---	50000	-999
Acetaminophen	TOT	ng/L	---	---	---	---	---	---	---	---	250000	7.21	---	---	96000	649
Azithromycin	TOT	ng/L	---	---	---	---	---	---	---	---	321	280	---	---	228	203
Bisphenol A	TOT	ng/L	---	---	---	---	119	<9.67	---	---	146	99.5	---	---	217	199
Caffeine	TOT	ng/L	---	---	---	---	---	---	---	---	168000	152	---	---	134000	148
Carbadox	TOT	ng/L	---	---	---	---	---	---	---	---	5.46	<3.81	---	---	47.5	13.6
Carbamazepine	TOT	ng/L	---	---	---	---	---	---	---	---	778	510	---	---	413	566
Cefotaxime	TOT	ng/L	---	---	---	---	---	---	---	---	<11.5	<5.67	---	---	-999	-999
Ciprofloxacin	TOT	ng/L	---	---	---	---	---	---	---	---	508	251	---	---	366	194
Clarithromycin	TOT	ng/L	---	---	---	---	---	---	---	---	129	138	---	---	170	122
Clinafloxacin	TOT	ng/L	---	---	---	---	---	---	---	---	<2.13	<1.9	---	---	<7.69	<2.86
Cloxacillin	TOT	ng/L	---	---	---	---	---	---	---	---	<2.88	<2.86	---	---	<11.5	<2.81
Dehydronifedipine	TOT	ng/L	---	---	---	---	---	---	---	---	2.37	17.4	---	---	5.78	13.8
Digoxigenin	TOT	ng/L	---	---	---	---	---	---	---	---	<1.94	<1.45	---	---	<7.73	<3.49
Digoxin	TOT	ng/L	---	---	---	---	---	---	---	---	<7.56	<5.72	---	---	<23.1	<7.22
Diltiazem	TOT	ng/L	---	---	---	---	---	---	---	---	810	490	---	---	884	361

Appendix B4, continued

Parameter			Jan. 18 2022		Jan. 20 2022		Apr. 06 2022		Jul. 12 2022		Jul. 13 2022		Jul. 14 2022		Oct. 27 2022	
			Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Q+	Effluent Q+	Influent Quarterly	Effluent Quarterly	Influent Quarterly	Effluent Quarterly
Diphenhydramine	TOT	ng/L	---	---	---	---	---	---	---	---	1720	604	---	---	1310	579
Enrofloxacin	TOT	ng/L	---	---	---	---	---	---	---	---	<0.576	<0.572	---	---	<2.31	<0.561
Erythromycin-H2O	TOT	ng/L	---	---	---	---	---	---	---	---	3.74	5.7	---	---	26.2	81.6
Flumequine	TOT	ng/L	---	---	---	---	---	---	---	---	<0.288	<0.286	---	---	<1.15	<0.281
Fluoxetine	TOT	ng/L	---	---	---	---	---	---	---	---	62.7	44	---	---	41.4	32.7
Furosemide	TOT	ng/L	---	---	---	---	1480	488	---	---	1360	297	---	---	1130	219
Gemfibrozil	TOT	ng/L	---	---	---	---	24.5	14.4	---	---	79.8	63.5	---	---	17.8	17.9
Glipizide	TOT	ng/L	---	---	---	---	<2.53	<0.741	---	---	<3.84	<2.29	---	---	<3.08	<0.748
Glyburide	TOT	ng/L	---	---	---	---	<2.53	1.69	---	---	<3.84	2.95	---	---	<3.08	3.87
Hydrochlorothiazide	TOT	ng/L	---	---	---	---	1670	1210	---	---	2380	2640	---	---	2820	2300
Ibuprofen	TOT	ng/L	---	---	---	---	10100	1240	---	---	18200	296	---	---	21100	298
Lincomycin	TOT	ng/L	---	---	---	---	---	---	---	---	0.913	0.991	---	---	<2.31	0.662
Lomefloxacin	TOT	ng/L	---	---	---	---	---	---	---	---	<0.576	<0.572	---	---	<2.31	<0.561
Miconazole	TOT	ng/L	---	---	---	---	---	---	---	---	8.98	0.617	---	---	7.34	1.47
Naproxen	TOT	ng/L	---	---	---	---	6880	441	---	---	11700	324	---	---	10700	717
Norfloxacin	TOT	ng/L	---	---	---	---	---	---	---	---	<4.57	<1.9	---	---	<7.69	<3.11
Norgestimate	TOT	ng/L	---	---	---	---	---	---	---	---	<1.44	<1.43	---	---	<5.77	<1.4
Ofloxacin	TOT	ng/L	---	---	---	---	---	---	---	---	72.4	19.9	---	---	19.3	28.8
Ormetoprim	TOT	ng/L	---	---	---	---	---	---	---	---	<0.144	<0.143	---	---	<0.664	<0.14
Oxacillin	TOT	ng/L	---	---	---	---	---	---	---	---	<1.44	<1.43	---	---	<5.77	<1.4
Oxolinic Acid	TOT	ng/L	---	---	---	---	---	---	---	---	<0.576	<0.572	---	---	<2.31	<0.561
Penicillin G	TOT	ng/L	---	---	---	---	---	---	---	---	<2.88	<2.86	---	---	<11.5	<2.81
Penicillin V	TOT	ng/L	---	---	---	---	---	---	---	---	<1.44	<1.43	---	---	<5.77	<1.4
Roxithromycin	TOT	ng/L	---	---	---	---	---	---	---	---	<0.705	<0.153	---	---	1.79	1.01
Sarafloxacin	TOT	ng/L	---	---	---	---	---	---	---	---	<2.88	<2.86	---	---	<11.5	<2.81
Sulfachloropyridazine	TOT	ng/L	---	---	---	---	---	---	---	---	<0.576	<0.572	---	---	<2.31	<1.47
Sulfadiazine	TOT	ng/L	---	---	---	---	---	---	---	---	<0.576	<0.572	---	---	3.79	<0.561
Sulfadimethoxine	TOT	ng/L	---	---	---	---	---	---	---	---	<0.288	<0.286	---	---	<1.15	<0.401
Sulfamerazine	TOT	ng/L	---	---	---	---	---	---	---	---	<0.576	<0.572	---	---	<2.31	<1.07
Sulfamethazine	TOT	ng/L	---	---	---	---	---	---	---	---	<0.746	<0.572	---	---	<2.31	<0.904
Sulfamethizole	TOT	ng/L	---	---	---	---	---	---	---	---	<1.23	<0.572	---	---	<41	<19.3
Sulfamethoxazole	TOT	ng/L	---	---	---	---	---	---	---	---	1650	307	---	---	2750	419
Sulfanilamide	TOT	ng/L	---	---	---	---	---	---	---	---	71.7	101	---	---	-999	-999
Sulfathiazole	TOT	ng/L	---	---	---	---	---	---	---	---	<1.44	<1.43	---	---	<19.2	<4.68
Thiabendazole	TOT	ng/L	---	---	---	---	---	---	---	---	41.7	29.2	---	---	27.2	23.4
Triclocarban	TOT	ng/L	---	---	---	---	1.95	<0.371	---	---	2.94	<1.14	---	---	<1.54	1.68
Triclosan	TOT	ng/L	---	---	---	---	74	19.4	---	---	68.9	18.7	---	---	37.6	15.8
Trimethoprim	TOT	ng/L	---	---	---	---	---	---	---	---	341	446	---	---	407	358
Tylosin	TOT	ng/L	---	---	---	---	---	---	---	---	24.7	5.7	---	---	3.97	4.41
Virginiamycin	TOT	ng/L	---	---	---	---	---	---	---	---	<1.76	<0.572	---	---	-999	-999
Warfarin	TOT	ng/L	---	---	---	---	4.01	3.83	---	---	7.14	4.78	---	---	5.15	5.47

Notes:
--- data not available

APPENDIX C

Surface Water / IDZ Monitoring

Appendix C1 SPTP Surface Water Stations

		Latitude	Longitude
Surface Water Stations	Outfall	48°37.3978	-123°23.1511'
	100N	48°37.4302	-123°23.1511'
	100S	48°37.3654	-123°23.1506'
	200NE	48°37.4440	-123°23.8221'
	200NW	48°37.4433	-123°23.2202'
	200SE	48°37.3522	-123°23.8160'
	200SW	48°37.3522	-123°23.2195'
	400E	48°37.3983	-123°22.5556'
	400N	48°37.5274	-123°23.1518'
	400S	48°37.2682	-123°23.1500'
	400W	48°37.3972	-123°23.3462'
	800N	48°38.5701	-123°23.1529'
	800S	48°37.1391	-123°23.1488'
	800W	48°37.3965	-123°23.5417'
	Reference 2	48°38.5496	-123°19.1139'
IDZ Stations	SP02	48°37.7179	-123°23.1816'
	SP03	48°37.6930	-123°23.1431'
	SP04	48°37.6576	-123°23.1365'
	SP05	48°37.6272	-123°23.1647'
	SP06	48°37.6137	-123°23.2149'
	SP07	48°37.6052	-123°23.2682'
	SP08	48°37.6088	-123°23.3218'
	SP09	48°37.6337	-123°23.3602'
	SP10	48°37.6691	-123°23.3668'
	SP11	48°37.6995	-123°23.3386'
	SP12	48°37.7130	-123°23.2884'
	SP13	48°37.7215	-123°23.2351'

Appendix C2 SPTP IDZ Sites Extended Sampling Results (one sampling day each season) 2022

		Aluminum (mg/L)		Antimony (mg/L)		Arsenic (mg/L)		Barium (mg/L)		Beryllium (mg/L)		Boron (mg/L)	
		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
WQ Guidelines						0.0125 mg/L *+#						1.2 mg/L	
Station 1	Top	0.0278	0.029	<0.001	<0.001	0.0015	0.00123	0.0099	0.0092	<0.0005	<0.0005	4.01	3.86
	Middle	0.0395	0.0181	<0.001	<0.001	0.00159	0.00235	0.0102	0.0092	<0.0005	<0.0005	4.18	3.69
	Bottom	0.0445	0.0207	<0.001	<0.001	0.00155	0.00242	0.0102	0.0093	<0.0005	<0.0005	4.2	3.75
Station 2	Top	0.0355	0.0199	<0.001	<0.001	0.00149	0.00234	0.01	0.0092	<0.0005	<0.0005	4.09	3.64
	Middle	0.0366	0.0158	<0.001	<0.001	0.00159	0.00244	0.0102	0.009	<0.0005	<0.0005	4.19	3.82
	Bottom	0.0428	0.0228	<0.001	<0.001	0.00157	0.0025	0.0097	0.0092	<0.0005	<0.0005	3.99	3.95
Station 3	Top	0.0349	0.029	<0.001	<0.001	0.00155	0.00244	0.0099	0.0097	<0.0005	<0.0005	4.06	3.73
	Middle	0.0341	0.0221	<0.001	<0.001	0.0016	0.00264	0.0101	0.0097	<0.0005	<0.0005	4.14	3.83
	Bottom	0.0408	0.0213	<0.001	<0.001	0.00153	0.00249	0.0099	0.0093	<0.0005	<0.0005	4.17	3.95
Station 4	Top	0.0292	0.0178	<0.001	<0.001	0.00154	0.00237	0.0096	0.0092	<0.0005	<0.0005	4.16	3.83
	Middle	0.0415	0.018	<0.001	<0.001	0.00158	0.00232	0.0097	0.0095	<0.0005	<0.0005	4.47	3.89
	Bottom	0.0339	0.0206	<0.001	<0.001	0.00165	0.0025	0.0096	0.009	<0.0005	<0.0005	4.43	3.97
Reference 2	Top	0.0242	0.0276	<0.001	<0.001	0.00156	0.00228	0.0096	0.0092	<0.0005	<0.0005	4.49	3.76
	Middle	0.033	0.0154	<0.001	<0.001	0.00161	0.00225	0.0094	0.0085	<0.0005	<0.0005	4.67	3.72
	Bottom	0.0317	0.0205	<0.001	<0.001	0.00156	0.00233	0.01	0.0089	<0.0005	<0.0005	4.49	3.8
Average IDZ Stations	Top	0.0319	0.0239	<0.001	<0.001	0.00152	0.00210	0.0099	0.0093	<0.0005	<0.0005	4.08	3.77
	Middle	0.0379	0.0185	<0.001	<0.001	0.00159	0.00244	0.0101	0.0094	<0.0005	<0.0005	4.25	3.81
	Bottom	0.0405	0.0214	<0.001	<0.001	0.00158	0.00248	0.0099	0.0092	<0.0005	<0.0005	4.20	3.91

		Cadmium (mg/L)		Chromium (mg/L)		Cobalt (mg/L)		Copper (mg/L)		Iron (mg/L)		Lead (mg/L)		Magnesium (mg/L)	
		Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
WQ Guidelines		0.00012 mg/L (max) *						0.002 mg/L (mean of 5 samples) or 0.14 mg/L (max) *							
Station 1	Top	0.000077	0.000044	<0.0005	<0.0005	<0.00005	<0.00005	<0.0005	<0.0005	0.023	0.02	<0.00005	<0.00005	1,100	1,030
	Middle	0.000074	0.00008	<0.0005	0.00149	<0.00005	0.000123	<0.0005	0.0006	0.032	0.014	<0.00005	0.000071	1,160	1,080
	Bottom	0.000077	0.000072	<0.0005	0.00132	<0.00005	0.000097	<0.0005	<0.0005	0.045	0.017	<0.00005	0.000052	1,140	1,090
Station 2	Top	0.000088	0.000047	<0.0005	0.00114	<0.00005	0.000104	<0.0005	<0.0005	0.035	0.011	<0.00005	0.000085	1,130	1,070
	Middle	0.000077	0.000045	<0.0005	0.00177	<0.00005	0.00014	<0.0005	<0.0005	0.035	0.015	<0.00005	<0.00005	1,190	1,090
	Bottom	0.000084	0.000088	<0.0005	0.00153	<0.00005	0.000115	<0.0005	<0.0005	0.044	0.014	<0.00005	0.000077	1,150	1,130
Station 3	Top	0.000077	0.000053	<0.0005	0.00151	<0.00005	0.000102	<0.0005	<0.0005	0.027	0.013	<0.00005	<0.00005	1,170	1,080
	Middle	0.00008	0.000075	0.0005	0.00173	<0.00005	0.000105	<0.0005	<0.0005	0.035	0.014	<0.00005	0.000066	1,180	1,120
	Bottom	0.000084	0.00006	<0.0005	0.00109	<0.00005	0.000107	<0.0005	<0.0005	0.044	0.015	<0.00005	<0.00005	1,160	1,110
Station 4	Top	0.000072	0.000037	<0.0005	0.00151	<0.00005	0.000097	<0.0005	<0.0005	0.03	0.01	<0.00005	<0.00005	1,140	1,050
	Middle	0.00008	0.000051	<0.0005	0.0016	<0.00005	0.000113	<0.0005	<0.0005	0.032	0.029	<0.00005	<0.00005	1,110	1,100
	Bottom	0.000073	0.000043	<0.0005	0.00161	<0.00005	0.000128	<0.0005	<0.0005	0.036	0.018	<0.00005	<0.00005	1,110	1,080
Reference 2	Top	0.000073	0.000075	0.00724	0.00285	0.000052	0.000088	<0.0005	0.00075	0.067	0.024	<0.00005	<0.00005	1,100	1,020
	Middle	0.000073	0.000067	<0.0005	0.00362	<0.00005	0.000101	<0.0005	0.00071	0.03	0.026	<0.00005	0.000054	1,150	1,030
	Bottom	0.000074	0.000061	<0.0005	0.00112	<0.00005	0.000088	<0.0005	<0.0005	0.032	0.015	<0.00005	0.000083	1,130	1,060
Average IDZ Stations	Top	0.00008	0.00005	<0.0005	0.00110	<0.00005	<0.00005	<0.0005	0.0003	0.029	0.014	<0.00005	0.00004	1,135	1,058
	Middle	0.00008	0.00006	<0.0005	0.00165	<0.00005	<0.00005	<0.0005	0.0008	0.034	0.018	<0.00005	0.00005	1,160	1,098
	Bottom	0.00008	0.00007	<0.0005	0.00139	<0.00005	<0.00005	0.0018	<0.0005	0.042	0.016	<0.00005	0.00004	1,140	1,103

Notes:
Shaded cells indicate exceedance to BC WQG (see Appendix C2)
* = BC Approved Water Quality Guideline
+ = BC Working Water Quality Guideline
# = CCME Water Quality Guideline for the Protection of Aquatic Life

Appendix C2, continued

		Manganese (mg/L)		Mercury (mg/L)		Molybdenum (mg/L)		Nickel (mg/L)		Potassium (mg/L)		Selenium (mg/L)		Silver (mg/L)		Strontium (mg/L)		Tin (mg/L)		Titanium (mg/L)		Uranium (mg/L)		Zinc (mg/L)	
		Winter	summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer
WQ Guidelines								0.0071 mg/L *				0.002 mg/L *		0.0015 mg/L (mean of 5 samples) or 0.003 mg/L (max) *										0.01 mg/L (mean of 5 samples) *	
Station 1	Top	0.0026	0.0022	<0.0019	<0.0019	0.00949	0.00882	<0.0005	<0.0002	446	310	<0.0005	<0.0005	<0.0001	<0.0001	6.74	6.43	<0.001	<0.001	<0.005	<0.005	0.00249	0.00245	<0.003	<0.003
	Middle	0.0029	0.0026	<0.0019	<0.0019	0.00977	0.00897	<0.0005	0.00269	470	328	<0.0005	<0.0005	<0.0001	<0.0001	6.87	5.99	<0.001	<0.001	<0.005	<0.005	0.0026	0.00255	<0.003	<0.003
	Bottom	0.0031	0.0026	<0.0019	<0.0019	0.00986	0.00867	<0.0005	<0.0002	470	332	<0.0005	<0.0005	<0.0001	<0.0001	6.92	6.07	<0.001	<0.001	<0.005	<0.005	0.00269	0.00268	<0.003	<0.003
Station 2	Top	0.0029	0.0028	<0.0019	<0.0019	0.00971	0.00864	<0.0005	<0.0002	465	326	<0.0005	<0.0005	<0.0001	<0.0001	6.78	5.82	<0.001	<0.001	<0.005	<0.005	0.0026	0.00248	<0.003	0.004
	Middle	0.0031	0.0031	<0.0019	<0.0019	0.0101	0.00857	<0.0005	<0.0002	471	326	<0.0005	<0.0005	<0.0001	<0.0001	7.11	6.05	<0.001	0.002	<0.005	<0.005	0.00265	0.00263	<0.003	<0.003
	Bottom	0.0030	0.0030	<0.0019	<0.0019	0.00942	0.00918	<0.0005	<0.0002	462	345	<0.0005	<0.0005	<0.0001	<0.0001	6.73	6.17	<0.001	<0.001	<0.005	<0.005	0.00253	0.00273	<0.003	0.003
Station 3	Top	0.0027	0.0029	<0.0019	<0.0019	0.00957	0.00857	<0.0005	<0.0002	470	324	<0.0005	<0.0005	<0.0001	<0.0001	6.79	5.92	<0.001	<0.001	<0.005	<0.005	0.00254	0.00261	0.0052	<0.003
	Middle	0.0029	0.0031	<0.0019	<0.0019	0.00966	0.0091	<0.0005	<0.0002	468	335	<0.0005	<0.0005	<0.0001	<0.0001	6.89	5.98	<0.001	<0.001	<0.005	<0.005	0.00263	0.00269	<0.003	<0.003
	Bottom	0.0030	0.0027	<0.0019	<0.0019	0.00994	0.0092	<0.0005	0.00029	459	331	<0.0005	<0.0005	<0.0001	<0.0001	7.01	6.05	<0.001	<0.001	<0.005	<0.005	0.00265	0.00268	<0.003	<0.003
Station 4	Top	0.0027	0.0028	<0.0019	<0.0019	0.00936	0.0084	<0.0005	0.00039	444	319	<0.0005	<0.0005	<0.0001	<0.0001	6.72	5.72	<0.001	<0.001	<0.005	<0.005	0.00252	0.00256	<0.003	<0.003
	Middle	0.0029	0.0028	<0.0019	<0.0019	0.00968	0.00853	<0.0005	<0.0002	441	328	<0.0005	<0.0005	<0.0001	<0.0001	6.79	5.98	<0.001	<0.001	<0.005	<0.005	0.00262	0.00259	<0.003	<0.003
	Bottom	0.0029	0.0029	<0.0019	<0.0019	0.00976	0.0087	<0.0005	<0.0002	450	329	<0.0005	<0.0005	<0.0001	<0.0001	6.89	6	<0.001	<0.001	<0.005	<0.005	0.00255	0.00264	0.008	<0.003
Reference 2	Top	0.0033	0.0029	<0.0019	<0.0019	0.01	0.0083	0.00061	0.00055	445	310	<0.0005	<0.0005	<0.0001	<0.0001	7.06	5.6	<0.001	<0.001	<0.005	<0.005	0.00262	0.00249	<0.003	<0.003
	Middle	0.0025	0.0026	<0.0019	<0.0019	0.00976	0.00828	<0.0005	0.00056	458	300	<0.0005	<0.0005	<0.0001	<0.0001	6.88	5.54	<0.001	<0.001	<0.005	<0.005	0.00254	0.0025	0.004	<0.003
	Bottom	0.0029	0.0026	<0.0019	<0.0019	0.00996	0.0091	<0.0005	<0.0002	458	318	<0.0005	<0.0005	<0.0001	<0.0001	7.03	5.88	<0.001	<0.001	<0.005	<0.005	0.00267	0.00257	<0.003	0.0052
Average IDZ Stations	Top	0.0027	0.0027	<0.0019	<0.0019	0.0095	0.0086	<0.0005	<0.0005	456	320	<0.0005	<0.0005	<0.0001	<0.0001	6.76	5.97	<0.001	<0.001	<0.005	<0.005	0.00254	0.00253	<0.003	<0.003
	Middle	0.0030	0.0029	<0.0019	<0.0019	0.0098	0.0088	<0.0005	0.00015	463	329	<0.0005	<0.0005	<0.0001	<0.0001	6.92	6.00	<0.001	<0.001	<0.005	<0.005	0.00263	0.00262	<0.003	<0.003
	Bottom	0.0030	0.0028	0.0019	<0.0019	0.0097	0.0089	<0.0005	0.00048	460	334	<0.0005	<0.0005	<0.0001	<0.0001	6.89	6.07	<0.001	<0.001	<0.005	<0.005	0.00261	0.00268	0.0031	<0.003

Notes:
Shaded cells indicate exceedance to BC WQG (see Appendix C2)
* = BC Approved Water Quality Guideline
+ = BC Working Water Quality Guideline
# = CCME Water Quality Guideline for the Protection of Aquatic Life

Appendix C3 SPTP IDZ Sites Nutrient Monitoring Results (1st to 5th day of sampling) 2022

NH3 mg/L – 2022							
	BC Approved WQG = 23-33 mg/L N (average over 5 samples) or 3.4-5.0 mg/L N (maximum)						
		Winter					Average
Reference	Top	0.042	0.071	0.084	0.062	0.049	0.062
	Middle	0.043	0.065	0.076	0.060	0.060	0.061
	Bottom	0.039	0.062	0.066	0.057	0.062	0.057
Station 1	Top	0.046	0.061	0.069	0.059	0.058	0.059
	Middle	0.037	0.054	0.069	0.061	0.053	0.055
	Bottom	0.036	0.064	0.080	0.053	0.048	0.056
Station 2	Top	0.038	0.065	0.071	0.055	0.057	0.057
	Middle	0.044	0.046	0.061	0.062	0.054	0.053
	Bottom	0.038	0.065	0.084	0.052	0.062	0.060
Station 3	Top	0.057	0.055	0.078	0.048	0.056	0.059
	Middle	0.041	0.080	0.071	0.050	0.059	0.060
	Bottom	0.033	0.074	0.073	0.051	0.050	0.056
Station 4	Top	0.040	0.066	0.079	0.044	0.054	0.057
	Middle	0.037	0.058	0.075	0.052	0.077	0.060
	Bottom	0.039	0.058	0.065	0.052	0.063	0.055
		Summer					Average
Reference	Top	0.084	0.072	0.074	0.065	0.032	0.065
	Middle	0.087	0.061	0.081	0.067	0.048	0.069
	Bottom	0.088	0.067	0.074	0.078	0.053	0.072
Station 1	Top	0.091	0.063	0.064	0.062	0.054	0.067
	Middle	0.097	0.057	0.082	0.079	0.065	0.076
	Bottom	0.091	0.070	0.073	0.076	0.069	0.076
Station 2	Top	0.076	0.080	0.075	0.079	0.040	0.070
	Middle	0.082	0.063	0.064	0.060	0.073	0.068
	Bottom	0.110	0.066	0.071	0.066	0.079	0.078
Station 3	Top	0.098	0.060	0.073	0.066	0.047	0.069
	Middle	0.094	0.059	0.088	0.086	0.058	0.077
	Bottom	0.100	0.048	0.073	0.074	0.092	0.077
Station 4	Top	0.090	0.054	0.078	0.065	0.039	0.065
	Middle	0.095	0.058	0.064	0.072	0.085	0.075
	Bottom	0.087	0.069	0.075	0.077	0.076	0.077

Notes:
WQG calculated from BC Approved Water Quality Guidelines Summary Report, Table 26E (long-term/average) and Table 26F (short-term acute/maximum). Values used for calculations are 30ppt salinity, 10°C, and pH of 8.

Appendix C3, continued

PO_4 Phosphate Total mg/L – 2022							
		Winter					Average
Reference	Top	0.063	0.065	0.061	0.064	0.062	0.063
	Middle	0.068	0.062	0.065	0.061	0.062	0.064
	Bottom	0.056	0.059	0.065	0.063	0.063	0.061
Station 1	Top	0.067	0.057	0.063	0.064	0.055	0.061
	Middle	0.067	0.058	0.066	0.068	0.061	0.064
	Bottom	0.067	0.063	0.064	0.054	0.060	0.062
Station 2	Top	0.068	0.054	0.063	0.049	0.063	0.059
	Middle	0.064	0.063	0.065	0.065	0.061	0.064
	Bottom	0.057	0.059	0.064	0.065	0.063	0.062
Station 3	Top	0.053	0.056	0.063	0.061	0.060	0.059
	Middle	0.063	0.061	0.065	0.064	0.061	0.063
	Bottom	0.066	0.063	0.064	0.055	0.060	0.062
Station 4	Top	0.068	0.060	0.067	0.059	0.060	0.063
	Middle	0.065	0.063	0.064	0.060	0.061	0.063
	Bottom	0.067	0.062	0.067	0.058	0.061	0.063
		Summer					Average
Reference	Top	0.055	0.055	0.051	0.059	0.041	0.052
	Middle	0.055	0.055	0.058	0.063	0.046	0.055
	Bottom	0.059	0.055	0.054	0.061	0.046	0.055
Station 1	Top	0.051	0.057	0.052	0.057	0.044	0.052
	Middle	0.058	0.061	0.056	0.059	0.047	0.056
	Bottom	0.055	0.059	0.055	0.057	0.047	0.055
Station 2	Top	0.050	0.057	0.052	0.057	0.039	0.051
	Middle	0.057	0.057	0.054	0.059	0.050	0.055
	Bottom	0.057	0.060	0.057	0.058	0.056	0.058
Station 3	Top	0.052	0.058	0.052	0.056	0.036	0.051
	Middle	0.057	0.057	0.060	0.063	0.049	0.057
	Bottom	0.060	0.058	0.056	0.059	0.057	0.058
Station 4	Top	0.053	0.054	0.051	0.055	0.038	0.050
	Middle	0.057	0.058	0.055	0.059	0.048	0.055
	Bottom	0.055	0.060	0.054	0.059	0.059	0.057

Appendix C3, continued

Total Suspended Solids mg/L – 2022							
		Winter					Average
Reference	Top	34.0	20.0	2.8	10.0	4.8	14.3
	Middle	34.0	15.0	8.0	14.0	<1	17.8
	Bottom	37.0	18.0	6.8	7.2	<1	17.3
Station 1	Top	31.0	32.0	2.4	3.2	3.6	14.4
	Middle	40.0	34.0	3.6	13.0	3.6	18.8
	Bottom	25.0	31.0	<1	10.0	3.6	17.4
Station 2	Top	22.0	29.0	3.2	21.0	1.6	15.4
	Middle	28.0	24.0	<1	21.0	5.6	19.7
	Bottom	32.0	13.0	<1	2.0	<1	15.7
Station 3	Top	22.0	15.0	1.6	2.0	6.4	9.4
	Middle	32.0	20.0	<1	11.0	3.2	16.6
	Bottom	10.0	26.0	1.2	4.0	1.2	8.5
Station 4	Top	18.0	33.0	2.4	<1	1.2	13.7
	Middle	32.0	19.0	7.2	6.8	4.8	14.0
	Bottom	15.0	20.0	<1	8.8	3.2	11.8
		Summer					Average
Reference	Top	2.0	17.0	18.0	18.0	15.0	14.0
	Middle	1.6	8.0	21.0	16.0	13.0	11.9
	Bottom	2.8	10.0	19.0	18.0	17.0	13.4
Station 1	Top	<1	13.0	11.0	19.0	24.0	16.8
	Middle	2.8	40.0	16.0	18.0	24.0	20.2
	Bottom	10.0	46.0	11.0	24.0	20.0	22.2
Station 2	Top	2.0	31.0	22.0	35.0	27.0	23.4
	Middle	1.2	8.0	19.0	31.0	32.0	18.2
	Bottom	3.2	29.0	20.0	22.0	18.0	18.4
Station 3	Top	3.2	12.0	15.0	31.0	22.0	16.6
	Middle	4.0	29.0	15.0	21.0	15.0	16.8
	Bottom	2.4	27.0	12.0	16.0	12.0	13.9
Station 4	Top	3.2	8.0	12.0	19.0	12.0	10.8
	Middle	4.0	10.0	24.0	17.0	40.0	19.0
	Bottom	1.6	8.4	32.0	23.0	11.0	15.2

Appendix C3, continued

TKN mg/L – 2022							
		Winter					Average
Reference	Top	0.033	0.079	0.027	<0.02	0.105	0.051
	Middle	0.031	0.082	0.030	<0.02	0.100	0.051
	Bottom	0.044	0.067	0.039	<0.02	0.119	0.056
Station 1	Top	0.037	0.049	0.053	<0.02	0.067	0.043
	Middle	0.029	0.059	0.035	<0.02	0.166	0.060
	Bottom	0.029	0.065	0.048	<0.02	0.148	0.060
Station 2	Top	0.042	0.059	0.054	<0.02	<0.02	0.035
	Middle	0.024	0.047	0.042	<0.02	0.129	0.050
	Bottom	0.055	0.041	0.055	<0.02	0.128	0.058
Station 3	Top	0.038	0.029	0.059	<0.02	0.128	0.053
	Middle	0.056	0.043	0.039	<0.02	0.100	0.050
	Bottom	0.049	0.046	0.045	<0.02	0.106	0.051
Station 4	Top	0.069	0.036	0.078	<0.02	0.094	0.057
	Middle	0.044	0.040	0.050	<0.02	0.100	0.049
	Bottom	0.026	0.072	0.052	<0.02	0.058	0.044
		Summer					Average
Reference	Top	0.125	0.045	0.050	0.149	0.108	0.095
	Middle	0.099	0.060	0.080	0.095	0.107	0.088
	Bottom	0.107	0.051	0.058	0.121	0.106	0.089
Station 1	Top	0.090	0.103	0.069	0.183	0.120	0.113
	Middle	0.047	0.063	0.042	0.128	0.091	0.074
	Bottom	0.103	0.054	0.053	0.118	0.063	0.078
Station 2	Top	0.089	0.088	0.055	0.121	0.159	0.102
	Middle	0.101	0.071	0.095	0.110	0.112	0.098
	Bottom	0.120	0.061	0.048	0.124	0.074	0.085
Station 3	Top	0.128	0.092	0.068	0.127	0.160	0.115
	Middle	0.084	0.053	0.044	0.112	0.090	0.077
	Bottom	0.084	0.064	0.045	0.113	0.063	0.074
Station 4	Top	0.093	0.106	0.212	0.110	0.197	0.144
	Middle	0.093	0.048	0.046	0.115	0.119	0.084
	Bottom	0.117	0.051	0.044	0.139	0.078	0.086

Appendix C3, continued

Sulphate mg/L – 2022							
		Winter					**Average**
Reference	Top	2,500	3,000	2,900	2,400	1,800	2,520
	Middle	2,800	2,400	3,300	2,100	2,000	2,520
	Bottom	2,700	2,600	2,700	2,300	2,000	2,460
Station 1	Top	2,500	2,800	2,900	2,200	2,000	2,480
	Middle	2,800	2,800	2,100	2,200	1,700	2,320
	Bottom	2,500	2,400	2,300	2,200	1,600	2,200
Station 2	Top	2,400	2,900	2,700	2,400	2,000	2,480
	Middle	2,300	3,000	2,100	1,700	1,700	2,160
	Bottom	2,800	3,000	3,100	2,000	2,000	2,580
Station 3	Top	2,100	2,600	2,900	2,100	1,900	2,320
	Middle	2,800	2,300	2,500	2,500	1,900	2,400
	Bottom	2,700	2,400	3,000	2,200	1,800	2,420
Station 4	Top	2,400	2,300	2,800	2,000	2,100	2,320
	Middle	2,500	2,000	2,700	2,100	1,900	2,240
	Bottom	2,900	2,800	3,100	2,300	2,200	2,660
		Summer					**Average**
Reference	Top	2,200	2,500	2,500	2,500	2,100	2,360
	Middle	2,400	2,400	2,600	2,600	2,100	2,420
	Bottom	2,300	2,400	2,600	2,600	2,100	2,400
Station 1	Top	2,300	2,100	2,500	2,500	2,200	2,320
	Middle	2,400	2,600	2,600	1,000	2,200	2,160
	Bottom	2,300	2,600	2,700	2,600	2,200	2,480
Station 2	Top	2,300	2,500	2,600	2,500	2,100	2,400
	Middle	2,400	2,100	2,600	2,600	2,300	2,400
	Bottom	1,700	2,600	2,500	2,100	2,300	2,240
Station 3	Top	2,300	2,500	2,400	2,400	2,100	2,340
	Middle	2,400	2,500	2,600	2,500	2,300	2,460
	Bottom	2,300	2,100	2,600	2,500	2,300	2,360
Station 4	Top	1,900	2,000	2,500	2,500	2,100	2,200
	Middle	2,300	2,600	2,500	2,600	2,200	2,440
	Bottom	2,200	2,300	2,600	2,500	2,300	2,380

Appendix C3, continued

Nitrate Nitrogen mg/L – 2022							
	BC Approved WQG = 3.7 mg/L (average over 5 samples)						
		Winter					Average
Reference	Top	0.407	0.406	0.405	0.402	0.325	0.389
	Middle	0.410	0.406	0.401	0.405	0.327	0.390
	Bottom	0.410	0.409	0.402	0.408	0.332	0.392
Station 1	Top	0.408	0.404	0.403	0.405	0.357	0.395
	Middle	0.404	0.386	0.421	0.394	0.244	0.370
	Bottom	0.409	0.395	0.406	0.408	0.299	0.383
Station 2	Top	0.408	0.418	0.403	0.409	0.289	0.385
	Middle	0.433	0.416	0.407	0.406	0.272	0.387
	Bottom	0.410	0.405	0.395	0.394	0.313	0.383
Station 3	Top	0.410	0.405	0.400	0.393	0.301	0.382
	Middle	0.399	0.405	0.414	0.393	0.312	0.385
	Bottom	0.404	0.407	0.407	0.398	0.322	0.388
Station 4	Top	0.402	0.405	0.398	0.397	0.319	0.384
	Middle	0.409	0.407	0.396	0.396	0.320	0.386
	Bottom	0.407	0.408	0.402	0.409	0.328	0.391
		Summer					Average
Reference	Top	0.252	0.284	0.278	0.246	0.167	0.245
	Middle	0.264	0.281	0.293	0.279	0.207	0.265
	Bottom	0.285	0.281	0.296	0.282	0.202	0.269
Station 1	Top	0.217	0.232	0.255	0.194	0.062	0.192
	Middle	0.281	0.284	0.288	0.218	0.184	0.251
	Bottom	0.277	0.301	0.294	0.226	0.183	0.256
Station 2	Top	0.208	0.238	0.253	0.220	0.073	0.198
	Middle	0.263	0.286	0.279	0.235	0.194	0.251
	Bottom	0.269	0.300	0.291	0.225	0.250	0.267
Station 3	Top	0.224	0.248	0.256	0.227	0.066	0.204
	Middle	0.278	0.296	0.305	0.249	0.199	0.265
	Bottom	0.283	0.308	0.290	0.245	0.256	0.276
Station 4	Top	0.240	0.251	0.258	0.234	0.076	0.212
	Middle	0.278	0.304	0.285	0.248	0.196	0.262
	Bottom	0.219	0.307	0.284	0.252	0.250	0.262

Appendix C3, continued

Nitrite Nitrogen mg/L – 2022							
	BC Approved WQG = 3.7 mg/L (average over 5 samples)						
		Winter					Average
Reference	Top	<0.002	<0.002	<0.002	<0.002	0.003	0.001
	Middle	<0.002	<0.002	<0.002	<0.002	0.003	0.001
	Bottom	<0.002	<0.002	<0.002	<0.002	0.004	0.002
Station 1	Top	<0.002	<0.002	<0.002	0.003	0.004	0.002
	Middle	<0.002	<0.002	<0.002	0.003	0.003	0.002
	Bottom	<0.002	<0.002	<0.002	0.002	0.004	0.002
Station 2	Top	<0.002	<0.002	0.002	<0.002	0.004	0.002
	Middle	<0.002	<0.002	<0.002	0.002	0.004	0.002
	Bottom	<0.002	<0.002	<0.002	0.003	0.004	0.002
Station 3	Top	<0.002	<0.002	<0.002	0.002	0.004	0.002
	Middle	<0.002	<0.002	<0.002	0.003	0.004	0.002
	Bottom	<0.002	<0.002	<0.002	0.002	0.004	0.002
Station 4	Top	<0.002	<0.002	<0.002	0.003	0.005	0.002
	Middle	<0.002	<0.002	<0.002	0.002	0.004	0.002
	Bottom	<0.002	<0.002	<0.002	0.002	0.003	0.002
		Summer					Average
Reference	Top	0.005	0.005	0.004	0.004	0.002	0.004
	Middle	0.005	0.004	0.004	0.005	0.003	0.004
	Bottom	0.005	0.004	0.004	0.004	0.003	0.004
Station 1	Top	0.006	0.005	0.003	0.004	<0.002	0.004
	Middle	0.005	0.005	0.003	0.005	0.004	0.004
	Bottom	0.005	0.005	0.003	0.005	0.003	0.004
Station 2	Top	0.005	0.004	0.004	0.005	<0.002	0.004
	Middle	0.005	0.005	0.003	0.004	0.003	0.004
	Bottom	0.005	0.005	0.003	0.004	0.004	0.004
Station 3	Top	0.005	0.004	0.004	0.004	<0.002	0.004
	Middle	0.005	0.005	0.006	0.006	0.003	0.005
	Bottom	0.005	0.005	0.004	0.005	0.004	0.005
Station 4	Top	0.006	0.004	0.004	0.004	<0.002	0.004
	Middle	0.006	0.005	0.004	0.004	0.003	0.004
	Bottom	0.005	0.005	0.004	0.005	0.004	0.005

Appendix C3, continued

Salinity – 2022							
		Winter					Average
Reference	Top	29.3	29.9	29.3	29.9	27.5	29.2
	Middle	29.4	30.6	29.7	29.8	27.9	29.5
	Bottom	29.3	30.0	29.7	30.2	27.9	29.4
Station 1	Top	29.0	29.8	29.4	29.6	28.1	29.2
	Middle	29.3	29.9	29.4	29.8	28.9	29.5
	Bottom	29.6	30.1	29.5	30.2	28.7	29.6
Station 2	Top	29.1	29.8	29.4	29.8	28.0	29.2
	Middle	29.2	30.0	29.7	29.9	28.5	29.5
	Bottom	29.5	30.1	29.8	30.2	28.4	29.6
Station 3	Top	29.2	30.1	29.3	29.8	27.9	29.3
	Middle	29.1	30.0	29.4	29.7	28.0	29.2
	Bottom	29.6	30.0	29.6	29.9	28.1	29.4
Station 4	Top	29.4	29.9	29.4	29.9	27.6	29.2
	Middle	29.4	30.2	29.4	29.8	27.7	29.3
	Bottom	29.5	30.0	29.6	30.2	27.9	29.4
		Summer					Average
Reference	Top	28.1	29.1	28.0	29.1	25.5	28.0
	Middle	28.6	29.4	29.0	30.2	27.0	28.8
	Bottom	29.3	29.3	29.1	30.0	26.7	28.9
Station 1	Top	27.7	29.4	28.3	29.1	26.0	28.1
	Middle	29.3	30.0	29.4	29.7	27.3	29.1
	Bottom	29.1	30.0	29.5	29.8	27.4	29.2
Station 2	Top	27.7	29.4	28.3	29.2	25.9	28.1
	Middle	29.1	29.8	29.1	29.7	27.4	29.0
	Bottom	29.2	29.9	29.4	29.4	28.6	29.3
Station 3	Top	28.1	29.4	28.3	29.2	26.1	28.2
	Middle	29.2	30.0	29.3	29.7	27.7	29.2
	Bottom	29.3	30.1	29.4	29.9	28.8	29.5
Station 4	Top	28.0	29.6	28.3	29.0	26.0	28.2
	Middle	29.3	30.1	29.2	30.0	27.6	29.2
	Bottom	28.1	30.2	29.3	29.9	28.7	29.2

Appendix C3, continued

N Nitrogen Total mg/L – 2022							
		Winter					**Average**
Reference	Top	0.440	0.485	0.432	0.338	0.433	0.426
	Middle	0.441	0.488	0.431	0.342	0.430	0.426
	Bottom	0.453	0.476	0.441	0.344	0.455	0.434
Station 1	Top	0.445	0.454	0.455	0.356	0.428	0.428
	Middle	0.433	0.445	0.455	0.352	0.413	0.420
	Bottom	0.438	0.461	0.453	0.353	0.450	0.431
Station 2	Top	0.450	0.477	0.459	0.343	0.299	0.406
	Middle	0.457	0.463	0.449	0.354	0.405	0.426
	Bottom	0.465	0.446	0.450	0.360	0.444	0.433
Station 3	Top	0.448	0.433	0.459	0.339	0.433	0.422
	Middle	0.455	0.448	0.453	0.345	0.416	0.423
	Bottom	0.453	0.453	0.452	0.347	0.432	0.427
Station 4	Top	0.472	0.442	0.477	0.349	0.417	0.431
	Middle	0.453	0.447	0.446	0.351	0.424	0.424
	Bottom	0.434	0.480	0.454	0.348	0.390	0.421
		Summer					**Average**
Reference	Top	0.383	0.334	0.332	0.399	0.277	0.345
	Middle	0.369	0.345	0.376	0.379	0.316	0.357
	Bottom	0.396	0.336	0.358	0.408	0.310	0.362
Station 1	Top	0.312	0.340	0.328	0.381	0.185	0.309
	Middle	0.333	0.352	0.333	0.350	0.278	0.329
	Bottom	0.385	0.360	0.350	0.348	0.249	0.338
Station 2	Top	0.303	0.331	0.311	0.345	0.233	0.305
	Middle	0.370	0.362	0.378	0.349	0.309	0.354
	Bottom	0.394	0.366	0.342	0.353	0.328	0.357
Station 3	Top	0.357	0.344	0.327	0.358	0.226	0.322
	Middle	0.367	0.354	0.354	0.367	0.292	0.347
	Bottom	0.372	0.377	0.339	0.364	0.322	0.355
Station 4	Top	0.339	0.361	0.474	0.348	0.274	0.359
	Middle	0.377	0.357	0.334	0.368	0.318	0.351
	Bottom	0.341	0.363	0.333	0.396	0.331	0.353

Appendix C3, continued

Sulfide mg/L – 2022							
		Winter					Average
Reference	Top	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Station 1	Top	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Middle	0.002	<0.0018	<0.0018	<0.0018	<0.0018	0.0012
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Station 2	Top	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Station 3	Top	<0.0018	<0.0018	<0.0018	<0.0018	0.003	0.0012
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	0.029	0.0065
Station 4	Top	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
		Summer					Average
Reference	Top	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Station 1	Top	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Station 2	Top	<0.0018	<0.0018	<0.0018	<0.0018	0.013	0.0033
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Station 3	Top	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Station 4	Top	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Middle	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
	Bottom	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018

Appendix C3, continued

Total Organic Carbon mg/L – 2022							
		Winter					Average
Reference	Top	490	120	68	1,300	150	426
	Middle	500	120	46	1,400	190	451
	Bottom	410	110	62	1,400	150	426
Station 1	Top	490	100	61	1,400	140	438
	Middle	500	110	61	1,100	170	388
	Bottom	530	110	64	760	140	321
Station 2	Top	510	110	65	1,500	1,500	737
	Middle	520	120	71	1,400	150	452
	Bottom	540	120	62	1,400	140	452
Station 3	Top	540	120	67	1,500	180	481
	Middle	470	120	47	1,400	190	445
	Bottom	490	120	69	850	190	344
Station 4	Top	480	140	60	1,500	140	464
	Middle	540	120	71	1,500	180	482
	Bottom	520	120	55	1,400	150	449
		Summer					Average
Reference	Top	180	110	120	100	80	118
	Middle	210	110	150	94	87	130
	Bottom	200	120	120	100	110	130
Station 1	Top	210	110	160	99	83	132
	Middle	220	110	150	100	100	136
	Bottom	110	120	140	91	81	108
Station 2	Top	69	130	150	100	99	110
	Middle	210	140	140	120	100	142
	Bottom	360	110	130	99	110	162
Station 3	Top	110	130	110	100	98	110
	Middle	210	120	130	95	100	131
	Bottom	230	120	150	100	110	142
Station 4	Top	200	120	140	110	88	132
	Middle	220	120	140	96	110	137
	Bottom	66	120	170	120	96	114