

**CAPITAL REGIONAL DISTRICT
Core area Liquid Waste Management Plan**

AMENDMENT NO. 7

As Approved by Minister on _____

SUBJECT: CORE AREA WASTEWATER TREATMENT PROGRAM

TYPE OF AMENDMENT: MINISTER DIRECTED

PURPOSE

To submit a Liquid Waste Management Plan Amendment by the end of December 2009 that will substantially comply with the Minister of Environment's direction as set out in his letter dated 14 December 2007 and subsequent correspondence.

AMENDMENT

The following Amendment No. 7 replaces chapters 1, 2, 3, 4, 5, 8, 9, 13, 14, 15 and 17 and operational certificates ME-01877 (Clover Point outfall) and ME-00270 (Macaulay Point outfall) of the existing plan, and all subsequent amendments to the chapters and operational certificates, with the exception of the October 2005 amendment to Chapter 16.

AMENDMENT APPROVALS

Capital Regional District Board Approval

December 2009

Ministry of Environment Approval

2010

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

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LIST OF APPENDICES AND SUPPORTING DOCUMENTS

Appendix A – Supporting Section 3

1. Bylaw No. 3478, A bylaw to establish a service to develop and implement a management program for onsite sewage systems.
2. Bylaw No. 3479, A bylaw to regulate the maintenance of onsite sewage systems in the Capital Regional District

Appendix B – Supporting Section 5

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

Appendix C – Supporting Sections 4, 6, 7 and 11

1. Stantec Consulting Ltd. And Brown and Caldwell, “Core Area Wastewater Treatment Program – Wastewater Treatment Plant Option 1A”, December 2009
2. Stantec Consulting Ltd. and Brown and Caldwell, “Core Area Wastewater Treatment – Assessment of Wastewater Treatment Options 1A, 1B and 1C – Volume 1-Report”, September 2009
3. Stantec Consulting Ltd. and Brown and Caldwell, “Core Area Wastewater Program – Biosolids Management Plan”, November 2009
4. Stantec Consulting Ltd., “Regulatory Framework for Water Reuse”, November 2009

Appendix D – Supporting Section 8

1. CRD staff report to the Core Area Liquid Waste Management Committee, “Site Selection for Wastewater Treatment Facilities in Saanich East-North Oak Bay”, 07 October 2009
2. Westland Resource Group, “Comparative Environmental and Social Review – Saanich East-North Oak Bay Wastewater Treatment Facility Sites”, July 2009
3. Westland Resource Group, “Triple Bottom Line Analysis of Candidate Saanich East-North Oak Bay Wastewater Treatment Facility Sites”, July 2009

Appendix E – Supporting Section 9

1. WorleyParsons (2009) CRD Core Area Wastewater Treatment Pre-Discharge Monitoring Program (Technical Proposal Work Plan). Submitted to the Capital Regional District by WorleyParsons. Victoria, BC. September 1, 2009. (CRD Contract # 09-1641)

Appendix F – Supporting Section 10

1. J. Loveys, Capital Regional District, “Public Consultation Summary Report – Saanich East-North Oak Bay Wastewater Treatment Facility Siting, July 2009.”
2. Update on First Nations Consultation/Engagement, November 2009
3. J. Loveys, Capital Regional District, “Public Consultation Summary Report – Core Area Wastewater Treatment Project,” May 2009
4. Brochures on:
 - a) Wastewater Update, October 2009
 - b) Saanich East-North Oak Bay – Wastewater Treatment Site Selection **(Continued...)**

- c) Frequently Asked Questions, March 2009
- d) How Wastewater Treatment Works
- 5. Media Releases on:
 - a) Capital Regional District Core Area Liquid Waste Management Committee Narrows Focus and Moves Forward on Wastewater Treatment Option 1A, 23 September 2009
 - b) CRD Invites Public to Open Houses and Neighbourhood Workshops to Address Saanich East-North Oak Bay Siting for Wastewater Treatment Facilities, 5 June 2009
- 6. Minutes of Meetings of Core Area Liquid Waste Management Committee with Delegations regarding Saanich East-North Oak Bay Sites on August 12 and August 19, 2009
- 7. Notice on www.wastewatermadeclear.ca regarding Open Houses and Workshops related to the Project.
- 8. Information report, "Public Education for Esquimalt and Victoria", 10 November 2009

Supporting Documents (submitted previously) – Supporting Sections 5 and 9

- 1. Core Area Inflow and Infiltration Program – I&I Analysis Results October 2006 to March 2008, July 2009
- 2. Capital Regional District Core Area Liquid Waste Management Plan – Management of Inflow and Infiltration Biennial Report of 2007 and 2008, June 2009
- 3. Golder (2009a) Capital Regional District Wastewater Treatment Plant Discharge Stage 1 Environmental Impact Study. Submitted to Associated Engineering by Golder Associates Ltd. Burnaby, BC. Report # 08-1421-0019. March 27, 2009.
- 4. Golder (2009b) Spring 2009 Water Quality Monitoring Survey for Baseline Monitoring at Proposed Outfall Study Areas Located in Finnerty Cove and Albert Head: Data Report. Submitted to the Capital Regional District by Golder Associates Ltd. Burnaby, BC. Project # 09-1421-0028. August 13, 2009.

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SECTION 1

INTRODUCTION AND BACKGROUND

(REPLACES CHAPTERS 1, 2 AND 3 IN THE EXISTING PLAN)

INTRODUCTION

The Capital Regional District (CRD) provides wastewater management to residential, commercial, industrial and institutional customers, equivalent to a population of approximately 330,000 persons distributed throughout the Core Area and Westshore communities. These communities include the cities of Victoria, Langford and Colwood, the districts of Oak Bay and Saanich, the Township of Esquimalt and the Town of View Royal.

In 2006, the CRD commenced the planning for the expansion and upgrading of the wastewater management system with the principal goal of moving from the existing preliminary level of treatment to secondary treatment. A consulting engineering team, composed of Associated Engineering, CH2M HILL and Kerr Wood Leidal Associates, was engaged to assist the CRD in the planning and initial decision-making. Following the original phase of planning (termed the decision process), completed in June 2007, the CRD adopted a direction that would see the Core Area and Westshore communities move towards a distributed wastewater management strategy. A distributed wastewater management strategy will allow the CRD to take best advantage of the existing sewerage infrastructure, while enabling water reuse and energy recovery opportunities.

In February 2008, the CRD extended the consultant team's scope of work to undertake the conceptual planning under the program development phase for the distributed wastewater management strategy. The consultant team prepared a series of discussion papers on various technical aspects of the planning and developed a series of options that covered a range of distributed wastewater management strategies. The options were discussed and debated by the Core Area Liquid Management Committee (CALWMC), culminating in a decision on 2 June 2009 on a preferred distributed wastewater management strategy.

The Wastewater Treatment Program (the Program) then moved into the second part of the development phase. The CRD engaged Stantec Consulting Ltd. with Brown and Caldwell to assist with this phase of the work, which included tasks such as the following:

- Analysis of three options for system consideration (Options 1A, 1B and 1C). The resulting report, *Core Area Wastewater Treatment, Assessment of Wastewater Treatment Options 1A, 1B and 1C – Volume 1*, which is provided in Appendix C2, supports Sections 4, 6, 7 and 11 of this amendment.
- Development of a biosolids management plan. The resulting plan, *Core Area Wastewater Program, Biosolids Management Plan*, which is provided in Appendix C2, supports Section 6 and 7 of this amendment.

Other specialized consultants were engaged to assist with various aspects of the amendment, including the following:

- Westland Resource Group carried out siting studies, terrestrial environmental impact studies, and environmental and social reviews of proposed treatment plant sites and ancillary facilities. The resulting documents are provided in Appendix D and support Section 8 of this amendment.

- Golder Associates Ltd. was retained to carry out the Stage 1 environmental impact study and pre-discharge monitoring work at the anticipated marine outfall locations (Finnerty Cove, servicing the Saanich East-North Oak Bay and Albert Head, servicing the Westshore). The resulting reports were provided to the Ministry of Environment earlier this year. Further information on this work is provided in Section 9.
- WorleyParsons has recently been retained to complete the pre-discharge monitoring work for the outfalls referred to above. This work will provide the basis for the Stage 2 environmental impact study. The proposed work plan is provided in Appendix E. Further information is provided in Section 9.
- Ernst & Young Orenda Corporate Finance Inc. was retained in 2007 to assist with reviewing procurement options, governance issues, funding options, risk analysis and market sounding. Some of this work (market sounding and procurement analysis) has already been submitted to the Ministry of Environment. Ernst & Young's final report is expected to be submitted in early 2010.

Starting early in this wastewater treatment program, the CRD has carried out an extensive community engagement process with the general public, First Nations and stakeholder groups. Much of this has been documented and submitted to the Ministry of Environment with previous progress reports. Substantial additional documentation, particularly in relation to siting a treatment plant in the Saanich East-North Oak Bay area, is provided in Appendix F in support of Section 10 of this Amendment.

THE PROPOSED SYSTEM CONFIGURATION

The proposed system configuration is outlined in the commitments contained in sections 6 and 7 of this amendment and illustrated in figure 6.1 of section 6 (page 6.2).

All flows up to two times the average dry weather flow (ADWF) will receive secondary treatment as required by the Municipal Sewage Regulation and all systems will be in operation by the end of 2016.

All wet weather flows up to four times ADWF will receive at least primary treatment and any flows over this level will be screened prior to discharge. The infiltration and inflow program, as described in section 5, is designed to reduce wet weather flows to less than four times ADWF by 2030, thereby ensuring that after 2030 all flows will receive at least primary treatment.

As indicated in figure 6.1, the proposed system includes a new secondary treatment plant and outfall at Finnerty-Arbutus to serve Saanich East which will produce reclaimed water that will be available for use by the University of Victoria.

At Clover Point, a pump station will divert at least two times ADWF from that location via a forcemain to McLoughlin Point in Esquimalt for secondary treatment. Any remaining wet weather flows at Clover Point will receive high rate primary treatment up to four times ADWF. Flows above this will be screened until 2030 when flows above four times ADWF will be eliminated.

At McLoughlin Point, the flows diverted from Clover point will be added to flows from the north west trunk and given secondary treatment up to two times ADWF. The flows treated at this location will have originated in Oak Bay, Saanich, Victoria, Esquimalt, and View Royal. Wet weather flows at this location will be given primary treatment up to four times ADWF and any flows above this level will be screened until 2030, by which time such excess flows will be eliminated.

A new outfall will also be provided adjacent to the existing Macaulay Point outfall to discharge treated effluent at least a mile offshore from the McLoughlin treatment plant. Biosolids from the McLoughlin plant will be pumped to Hartland landfill or an upper Victoria harbour location for processing. Processing will include thermophilic anaerobic digestion, drying and transport to markets. Markets are expected to include fuel for cement kilns, paper mills and other energy-using facilities.

Finally, a secondary treatment plant will be provided on the Westshore to serve the municipalities of Colwood and Langford. The CRD will be working with both municipalities to finalize the Westshore treatment plant location and this will be the subject of another amendment early in 2010.

CURRENT PLAN AND AMENDMENTS

The Minister of Environment (the Minister) approved the original Core Area Liquid Waste Management Plan (the Plan) on 26 March 2003. Since that time, the Plan has had the following amendments:

| | |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Amendment No. 1 | Macaulay Point Outfalls Seafloor Trigger (approved 15 August 2003) |
| Amendment No. 2 | Amendment Process (submitted June 2004, not approved) |
| Amendment No. 3 | Reporting and Compliance Dates (approved 18 October 2005) |
| Amendment No. 4 | Chapters 16 and 17 (approved 18 October 2005) |
| Amendment No. 5 | Provision for Dockside Green development (approved 11 April 2007) |
| Amendment No. 6 | Wastewater Treatment Strategy, Cost and Schedule (submitted June 2007. The Minister in his letter dated 14 December 2007 approved the proposed treatment schedule in the amendment). |

Amendment No. 7 supersedes and replaces the above amendments, with the exception of the portion of Amendment No. 4 related to chapter 16.

MINISTER OF ENVIRONMENT REQUIREMENTS

The Minister, in his letter dated 21 July 2006, directed the Capital Regional District (CRD) to amend its Plan to include a fixed schedule for the provision of sewage treatment and provide information on the proposed type, number and location of treatment facilities along with a cost estimate for completing the required works.

In his letter dated 14 December 2007 the Minister directed that the Plan amendment be submitted by 31 December 2008 (subsequently extended to 31 December 2009) and that it include the following:

1. Decisions on the selected physical infrastructure model, selected resource recovery options, and P3 approach (including supporting rationale)
2. Identifying the site locations for sewage treatment facilities
3. The results of environmental impact studies for each sewage facility (site assessment)
4. The results of environmental impact studies for each new discharge location
5. Draft operational certificates for each sewage treatment facility/discharge location
6. Class B detailed capital and operating costs to implement the Plan, and costs per users, both with and without government funding
7. Consultation summary reports (public and First Nations)

Subsequently, in a letter dated 08 July 2008, the Minister directed that a progress report be submitted by 31 December 2008 and a second progress report by 30 June 2009. Both progress reports were submitted on schedule.

The primary purpose of Amendment No. 7 is to address the seven requirements listed above.

PORTIONS OF PLAN EXCLUDED FROM AMENDMENT NO. 7

Amendment No. 7 does not amend the following plan chapters and operating certificate:

| | |
|------------|------------------------------------|
| Chapter 6 | Program Overview |
| Chapter 7 | Source Control |
| Chapter 10 | Stormwater Quality Management |
| Chapter 11 | Harbours Environmental Action |
| Chapter 12 | Management of Trucked Liquid Waste |

Some or all of the above chapters will be the subject of a subsequent amendment.

PLAN AREA

The Plan area, shown on Figure 1.1 (page 1.5), includes the municipalities of Colwood, Esquimalt, Langford, Oak Bay, Saanich, Victoria and View Royal.

AREAS SERVED BY MUNICIPAL COLLECTION SYSTEMS AND SPECIFIC PRIVATE COLLECTION SYSTEMS

The municipalities of Esquimalt, Oak Bay and Victoria are fully served by sewers. The majority of properties in View Royal have sewers but a few still remain outside of the service area.

A large, predominantly rural area of Saanich is outside of the sewerage service area.

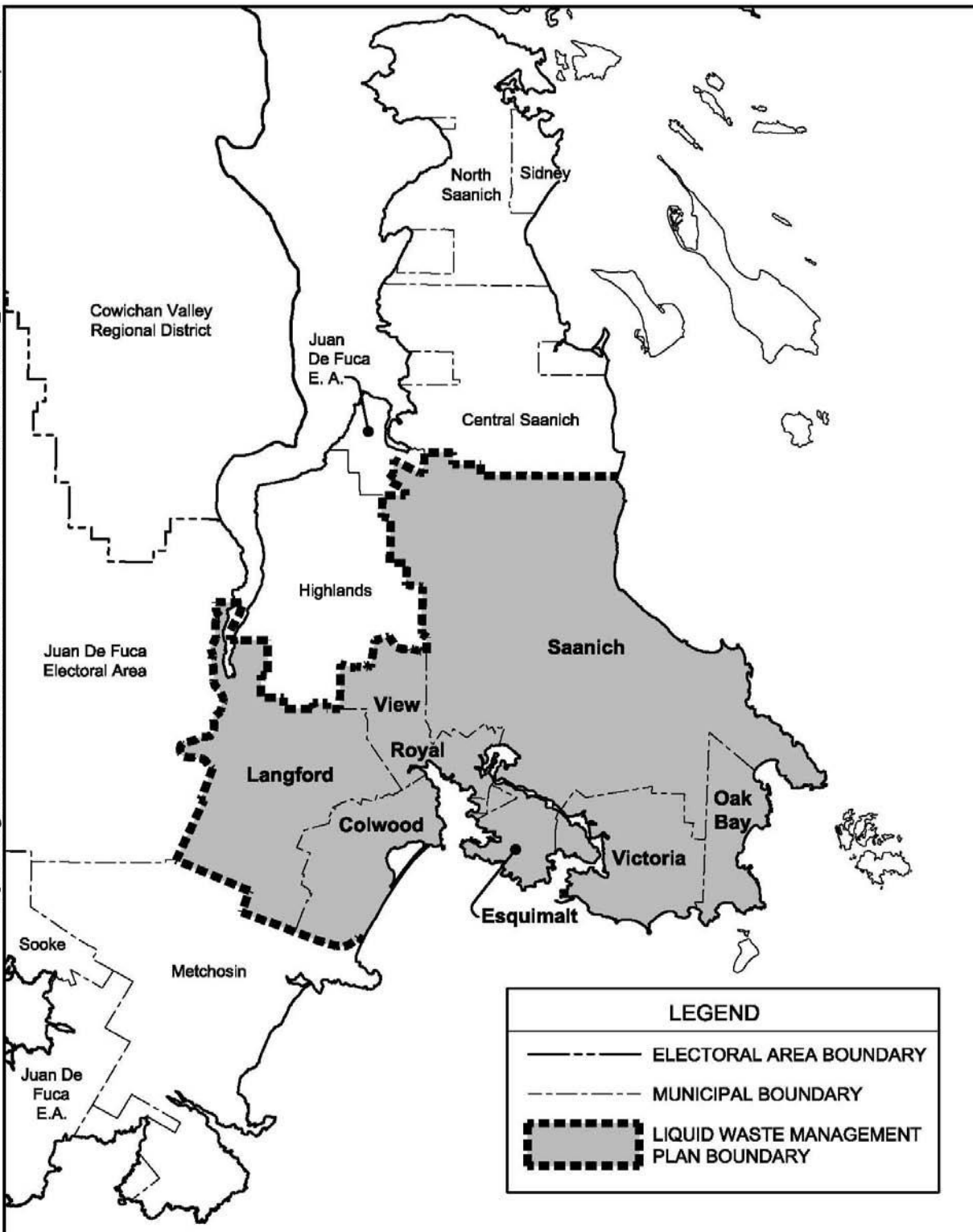
Increasing areas of Colwood and Langford are served by sewers, with plans for further expansion. In the long term, both municipalities are expected to be fully served by sewers.

The Dockside Green sewerage area, between the Johnson St. and Point Ellice bridges in Victoria, has its own collection system, sewage treatment plant and point of discharge to the harbour near Point Ellice Bridge.

It is a requirement of the Dockside Green operational certificate that the sewage treatment facility have “provision to be by-passed manually or overflow automatically to the City of Victoria sanitary sewer system.”

AREAS NOT SERVED BY MUNICIPAL COLLECTION SYSTEMS

Properties not served by sewers rely on septic tanks or small treatments plants to provide wastewater treatment. These onsite systems primarily rely on tile fields or other distribution methods for ground disposal of treated effluent.



| LEGEND | |
|--------|---------------------------------------|
| | ELECTORAL AREA BOUNDARY |
| | MUNICIPAL BOUNDARY |
| | LIQUID WASTE MANAGEMENT PLAN BOUNDARY |



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**CORE AREA
LIQUID WASTE MANAGEMENT PLAN**

PLAN AREA

FIGURE 1.1

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

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SECTION 2

EXISTING WASTEWATER INFRASTRUCTURE

(REPLACES CHAPTER 4 IN THE EXISTING PLAN)

OVERVIEW

The Capital Regional District (CRD) operates two major trunk sewerage systems in the Liquid Waste Management Plan (the Plan) area. These terminate at the major pump stations and outfalls at Clover Point and Macaulay Point. The trunk systems include several pump stations, minor lift stations and wastewater bypass locations, shown on Figure 2.1 (page 2.3).

MUNICIPAL AND REGIONAL RESPONSIBILITY

The roles of the CRD and its municipalities in relation to liquid waste management are complementary. The function of sewage collection and conveyance to a CRD trunk line is a municipal responsibility. Responsibility for trunk sewers and sewage disposal facilities was assigned to the CRD through the original Supplementary Letters Patent issued to the CRD by the Province on 24 October 1975. The Letters Patent had the effect of conferring exclusive jurisdiction on the CRD to construct, operate and manage trunk sewers and sewage disposal facilities within the area now included as the service area under Liquid Waste Management Core Area and Western Communities Service Establishment Bylaw No. 1, 1995 ("Bylaw No. 2312"). The authority of the CRD to operate the trunk sewers and sewage disposal facilities, including the responsibility to acquire, design, construct, operate, maintain, renew and administer trunk sewers and sewage disposal facilities was a function under the 1975 Supplementary Letters Patent and was converted to a service operated under a bylaw through the adoption of Bylaw No. 2312 on 14 August 2002.

The service operated under Bylaw No. 2312 would encompass energy and resource recovery options arising from sewage treatment and disposal, together with all sewage treatment and biosolids management processes.

The CRD will consider the potential for partnering agreements between the CRD and one or more public authorities or private sector partners where the CRD considers this to be in the public interest to contribute to the proper and successful implementation of a plan for sewage treatment and disposal. Any such agreements will be addressed by way of separate amendment to Section 6 of this Plan to accommodate these projects. It further is envisaged that the CRD will continue to fulfill this responsibility within the boundaries of the CRD in accordance generally with the principles set out in Section 6 of the Plan.

Through Supplementary Letters Patent issued to the CRD on 1 June 1978, the CRD was granted the function of septage disposal.

MUNICIPAL SYSTEMS

The age, condition and extent of sewage collection systems varies between municipalities. Many sewers in the inner core, including portions of Victoria, Esquimalt and Oak Bay, date back to the early 1900s. Sewers in Saanich are generally much newer, having mainly been installed since the 1960s as a consequence of the expansion into the rural areas and away from the city core. The Town of View

Royal's sewer system was constructed in the late 1970s. Few areas in these core municipalities remain unsewered, with the exception of areas of View Royal and rural Saanich. Substantial areas of Colwood and Langford remain unsewered, but plans are in place to extend sewer service to many areas of the Westshore by 2030. The general layout of the existing infrastructure is shown in Figure 2.1.

REGIONAL SYSTEMS

The CRD operates two major regional trunk sewer systems in the study area, terminating at the Clover Point and Macaulay Point outfalls. The various components of the system are described in the following sections.

Northwest Trunk Sewer – Macaulay Point Outfall

The northwest trunk sewer serves the Colwood, Esquimalt, Langford and View Royal municipalities, the Vic West area of Victoria and most sewer areas of Saanich. The trunk was completed by the City of Victoria in 1917, extending from the Gorge waterway to Macaulay Point. In order to provide for gravity flow, the trunk was tunnelled through rock over much of its length, at depths of up to 15 m. In the early 1970s, the sewer was reconstructed along its original route and extended north of Gorge waterway into Saanich. A separate branch was constructed west to serve Esquimalt and View Royal and extended in 1997 to serve Colwood and Langford.

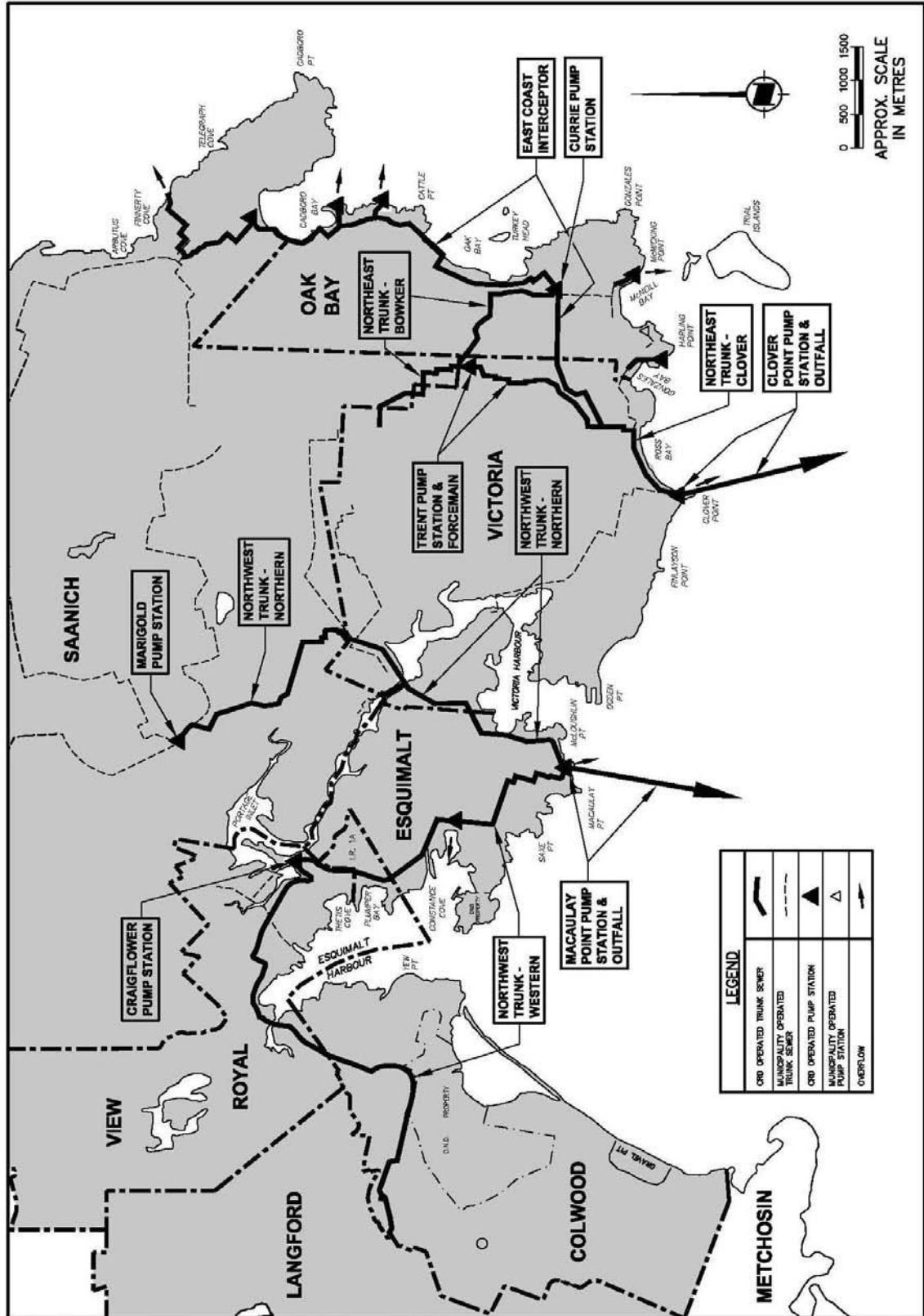
The construction of the Macaulay Point pump station and outfall in 1971 ended five decades of wastewater discharge just off the rocks at Macaulay Point. The 900 mm diameter Macaulay Point outfall, the terminus of the northwest trunk sewer, extends off Macaulay Point a distance of 1.7 km, discharging an average annual flow of 44,000 m³ of sewage per day (2008 average) at a depth of 60 metres. Wastewater is discharged uniformly through each of 28 ports located along a 135 m long diffuser at the end of the outfall. A 336 m emergency bypass outfall is used when station capacity is exceeded.

The Macaulay Point pump station, located at the head of the outfall, provides the pressure necessary for the outfall operation. In 1989, fine screens were installed in the station to remove sewage solids, plastic, and floatable materials larger than 6 mm. The screenings are transported to Hartland landfill twice weekly for disposal. In 2007 the pump station was provided with standby power to maintain station functions during power failure.

The Marigold peak flow storage tank was completed in 2003 to address capacity deficiencies in the northwest trunk and to reduce wet weather overflows from that system.

East Coast Trunk Sewers – General

In the past, the conveyance and disposal of wastewater on the south and east coast of the area was undertaken on a local basis by the individual municipalities of Oak Bay, Saanich and Victoria. Parts of Victoria's core were serviced by 1895. Sewage was discharged through a short outfall at Clover Point. The northeast trunk sewer, originally discharging at McMicking Point in Oak Bay, is another old system dating back to early in the century, jointly constructed by Victoria and Oak Bay. Saanich sewers, constructed to meet housing demand in the Shelbourne and Gordon Head areas in the 1960s and 1970s, were either connected to an outfall at Finnerty Cove or diverted to the northeast trunk. In Oak Bay, localized sewer systems discharged to small outfalls at Humber Road and Rutland Avenue in the Uplands area and also to small outfalls in the Harling Point area.



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CORE AREA LIQUID WASTE MANAGEMENT PLAN
EXISTING SEWER INFRASTRUCTURE

FIGURE 2.1

The CRD, with the cooperation of the municipalities, worked to reduce the number of these individual discharge points. The east coast interceptor trunk sewer eliminated the discharge of sewage at all of the locations mentioned, except during periods of heavy rainfall. Flow from the east coast interceptor is pumped to Clover Point where it combines with additional flow from Victoria, and where, in 1980, the CRD constructed its second major pump station and deep-water marine outfall serving the Plan area.

East Coast Interceptor Sewer System

The east coast interceptor sewer system was fully operational in January 1992. The 10 km pipeline system intercepts flow from the Finnerty Cove outfall in the District of Saanich, from the Penrhyn lift station serving Cadboro Bay in Saanich, from Humber and Rutland outfalls in Oak Bay, and flows from Victoria, Oak Bay and Saanich that was previously discharged at McMicking Point. The Currie Road pump station in Oak Bay redirects the wastewater to Clover Point pump station.

The Trent peak flow pump station and forcemain were constructed in 2007 and 2008 to divert peak flows away from the overloaded northeast trunk. The northeast trunk had frequently overflowed unscreened sewage into Bowker Creek and into Oak Bay at the Broom Road overflow.

Clover Point Pump Station/Outfall

At Clover Point, as at Macaulay Point, the sewage is screened to exclude objects larger than 6 mm prior to discharge to the outfall. The 1100 mm diameter outfall extends 1.1 km offshore from Clover Point, terminating in a diffuser of 196 metres length at a depth of 67 metres. The average daily sewage flow was 50,000 m³ per day in 2008. The station has installed standby power to maintain station functions during power failure. A 330 metre emergency bypass outfall is used when station capacity is exceeded.

Septage Disposal

Septage, the waste material removed periodically from residential and commercial septic tanks or sewage holding tanks, is discharged to a privately owned and operated septage receiving facility in Langford. The septage is treated at the facility to comply with CRD source control requirements prior to discharge to a municipal sewer, which is connected through the northwest trunk sewer system to the Macaulay Point outfall.

Federal Systems

The Department of National Defence (DND) operates wastewater collection systems at CFB Esquimalt properties (Naval dockyard, Naden area, Work Point barracks) that connect directly to municipal or regional sewerage systems. DND also operates a sewage collection system in Belmont park subdivision and for DND operations in the Esquimalt lagoon area. These systems, which previously incorporated septic tank treatment and effluent discharge to a marine outfall at Coburg Peninsula, are now diverted to the North West trunk and the Macaulay Point outfall.

In Esquimalt, wastewater collection systems within Songhees Indian Reserve and Esquimalt Indian Reserve discharge to municipal or regional sewerage systems.

Private Systems

In addition to the CRD marine discharges at Macaulay Point and Clover Point, the Ministry of Environment has issued several permits for sewage discharge within the study area. These are primarily for ground discharge of effluent in quantities in excess of 22,730 litres per day following treatment in septic tanks or secondary treatment plants and serve subdivisions, schools, golf course clubhouses and hospitals. Since the extension of the trunk sewer system into Colwood and Langford, many of these are now connected to sewers.

The Dockside Green development has its own sewage collection system, sewage treatment plant and point of discharge to the harbour. The developer constructed a membrane bioreactor plant with nitrogen and phosphorus reduction to produce high quality reclaimed water, which is used for toilet flushing, irrigation and to create an impoundment (greenway) running through the property. The reclaimed water and stormwater runoff contained in the greenway discharges to the Victoria Harbour near Point Ellice Bridge. As indicated in Section 1, the Dockside Green plant has the ability (and requirement), in the event of emergency, to discharge flows to the City of Victoria sanitary sewer system.

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 3

ONSITE SYSTEMS

(REPLACES CHAPTER 15 IN THE EXISTING PLAN)

GOAL

To successfully implement a management program for onsite sewage systems in a manner that will substantially reduce or prevent the environmental degradation and public health risks associated with poorly maintained systems.

COMMITMENTS

The Capital Regional District and the participating municipalities (Colwood, Langford, Saanich, and View Royal) commit:

1. To promote awareness and understating of onsite septic system maintenance and care within the region through public education programs, such as Septic Savvy and other outreach initiatives.
2. To monitor resident compliance with Bylaw No. 3479, which encourages onsite septic system care through a regular pumping and maintenance schedule.
3. To provide support to residents of participating municipalities with onsite septic systems through open communications, staff availability, hotline telephone services, and online resources.
4. To continue to seek improvements in service delivery through ongoing engagement with industry, stakeholders, other government regulators, municipalities and the general public.

BACKGROUND

Within the Liquid Waste Management Plan (the Plan) area, the municipalities of Colwood, Langford, Saanich and View Royal contain areas that are not serviced by a municipal sewerage system and rely on small treatment and disposal systems serving individual residences, or several residences collectively, for wastewater treatment and disposal. Residents in these areas generally employ onsite systems consisting of septic tanks or small package treatment plants with subsurface wastewater infiltration systems.

For over two decades, the CRD has provided facilities for the disposal of septage and treatment plant sludge from residential and commercial onsite systems. This service continues to be provided by the private sector under the authority of the CRD.

In the CRD, the Vancouver Island Health Authority (VIHA) has the responsibility for administering the Sewerage System Regulation, BC Reg. 326/2004 (the "Regulation") under the Health Act (British Columbia) by means of filings of construction of onsite treatment and disposal systems and for enforcing the Regulation that became effective on 31 May 2005. Under the Regulation, an owner of an onsite system installed since 31 May 2005 must ensure that the system is maintained in accordance with the maintenance plan provided for the system.

Many systems are not adequately maintained. Failing onsite systems are known to cause several problems, including contamination of surface water and groundwater supplies and shellfish beds, health impacts and nuisance to neighbours, and nutrient enrichment of sensitive water bodies. These problems are well known but the ability of public health personnel to address them has been limited.

Onsite systems may fail due to a number of reasons, which can be broadly grouped into the following categories:

- High flow and organic loading
- Physical damage to the system
- Site conditions
- High water table
- Soil conditions
- Poor maintenance
- Faulty installation
- Age of the system

The limitations with the existing provincial regulatory situation include:

- The new sewerage system regulation increases maintenance requirements; however there is no method of enforcement and the regulation only applies to systems installed since 31 May 2005.
- The new provincial regulation limited public health inspector's roles to receive system registrations and file them, to respond to complaints and to issue orders and fines under the Health Act and Offences Act. Regular inspections are no longer a routine part of the inspector's duties.
- Failures may not be detected unless there are physical signs of a failure, at which point an impact to health or the environment may have already occurred.

ADVISORY COMMITTEE

An Onsite Management Advisory Committee (OMAC) worked on developing an onsite management system from 2001 to 2005 and OMAC subsequently made recommendations to the CRD Board for consideration.

MAINTENANCE MANAGEMENT PROGRAM

A maintenance management program that is intended to reduce the limitations with the management of onsite sewage disposal systems referred to above has now been developed and implemented for the estimated 10,590 systems in the four participating municipalities. On 26 March 2008, the CRD Board adopted Bylaw No. 3478, Management of Onsite Sewage Systems Service Establishment Bylaw, 2007, a bylaw to establish a service to develop and implement a management program for onsite sewage systems. On 09 April 2008, the Board approved Bylaw No. 3479, Onsite Sewage System Maintenance Bylaw, 2007, a bylaw to regulate the maintenance of onsite sewage systems in the CRD. The scope of the program and target level of effort is expected to address most problems associated with onsite system failures.

The program includes requirements to pump out septic tanks and maintain package treatment plants at regular intervals and retain records of all pump-outs and maintenance carried out on onsite systems, together with enforcement protocols and procedures.

Both the public and Technical and Community Advisory committees recommended that education should be a key component and that one agency should bear total responsibility for the program. This has been incorporated into the program.

MANAGEMENT OF SLUDGES FROM ONSITE SYSTEMS

Under its Supplementary Letters Patent, the CRD retains the authority for the disposal of septage within the region. Disposal facilities for septage and treatment plant sludges from onsite systems will continue to be provided by the private sector pursuant to a contract with the CRD.

SUPPORTING APPENDIX

Bylaw No. 3478, which establishes the onsite sewer function, and Bylaw No. 3479, which regulates this function are attached in Appendix A.

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 4

**POPULATIONS, POPULATION EQUIVALENTS,
INFILTRATION AND INFLOW, WATER CONSERVATION AND DESIGN WASTEWATER FLOWS**

(REPLACES CHAPTER 5 IN THE EXISTING PLAN)

OVERVIEW

The core area wastewater system will be designed to deal with wastewater from the following sources:

- Residential populations
- Industrial, commercial and institutional (ICI) sources
- Infiltration and inflow (I&I)

Information regarding each of these contributors is provided in the following sections, along with discussion of how appropriate I&I reduction and water conservation programs can reduce these flows. Section 5 deals in more detail with I&I reduction strategies.

The design flows listed in this section will serve existing populations, businesses and institutions, with a modest allowance for growth, and will reflect commitments to effective water conservation and I&I reduction programs.

RESIDENTIAL POPULATIONS

A number of information sources were used to estimate existing and future populations. These include municipal Official Community Plans (OCP) and CRD regional planning population projections.

The following Table 4.1 provides a summary of populations and projected populations from the OCP of the seven participating municipalities.

Table 4.1
Official Community Plan Populations and Projected Populations

| Municipality | OCP Adopted | Population @ OCP adoption | Projected Population |
|---------------------|--------------------|----------------------------------|-----------------------------|
| Oak Bay | 1997 | 19,900 | 19,800 (2030) |
| Victoria | 1995 | 71,200 | 87,800 (2020) |
| Esquimalt | 2007 | 17,100 | 21,000 (2026) |
| Saanich | 2008 | 113,500 | 119,300 (2026) |
| View Royal | 1999 | 6,500 | 10,800 (build-out) |
| Colwood | 2008 | 15,500 | 32,480 (2028) |
| Langford | 2008 | 24,900 | 47,244 (2028) |

CRD Regional Planning, using a variety of sources, estimates that future populations in the Plan area will be as indicated in Table 4.2. This table was reproduced as Table 2 in Discussion Paper 033-DP1 *Existing and Future Scenarios: Populations, ICI Equivalents, and Inflow and Infiltration*.

Table 4.2
CRD Total (Sewered and Unsewered) Population Estimates
(From Table 2 of Discussion Paper 033-DP-1)

| | 2006 Population | Avg. Annual Growth Rate (2006-2015) | 2015 Population | Avg. Annual Growth Rate (2015-2045) | 2045 Population | Avg. Annual Growth Rate (2045-2065) | 2065 Population |
|---------------|--------------------|-------------------------------------------|--------------------|-------------------------------------------|--------------------|-------------------------------------------|--------------------|
| Oak Bay | 18,059 | 0.1% | 18,222 | 0.1% | 18,777 | 0.1% | 19,175 |
| Victoria | 78,659 | 1.0% | 86,028 | 0.5% | 99,913 | 0.1% | 102,032 |
| Esquimalt | 17,407 | 0.5% | 18,206 | 0.5% | 21,145 | 0.1% | 21,593 |
| Saanich | 110,737 | 0.5% | 115,821 | 0.5% | 134,515 | 0.1% | 137,368 |
| View Royal | 8,375 | 2.0% | 10,009 | 1.5% | 15,645 | 1.0% | 19,280 |
| Colwood | 15,470 | 2.0% | 18,488 | 1.5% | 28,698 | 1.5% | 39,506 |
| Langford | 22,229 | 5.1% | 32,462 | 2.9% | 60,851 | 1.5% | 81,958 |
| Total | 270,936 | | 299,236 | | 379,544 | | 420,912 |

The populations indicated in the above table are total estimated populations, not sewered populations. In Oak Bay, Victoria and Esquimalt the total and sewered populations are essentially the same. Colwood, Langford, View Royal and Saanich have substantial unsewered populations, but with the exception of Saanich, these unsewered populations are expected to be mainly serviced by 2030.

The following table provides information on the number of dwellings per municipality currently connected to onsite systems with an estimate of the populations using these systems.

Table 4.3
Estimated Current Populations Using Onsite Systems

| Municipality | Dwelling Count | Estimate Population |
|---------------|----------------|----------------------|
| Colwood | 3,860 | 2.7 x 3,860 = 10,422 |
| Langford | 4,109 | 2.6 x 4,109 = 10,683 |
| Saanich | 2,524 | 2.6 x 2,524 = 6,562 |
| View Royal | 99 | 2.7 x 99 = 267 |
| Totals | 10,592 | 27,934 |

The Dockside Green development in Victoria is served by its own wastewater treatment and disposal system. Its operating certificate from the Ministry of Environment permits a maximum rate of discharge to Victoria harbour of 380 m³/day, but under non-compliant operating conditions, the development is required to discharge to Victoria's sewer system.

INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL (ICI) EQUIVALENTS

Discussion paper 033-DP-1 (Kerr Wood Leidal, January 2009) provides estimates for the population equivalents, from a wastewater generation perspective, of industrial, commercial and institutional development in the Plan area. The consultant relied on nine reports prepared on the CRD trunk sewer systems between 1994 and 2008, as listed in Table 1 of discussion paper 033-DP-1. Typical ICI population equivalents resulting from these studies is shown in table 4.4.

Table 4.4
 Typical ICI Parameters
 (from Table 3 of Discussion Paper 033-DP-1)

| Land Use | Population Equivalent per Hectare |
|---------------|-----------------------------------|
| Industrial | 25 |
| Commercial | 90 |
| Institutional | 50 |

Tables 4.5 and 4.6 summarize data taken from discussion paper 033-DP-1 on residential, ICI and total equivalent populations served by municipal sewer systems in the Plan area.

Table 4.5
 Sewered Residential and ICI Estimates by Municipality 2005 – 2030
 (From Table 4 of Discussion Paper 033-DP-1)

| | 2005 | | | 2015 | | | 2030 | | |
|------------|-------------|--------|-----------|-------------|--------|-----------|-------------|--------|-----------|
| | Residential | ICI | Total PE1 | Residential | ICI | Total PE1 | Residential | ICI | Total PE1 |
| Saanich | 110,730 | 31,860 | 142,590 | 115,944 | 35,368 | 151,312 | 126,393 | 40,120 | 166,513 |
| Victoria | 78,658 | 37,341 | 115,999 | 86,057 | 46,115 | 132,172 | 92,566 | 49,168 | 141,735 |
| Esquimalt | 17,412 | 6,773 | 24,185 | 18,206 | 7,411 | 25,617 | 18,667 | 8,199 | 26,866 |
| Langford | 8,547 | 4,542 | 13,089 | 24,988 | 13,279 | 38,267 | 48,672 | 25,865 | 74,537 |
| Colwood | 5,389 | 3,010 | 8,400 | 9,779 | 7,137 | 16,916 | 24,942 | 9,606 | 34,548 |
| View Royal | 8,372 | 4,693 | 13,065 | 10,009 | 4,693 | 14,702 | 12,512 | 10,460 | 22,972 |
| Oak Bay | 18,075 | 6,033 | 24,108 | 18,237 | 6,899 | 25,135 | 18,514 | 7,790 | 26,304 |

Table 4.6
 Sewered Residential and ICI Estimates by Municipality 2030 – 2065
 (From Table 4 of Discussion Paper 033-DP-1)

| | 2030 | | | 2045 | | | 2065 | | |
|------------|-------------|--------|-----------|-------------|--------|-----------|-------------|--------|-----------|
| | Residential | ICI | Total PE1 | Residential | ICI | Total PE1 | Residential | ICI | Total PE1 |
| Saanich | 126,393 | 40,120 | 166,513 | 134,773 | 49,651 | 184,424 | 137,614 | 50,693 | 188,307 |
| Victoria | 92,566 | 49,168 | 141,735 | 99,239 | 52,350 | 151,589 | 101,216 | 53,397 | 154,612 |
| Esquimalt | 18,667 | 8,199 | 26,866 | 21,153 | 8,987 | 30,140 | 21,581 | 17,991 | 39,572 |
| Langford | 48,672 | 25,865 | 74,537 | 60,852 | 32,337 | 93,189 | 81,958 | 43,554 | 125,512 |
| Colwood | 24,942 | 9,606 | 34,548 | 40,623 | 12,075 | 52,697 | 57,278 | 17,019 | 74,297 |
| View Royal | 12,512 | 10,460 | 22,972 | 15,640 | 16,226 | 31,867 | 19,276 | 19,991 | 39,267 |
| Oak Bay | 18,514 | 7,790 | 26,304 | 18,816 | 7,854 | 26,670 | 19,183 | 8,003 | 27,187 |

¹ The PE (population equivalent) is the sum of the residential population and the population that would produce the same amount of sewage as the industrial, commercial and institutional (ICI) development in the area.

INFILTRATION AND INFLOW

The third contributor to wastewater quantities, in addition to flows from residential populations and industrial, commercial and institutional sources, is flow resulting from infiltration and inflow (I&I) of stormwater into sanitary sewer systems. I&I becomes particularly significant during wet weather and tends to increase as systems age. In addition, as indicated in discussion paper 033-DP-1, climate change is expected to result in increased winter rainfall, with a related potential increase in I&I rates.

The design flow tables provided in discussion paper 033-DP-2, *Design Flow Tables*, assume that the municipalities and the CRD will invest sufficiently in aging systems to fully compensate for the effects of infrastructure decay and climate change. It is estimated that about 1% of the replacement cost of existing systems will need to be invested annually to achieve this goal.

The I&I estimates used in the design flow tables are based on extensive flow monitoring carried out over more than a decade on the CRD and municipal collection systems.

The proposed I&I reduction program is described in Section 5 of this amendment.

WATER CONSERVATION

The design flow tables provided in the discussion paper 033-DP-2 assumes that, as a result of increased water conservation, the per-capita rate of water consumption will reduce from the current 225/250 L/cap/day to 195 L/cap/day in 2045.

Since water conservation programs were introduced by the CRD in the mid 1990s, the total annual water consumption per capita has decreased by about 8% as a result of increasing public awareness of water issues and the CRD's comprehensive demand management program.

Residential Water Conservation Programs

As more than 70 per cent of the water supply is used for residential purposes, a number of residential water conservation programs are currently being implemented, including the following:

School Programs

The CRD, in conjunction with educators, has developed two school curricula supplements used in every public and most private schools in Greater Victoria at the Grade 2 and Grade 8-10 levels.

Public Events

Every year, CRD water conservation staff attend and distribute educational resources and program information at more than 60 public events, reaching more than 20,000 people annually.

Workshops

The CRD delivers workshops on native plants and irrigations system design and maintenance to homeowners.

Water Conservation Bylaw

More than a quarter of the total annual water supply to Greater Victoria is used for irrigating lawns and gardens. The CRD's Water Conservation Bylaw establishes watering schedules and prohibits wasteful water uses.

Other Initiatives

Other water conservation initiatives are also encouraged, such as the use of rain barrels as an alternate source of water for watering plants and washing cars.

Publications and Website

Several fact sheets, manuals and brochures and a website (www.crd.bc.ca/water/conservation) have been developed to support the CRD water conservation programs.

Industrial, Commercial and Institutional (ICI) Water Conservation Programs

Nearly 30% of municipal water in Greater Victoria is used by ICI sectors. The following water conservation programs were developed to address the diverse needs of this sector:

Grants

Grants are provided annually to Greater Victoria schools for water conservation retrofits. Rebates are also available for eliminating once-through cooling systems that waste large volumes of clean municipal water.

Audits and Technical Services

The CRD offers free water use and efficiency audits to businesses, including access to specialized instruments and expertise.

Industry Education

Water conservation education provided for businesses include specialized workshops, displays at trade shows, talks at industry events and various publications. Key program targets include food service facilities and landscape irrigation. The CRD, in conjunction with the BC Irrigation Association, has developed an irrigation installer certification program allowing installers to obtain Level 1 and Level 2 certification.

In addition to the above CRD water conservation programs, some municipalities have implemented charging for sewer system costs based on metered water use (usually winter water use). This provides an additional incentive to reduce indoor water use.

DESIGN WASTEWATER FLOWS

Design wastewater flows are derived from flows from residential populations, industrial, commercial and institutional sources and flows resulting from infiltration and inflow of surface water and ground water into the sanitary sewer systems. Schedule 3 of the Municipal Sewage Regulation (MSR) requires that, for discharges to open marine waters, secondary treatment be provided for daily flows up to 2 times the average dry weather flow (ADWF) and primary treatment for flows greater than this. Primary treatment is defined under the MSR as treatment being capable of producing an effluent with a Biochemical Oxygen Demand (BOD) of 130 mg/L and a Total Suspended Solids (TSS) of 130 mg/L. ADWF is defined in the MSR as "the daily municipal sewage flow to a sewage facility that occurs after an extended period of dry weather such that the inflow and infiltration has been minimized to the greatest extent practicable."

As indicated in Section 5 regarding the management of I&I, the I&I program is designed to reduce all flows to less than four-times the average dry weather flow by 2030. By that date, all flows will receive at least primary treatment.

Based on the above, the following tables indicate the proposed level of treatment for dry weather and wet weather flows at the various treatment plant locations serving the core area with the exception of the flows from the Westshore, which have yet to be agreed on. Capacity redundancy will be provided as required by the MSR.

For a full description of the treatment options referred to in the following tables see Section 6.

Table 4.7
Saanich East-North Oak Bay Design Hydraulic Flows
(applies to Option 1A as described in the Stantec report in Appendix C1)

| Item | 2030 | | 2065 | |
|-------------------------------|-------------|------------------------------------------------|-------------|-----------------------------------|
| | Flow (ML/d) | Treatment | Flow (ML/d) | Treatment |
| ADWF | 16.6 | | 17.2 | |
| 1.75 x ADWF | 29.01 | Secondary (MBR) | 30.1 | Secondary (MBR) |
| 1.75 x ADWF – 4 x ADWF | 37.42 | Primary | 43.0 | Primary |
| Filtration for Reuse | 29.0 | ≈12 ML/d guaranteed ³ | 30.1 | ≈12 ML/d guaranteed |
| Biosolids | | Discharge to downstream treatment ⁴ | | Discharge to downstream treatment |

¹ By combining the 1.75x ADWF of high quality MBR effluent with 0.25x ADWF of primary effluent, the secondary treatment requirement for 2 x ADWF can be easily met.

² No flows greater than 4x ADWF are expected at this facility

³ The amount of highly treated reuse water that can be always available is something less than the ADWF.

⁴ If this facility goes into operation before a downstream treatment plan is in operation, the biosolids will be removed from the facility and taken to Hartland landfill.

Table 4.8
Clover Point Design Hydraulic Flows
(applies to Option 1A as described in the Stantec report)

| Item | 2030 | | 2065 | |
|----------------------------|-------------|------------------------------------------------|-------------|------------------------------------------------|
| | Flow (ML/d) | Treatment | Flow (ML/d) | Treatment |
| ADWF | 37.8 | | 37.1 | |
| 2 x ADWF | 75.6 | Transfer to downstream for secondary treatment | 74.2 | Transfer to downstream for secondary treatment |
| 2 x ADWF – 4 x ADWF | 75.6 | Primary | 74.2 | Primary |
| >4 x ADWF | ≈40 | Screening | 0 | No flow > 4 x ADWF expected beyond 2030 |
| Biosolids | | Discharge to downstream treatment | | Discharge to downstream treatment |

Table 4.9
Macaulay Catchment / McLoughlin Point Design Hydraulic Flows
(applies to Option 1A in the Stantec report)

| Item | 2030 | | 2065 | |
|---------------------------------|-------------|------------------|-------------|-----------------------------------------|
| | Flow (ML/d) | Treatment | Flow (ML/d) | Treatment |
| ADWF (tributary) | 46.4 | | 50.4 | |
| 2 x ADWF (tributary) | 92.8 | Secondary | 100.8 | Secondary |
| 2 x ADWF (from Clover) | 75.6 | Secondary | 74.1 | Secondary |
| Total design flow of 2 x ADWF | 168.4 | Secondary | 174.9 | Secondary |
| 2 x ADWF – 4 x ADWF (tributary) | 92.8 | Primary | 100.8 | Primary |
| >4 x ADWF (tributary) | ≈50 | Screening | 0 | No flow >4 x ADWF1 expected beyond 2030 |
| Filtration for Reuse | 12 | | 24 | |
| Biosolids | | To separate site | | To separate site |

¹ See the commitments in Section 5 aimed at achieving this goal.

SUPPORTING APPENDICES

The following documentation in Appendices C1 and C2, provides additional information on design wastewater flows. This supplements discussion papers and reports provided with previous progress reports to the Ministry of Environment in December 2008 and June 2009:

- C1 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Treatment Program – Wastewater Treatment Plant Option 1A*, December 2009
- C2 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Treatment – Assessment of Wastewater Treatment Options 1A, 1B and 1C – Volume 1-Report*, September 2009

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 5

MANAGEMENT OF INFILTRATION AND INFLOW AND CONTROL OF WASTEWATER OVERFLOW

(REPLACES CHAPTER 8 AND 13 IN THE EXISTING PLAN)

GOAL

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

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

How the CRD proposes to substantially meet the requirements of Condition 17(2) is addressed in Sections 4 and 6 and in the draft operational certificates in Sections 12, 13 and 14.

COMMITMENTS

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

1. Continue flow monitoring in each municipality to further refine priority areas for remediation.
2. Develop, by the end of 2011, and submit to the Ministry of Environment, comprehensive inflow and infiltration management plans for the core area that will:
 - a) Identify and evaluate options and opportunities that promote the minimization of groundwater and rainwater I&I into municipal sanitary sewer systems, including I&I originating from service laterals (private and public sections of sewer connections).
 - b) Identify needed changes to legislation and legal authority to enable options and strategies.
 - c) Identify opportunities for the inspection of private sewers connected to municipal sewers:
 - (i) as part of the municipal process in evaluating and issuing renovation and building permits for serviced properties; and/or
 - (ii) at the time of property transfer; and/or
 - (iii) targeted inspections.
 - d) Require the repair or replacement of private sewers that have cross-connections between storm sewers and sanitary sewer or are identified as being in poor condition.
3. Update, by the end of 2011, and enforce sewer use bylaws to prohibit the construction of rainwater and groundwater connections to sanitary sewers.
4. Implement the overflow reduction plans contained in the sanitary sewer overflow management plan, which was submitted to the Ministry of Environment in June 2008. These plans are summarized as follows:

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

| Priority No. | O/F Name | Action Plan | Estimated Year of Completion | Estimated Cost (\$2008) to Complete |
|--------------|-----------------------------|----------------------------------------------------------------------|------------------------------|-------------------------------------|
| 1. | Monterey Avenue MH0130 | Complete and commission Trent pump station | 2008 (Complete) | \$500,000 |
| 2. | Macaulay Point Pump Station | Complete installation of standby power | 2008 (Complete) | \$800,000 |
| 3. | Craigflower Pump Station1 | Request approval from CRD Board to proceed with construction | 2009-10 | \$15,000,000 |
| 4. | Harling Pump Station | Install a screen on the overflow pipe | 2008 (Complete) | \$10,000 |
| 5. | Shoreline Drive MH0340 | Commence with capacity deficiency study and identify upgrade options | 2010 | \$50,000 |
| 6. | Penrhyn Lift Station | Investigate pump and genset capacity | 2010 | \$600,000 |
| 7. | Humber Combined Sewers | Oak Bay plans to separate the sewers in the Uplands area | 2015* | \$6,000,000 (Oak Bay cost) |
| 8. | Rutland Combined Sewers | Oak Bay plans to separate the sewers in the Uplands area | 2015* | \$6,000,000 (Oak Bay cost) |
| 9. | Head Street MH0040 | Twin the NWT from Macaulay Point to MH0055 | 2015 | \$20,000,000 |
| 10. | Sea Terrace MH0055 | Twin the NWT from Macaulay Point to MH0055 | 2015 | as above |
| 11. | Currie Pump Station | Extend Trent forcemain down to Clover Point | 2017 | \$3,000,000 |
| 12. | Broom Road | Extend Trent forcemain down to Clover Point | 2017 | as above |

¹ The timing and scope of this work will be finalized when decisions have been made regarding the management of wastewater on the Westshore

* Subject to Oak Bay Council resolution in December 2009.

Table 5.2 Prioritized Order of Colwood Overflow Reduction Plan

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

Table 5.3 Prioritized Order of Esquimalt Overflow Reduction Plan

| Item No. | Work Name | Description | Estimated Year of Completion | Estimated Cost (\$2008) to Complete |
|----------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------|
| 1. | Sewer Relining | Relining and repairs to sewer mains rated poor and poorest | Completed | n/a |
| 2. | Combination Manhole Separation | <ul style="list-style-type: none"> • 148 manholes remain to be separated • 29 manholes to be separated in 2008 • Five manholes separated per year from 2009 to 2025 | 2025 | \$950,000 |
| 3. | Grafton Pump Station Upgrade | New electrical power supply, kiosk and controls | 2008 (Complete) | \$38,000 |
| 4. | Grafton Pump Station Upgrade | Pump replacement | 2012 | \$40,000 |
| 5. | Sewer Main Replacement | Replacement of undersize sewer main on Craigflower Road between Tillicum Road and Lampson Street | 2009 (Complete) | \$250,000 |
| 6. | Municipal Wide Smoke and Dye Testing | Smoke and dye testing underway to identify cross connections in attempts to reduce I&I in the future. The full scope of the project has not yet been determined. | 2010 | unknown |

Table 5.4 Prioritized Order of Langford Overflow Reduction Plan

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

Table 5.5 Prioritized Order of Oak Bay Overflow Reduction Plan

| Item No. | Work Name | Description | Estimated Year of Completion | Estimated Cost (\$2008) to Complete |
|----------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------|
| 1. | Uplands Sewer Separation | Complete the separation of combined sewers in Uplands. | 2015* | \$12,000,000 (est.) |
| 2. | South Oak Bay I&I Rehab Project | Continue with the phased rehabilitation project in the Windsor catchment area. | 2010 | \$1,000,000 (est.) |
| 3. | Hydraulic Model | Continue to complete a hydraulic model of the entire collection system. | 2014 | \$90,000 (est.) |
| 4. | CCTV Inspection | Continue to video inspect sewer mains. | Annually | \$25,000 |
| 5. | Pump Station Maintenance | Continue to maintain all pump station components to ensure that they run efficiently. | Annually | \$30,000 |
| 6. | SCADA Upgrade | Upgrade the SCADA system to collect flow data from all pump stations. Typically one station per year is added to the Oak Bay SCADA system. | 2016 | \$180,000 (est.) |
| 7. | Sewer System Maintenance | Continue to keep the sewers clean and free from defects. | Annually | \$237,000 |
| 8. | Manhole Inspection | Continue to visually inspect manholes to ensure that they do not leak. | Annually | \$15,000 |

* Subject to Oak Bay Council Resolution in December 2009

Table 5.6 Prioritized Order of Saanich Overflow Reduction Plan

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

Table 5.7 Prioritized Order of Victoria Overflow Reduction Plan

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

Table 5.8 Prioritized Order of View Royal Overflow Reduction Plan

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

SUPPORTING DOCUMENTS

Further information on the approach of the CRD and the participating municipalities to minimizing infiltration and inflow and system overflows is contained in the following documents, which were prepared by CRD staff and submitted to the Ministry of Environment in June 2008 and July 2009.

1. Capital Regional District Core Area Liquid Waste Management Plan – Sanitary Sewer Overflow Management Plan, June 2008
2. Core Area Inflow and Infiltration Program – I&I Analysis Results October 2006 to March 2008, July 2009
3. Capital Regional District Core Area Liquid Waste Management Plan – Management of Inflow and Infiltration Biennial Report for 2007 and 2008, June 2009

Extracts from item 1 above regarding the frequency and location of overflows from the CRD system are provided in Appendix B.

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 6

PROPOSED SYSTEM CONFIGURATION AND BIOSOLIDS MANAGEMENT PLAN

(REPLACES CHAPTER 14 IN THE EXISTING PLAN)

GOAL

The goal of the proposed wastewater management system is to protect public health and the environment and comply with provincial and federal regulations in a sustainable and cost effective manner.

COMMITMENTS

1. GENERAL

The Capital Regional District (CRD) and the participating municipalities commit to completing the required wastewater management program by the end of 2016 in a manner that will:

- a) Have a net negative carbon footprint.
- b) Be sustainable and optimize the recovery and beneficial use of resources.
- c) Avail of opportunities to integrate the solid and liquid waste functions wherever a mutual benefit can be achieved.
- d) Provide appropriate wastewater treatment for the participating municipalities that will minimize the cost to taxpayers.
- e) Protect public health and the environment.
- f) Provide facilities that are compatible with the surrounding communities.
- g) Comply with the draft operational certificates, which will be amended as required.

2. WASTEWATER TREATMENT

The CRD and the participating municipalities commit to providing, by the end of 2016, a wastewater management system as indicated in Figure 6.1 (page 6.3) that will include the following major components:

- a) A Saanich East-North Oak Bay secondary treatment plant, to be completed by the end of 2013, that will be capable of producing reclaimed water suitable for irrigation, toilet flushing and other uses.
- b) A pump station at Clover Point that will pump up to three times the average dry weather flow (ADWF) at this location to McLoughlin Point for secondary treatment.
- c) A wet weather primary treatment plant at Clover Point for flows between two and four times ADWF. It is noted that as the discharge from this plant will not be combined with a secondary effluent discharge as required by Condition 17 (2)(b)(iii) of Schedule 1 of the Municipal Sewage Regulation, it does not fully comply with the regulation. Therefore, an exception to the requirement to comply with this condition is requested.
- d) A treatment plant at McLoughlin Point that will provide primary treatment for flows up to four times ADWF and secondary treatment for flows up to two times ADWF from the northwest trunk and from Clover Point with membrane bioreactor and UV treatment for the portion of effluent to be reclaimed for irrigation and toilet flushing.

- e) A Westshore secondary treatment plant, which is currently being planned in collaboration with Colwood and Langford, will be the subject of a further amendment in early 2010.
- f) A biosolids processing and resource recovery facility at an upper Victoria harbour industrial site or at Hartland Landfill and a biosolids transmission system to convey the biosolids from McLoughlin Point to one of these locations for treatment.
- g) Primary treatment of any flows over four-times ADWF after 2030.

3. BIOSOLIDS PROCESSING

The CRD and the participating municipalities commit to processing the biosolids generated by primary and secondary treatment in a manner that will optimize opportunities for beneficial use by:

- a) Using thermophilic anaerobic digestion to stabilize and reduce solids, kill pathogens and generate methane gas (biogas) for use onsite or offsite in the natural gas distribution system.
- b) Drying some or all of the digested biosolids and selling it as a fuel for cement kilns, paper mills or other energy facilities.

4. PROPOSED TREATMENT PLANT LOCATIONS

As indicated in the attached draft operational certificates, the proposed treatment plants will be located at the following lot legal descriptions:

Saanich East:

Lot 1, Section 44, Victoria District, Plan 14502

McLoughlin Point

Lots A-E, Plan 35322 (337 Victoria View Road)

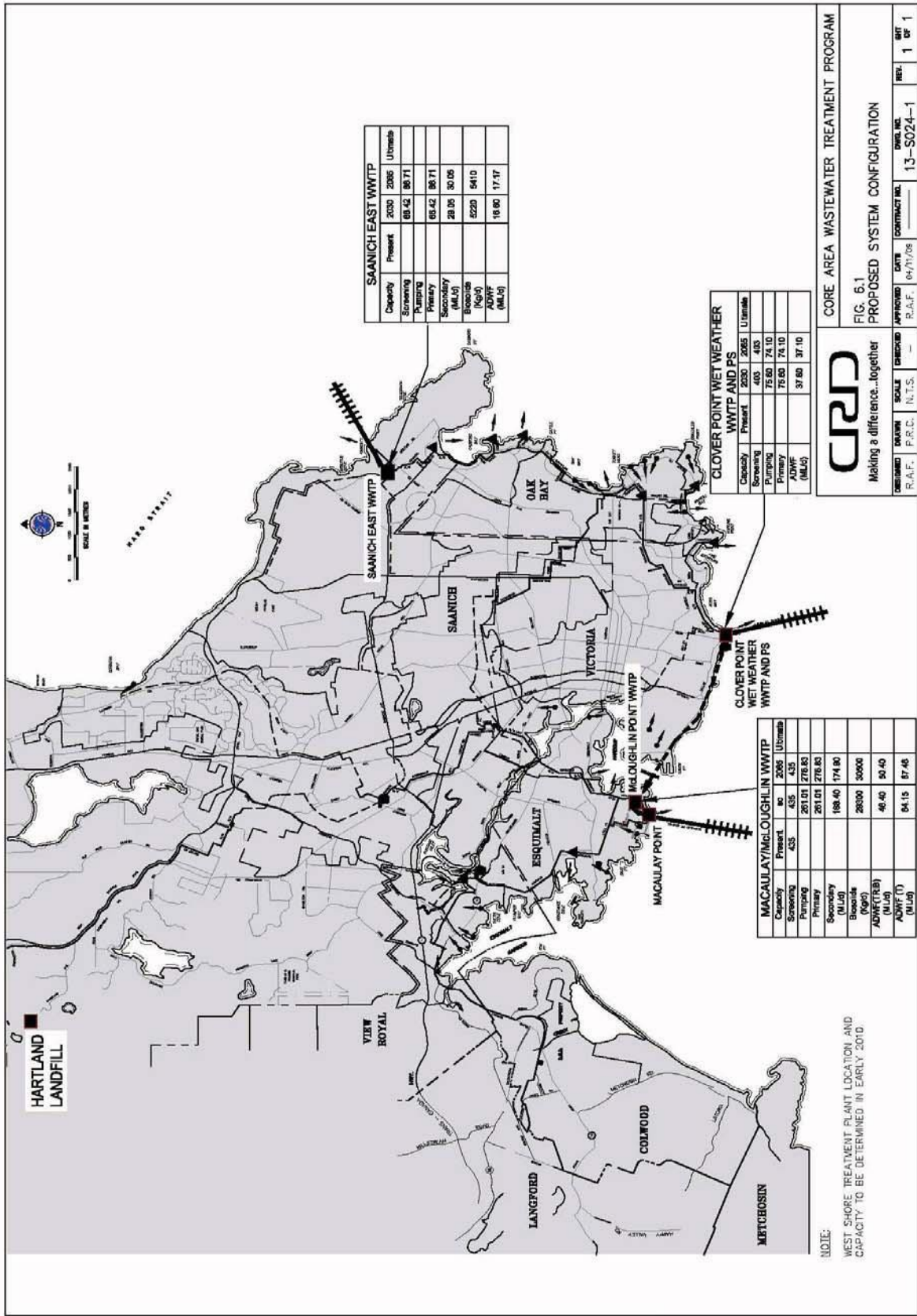
Clover Point

Section 82, Plan 13, O.S. 524, P.P. 3358 Fairfield Farm Estate, Victoria Land District

SUPPORTING APPENDICES

The documentation in support of these commitments is provided in Appendix C, as noted below. This supplements discussion papers and reports provided with previous progress reports to the Ministry of Environment in December 2008 and June 2009.

- C1 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Treatment Program – Wastewater Treatment Plant Option 1A*, December 2009
- C2 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Treatment – Assessment of Wastewater Treatment Options 1A, 1B and 1C – Volume 1-Report*, September 2009
- C3 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Program – Biosolids Management Plan*, November 2009



NOTE:
WEST SHORE TREATMENT PLANT LOCATION AND CAPACITY TO BE DETERMINED IN EARLY 2010.

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 7

**SUSTAINABILITY, RESOURCE RECOVERY, CARBON FOOTPRINT AND
GREENHOUSE GAS REDUCTION**

GOAL

Manage wastewater in a sustainable and regulatory compliant manner by establishing resource recovery opportunities, including partnerships for water reuse, heat recovery and the beneficial use of biosolids, and by aggressively pursuing opportunities to minimize greenhouse gas emissions.

COMMITMENTS

1. GENERAL

The Capital Regional District and the participating municipalities will:

- a) Complete and submit to the Ministry of Environment, by end of 2010, a comprehensive and detailed Resource Recovery and Use Plan for optimizing the management and processing of resources from wastewater, taking into account the approved system configuration, facility locations and currently available or probable markets for resources.
- b) Complete, by the end of 2011, Letters of Understanding (LOUs) with prospective customers and partners regarding their commitment to purchase resources in order to confirm the size, timing and location of markets for the resources to be recovered from wastewater, including a business plan for each facility.
- c) Refine, by mid 2011, the system configuration and facility designs to ensure system compatibility with currently available and probable markets for resources.

2. RECOVERY OF ENERGY FROM BIOSOLIDS

The Capital Regional District and the participating municipalities will, by the end of 2016:

- a) Provide thermophilic anaerobic digesters to produce biogas from wet sludge, reduce solids mass and provide pathogen destruction.
- b) Provide some additional capacity in the digesters to accept clean food waste and/or fats, oils and greases (FOG) to enhance the production of biomethane.
- c) Upgrade the biogas to high quality biomethane and inject it into the natural gas pipeline system and/or use it at the plant.
- d) Recover waste heat from the digesters and secondary effluent to warm the raw sludge being fed to them, thereby reducing digester heating costs.
- e) Dewater and/or thermally dry the digested biosolids to be used as a fuel for cement kilns, pulp mills or waste to energy facilities.

3. RECOVERY OF HEAT FROM EFFLUENT (markets and degree of implementation to be quantified based on the outcome of commitment 1b above)

The Capital Regional District and the participating municipalities will:

- a) Use effluent source heat pumps to help heat the anaerobic digesters and treatment plant buildings using heat pumps and hot water loops.

- b) Use effluent source heat pumps to provide cost-effective heat to:
 - (i) existing developments that have compatible heating infrastructure; and/or
 - (ii) new developments using district heating systems.

4. RECLAIMED WATER USE (markets and degree of implementation to be quantified based on the outcome of commitment 1b above)

The Capital Regional District and the participating municipalities will provide tertiary filtration for reclaimed water and will:

- a) Produce reclaimed water to meet demand for the irrigation of golf courses, parks, institutional grounds and other customers.
- b) Produce reclaimed water to meet the demand for toilet flushing or other non-potable uses.
- c) Manage the reclaimed water as described in the *Regulatory Framework for Water Reuse* document attached as Appendix C3. An equivalency case is made in Section 1.5 of this document in response to the requirements of Conditions 10 (1)(c)(iii) and 10(3) of the MSR.

5. PHOSPHOROUS RECOVERY

The Capital Regional District and the participating municipalities will recover phosphorous fertilizer (via struvite crystallization) from anaerobic digester return streams for sale as a fertilizer.

6. GREENHOUSE GAS REDUCTION AND CARBON FOOTPRINT

The Capital Regional District and the participating municipalities will complete the wastewater treatment system in a manner that will result in its operation being carbon neutral, or better, due largely to the extensive utilization of wastewater resources.

The Climate Action Secretariats comments on Stantec's report dated September 2009 will be evaluated and if applicable, be incorporated into the Plan.

SUPPORTING APPENDICES

The following documentation in support of these commitments is provided in Appendix C. This supplements discussion papers and reports provided with previous progress reports to the Ministry of Environment in December 2008 and June 2009:

- C1 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Treatment Program – Wastewater Treatment Plant Option 1A*, December 2009
- C2 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Treatment – Assessment of Wastewater Treatment Options 1A, 1B and 1C – Volume 1-Report*, September 2009
- C3 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Program – Biosolids Management Plan*, November 2009
- C4 Stantec Consulting Ltd., *Regulatory Framework for Water Reuse*, November 2009

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 8

**SITING STUDIES, TERRESTRIAL ENVIRONMENTAL IMPACT STUDIES, AND ENVIRONMENTAL
AND SOCIAL REVIEWS OF TREATMENT PLANT SITES AND ANCILLARY FACILITIES**

GOAL

To satisfy regulatory requirements, maximize environmental and community benefits, and minimize adverse effects of the wastewater treatment project, consistent with fiscal responsibility.

COMMITMENTS

1. FACILITY SITING COMMITMENTS

The Capital Regional District (CRD) and participating municipalities will seek sites for wastewater treatment facilities that:

- a) Provide opportunity for energy and water reclamation and reuse.
- b) Minimize impacts of traffic, noise, visual aesthetics, and odour.
- c) Are compatible with surrounding land and marine uses.
- d) Maximize effective use of existing infrastructure.
- e) Minimize impacts to known significant cultural resources.
- f) Minimize use of energy and resources.
- g) Avoid or mitigate adverse effects to ecosystems and neighbourhoods.
- h) Incur reasonable lifetime costs for the treatment and conveyance facilities, and outfalls.
- i) Reflect and respond to the interests of residents.
- j) Respect the interests of aboriginal peoples of the region.
- k) Provide the best triple bottom line benefit to the region and we will therefore continue to pursue new sites that will improve the overall system.

2. ENVIRONMENTAL STUDIES COMMITMENTS

The CRD will complete the following work:

- a) Prepare an environmental impact study that satisfies requirements of the Ministry of Environment.
- b) Prepare environmental and social reviews of the facilities at Saanich East-North Oak Bay, Clover Point, McLoughlin Point, the Upper Victoria Harbour, and the Westshore.
- c) Outline environmental management plans for the facilities.
- d) Engage the public and First Nations in environmental studies and facility siting and design
- e) Monitor environmental and community effects of the facilities.
- f) Work with federal officials to ensure that Canadian Environmental Assessment Act requirements are met.

BACKGROUND

This section summarizes the facility siting and environmental assessments that were conducted to meet the Minister of Environment's requirements as set out in his letter dated 14 December 2007. The purposes of the environmental studies are to minimize adverse environmental effects of the construction and operation of wastewater treatment facilities and to meet federal and provincial regulations. First

Nations communities and the public were consulted during the environmental studies. Details of the First Nations and public consultations are described in Section 10 of this document.

Facility Siting

The treatment facilities needed in the core area are described in Section 6 of this document and in the operational certificates provided in Sections 12, 13 and 14. The CRD is seeking sites for wastewater treatment facilities that minimize environmental and community effects. The entire core area was investigated to develop a database for evaluating treatment facility feasibility and siting. The work in the seven core area municipalities involved collecting and analyzing geotechnical, ecological, archaeological, heritage, and land use information. These topics were studied as they relate to the technical aspects of facility operation, cost, energy consumption, resource recovery, effluent discharge, and effect on adjacent neighbourhoods.

The following criteria were applied in the search for suitable sites:

- Archaeological and heritage features are avoided.
- Existing and planned land uses are compatible.
- Surficial material, seismic and liquefaction risk, and site drainage and stability are suitable for facility construction and operation.
- Gravity rather than pumps can be used to transport effluent, thereby conserving energy.
- Adverse effects on sensitive or important habitat are avoided.
- Reclaimed water and recovered energy can be used nearby.
- Land availability.
- Parcel size is adequate for a facility to serve treatment needs to 2065.
- Housing, institutional structures, and school playgrounds are avoided.

The Technical and Community Advisory Committee (TCAC), the Core Area Liquid Waste Management Committee (CALWMC), First Nations, and the general public were involved in developing the criteria. The public was engaged through telephone surveys, the CRD website, and newspaper advertisements.

Databases of land use, environment, and community characteristics in Saanich East-North Oak Bay, the inner harbour and the Westshore were developed specifically for the wastewater treatment program. Field work was conducted on the ecology, archaeology, geology, and land use in the study area. Based on these studies, a short list of candidate sites was developed for Saanich East-North Oak Bay and the Westshore. The findings were discussed with property owners of suitable sites, and with First Nations. The revised list and map of candidate sites in Saanich East-North Oak Bay were presented to the public through a series of open houses, information brochures, and workshops and through the project website www.wastewatertomadeclar.ca. The short list of candidate sites in the Westshore is currently under review and pending approval of the Westshore communities.

During the review of the Westshore and Saanich East-North Oak Bay siting results, members of the CALWMC requested that an equivalent study be conducted for other locations where treatment facilities are likely to be required, specifically the south-eastern portion of the Town of Esquimalt and the James Bay and upper harbour areas of the City of Victoria. The land suitability analysis was intended to aid in selecting candidate areas for further study.

The Peer Review Team recommended that a single, large treatment facility at a consolidated site in the core area be studied as a possible lowest cost option for meeting provincial wastewater treatment requirements. An assessment of land availability was conducted to identify suitable 8-ha parcels in the core area. Using land use, land ownership, geotechnical and slope criteria, the analysis identified sites in the core area that were large enough to construct a treatment facility. These areas would require further study to select the most suitable sites.

Environmental and Social Reviews

The CRD developed an environmental and social review (ESR) process to identify project construction and operational impacts and to develop mitigation measures. To date, an ESR has been completed for the three candidate sites in the Saanich East-North Oak Bay area. The ESR evaluated potential social and environmental effects of constructing and operating a treatment facility on each of the sites. The significance of the impacts was determined, and mitigation measures were recommended to avoid or reduce potential adverse effects. Results of the ESR were shared with First Nations and the public. Comments received at open houses, meetings, community workshops, and through the CRD website were incorporated in revisions to the ESR report.

After the ESR was completed for the Saanich East-North Oak Bay candidate sites, a triple bottom line (TBL) analysis was performed to weigh social, environmental, and economic considerations. The TBL results were also subject to public and First Nations review, and were discussed with the CALWMC and the TCAC. Revisions to the TBL report reflected comments received on the draft. The results of the TBL and ESR reports, combined with other information, were used to assist the CALWMC in choosing a location for a facility in Saanich East-North Oak Bay.

In 2010, the CRD will complete environmental and social reviews for Clover Point, McLoughlin Point, the Victoria upper harbour industrial site, and the Westshore. The ESRs will use the same methods as were applied to the Saanich East-North Oak Bay study.

Resource Recovery

An innovative study was completed to identify the potential demand for energy recovered from wastewater in the core area. This research was based on forecasting development in the years 2030 and 2065 using municipal Official Community Plans, the CRD Regional Growth Strategy, and additional information collected from municipal and regional planners, developers, and institutional managers. Floor area ratios of residential, commercial, institutional, and other buildings were estimated, based on community plans, zoning bylaws, municipal staff discussions, and information from the British Columbia Assessment Authority. Using energy demand forecasts provided by BC Hydro, and the locations of hot water boiler heating systems, the future demand for energy was estimated and mapped in the core area. Using the resulting future energy demand and supply maps, the study team identified 38 energy recovery opportunity areas that have the greatest potential to use energy from wastewater for a portion of their space and water heat.

Major water users in the core area – golf courses, playfields, and large institutions – were mapped to identify potential areas where treated effluent could be used to supply non-potable water needs. Information from the energy demand and water reuse potential studies assisted in identifying suitable sites for wastewater treatment facilities.

Studies are underway for heat recovery and water reuse for the James Bay area and the University of Victoria. These studies evaluated the potential for district heating and use of reclaimed water.

The developer of Westhills, a residential and commercial project proposed in the District of Langford, approached the CRD about constructing a wastewater treatment facility on its land. The developer proposed to use heat recovered from wastewater (from the Westhills development and elsewhere in Langford) to provide a portion of heat for the Westhills development. Environmental studies were conducted of the potential to discharge treated effluent to the ground, to streams, or other waterbodies. Land requirements, regulatory standards, and potential effects on ecosystems and fish habitat were examined.

Environmental Impact Study

The CRD is required to complete an environmental impact study (EIS) as part of the Liquid Waste Management Plan amendment, as stated in the Minister of Environment's letter dated 14 December

2007. An EIS assesses the extent to which the proposed treatment facility or use of reclaimed water will affect human health and the environment. The EIS will reflect project effects on the terrestrial environment and the marine environment. A discussion of the marine environment portion of the EIS is presented in Section 9 of this document.

A draft EIS has been completed for the Saanich East-North Oak Bay facility and was submitted to the Ministry of Environment for review in December 2009. Land use and environmental information has been collected and mapped. Fieldwork and detailed environmental investigations, including archaeological impact assessments, are being conducted to identify potential effects of construction and operation of the treatment and ancillary facilities on the terrestrial environment. Mitigation measures will be proposed to avoid or reduce any adverse effects. The public and First Nations will be engaged to share findings and review information. An EIS for the other sites will be initiated in 2010, once site selection is complete.

In 2010 and 2011, the CRD will complete detailed facility designs to minimize adverse effects. The public will be involved in a review of these designs, and in discussions of specific mitigation measures, such as landscaping, safety features, and visual appearance of the buildings. Public comments will be considered in facility design amendments.

SUPPORTING APPENDICES

The following documentation, attached in Appendix D, provides further information on site selection and evaluation work for wastewater treatment facilities at Saanich East-North Oak Bay:

- D1 CRD staff report to the Core Area Liquid Waste Management Committee, *Site Selection for Wastewater Treatment Facilities in Saanich East-North Oak Bay*, 07 October 2009
- D2 Westland Resource Group, *Comparative Environmental and Social Review – Saanich East-North Oak Bay Wastewater Treatment Facility Sites*, July 2009
- D3 Westland Resource Group, *Triple Bottom Line Analysis of Candidate Saanich East-North Oak Bay Wastewater Treatment Facility Sites*, July 2009

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 9

**WASTEWATER AND MARINE ENVIRONMENT PROGRAM – CAPITAL REGIONAL DISTRICT
CORE AREA OUTFALLS**

(REPLACES CHAPTER 9 IN THE EXISTING PLAN)

GOALS

The goals of the Capital Regional District (CRD) Wastewater and Marine Environment program (WMEP) for the CRD core area outfalls are to:

1. Monitor and assess wastewater quality and quantity;
2. Monitor and assess the potential effects of the wastewater discharges to the marine environment;
3. Monitor and assess the potential effects of the wastewater discharges to human health;
4. Provide information to the CRD Regional Source Control program (RSCP);
5. Provide information to wastewater managers regarding treatment plant and outfall diffuser performance;
6. Provide compliance monitoring results to regulatory agencies; and
7. Provide scientific assessment to the general public regarding the use of the marine environment for the disposal of municipal wastewater.

These goals will be met by the implementation of an appropriate monitoring program.

COMMITMENTS

The CRD and the participating municipalities commit:

1. To undertake pre-discharge marine environmental impact studies to assess the potential for adverse effects of any proposed outfalls or for existing core area outfalls that are anticipated to undergo significant increases in flow.
2. To work with Ministry of Environment staff to develop cost-effective and comprehensive long-term wastewater and marine environment monitoring programs tailored to each individual CRD core area discharge and to document effluent quality and the state of the marine receiving environment.
3. To carry out one-time investigations to provide background data to the monitoring programs and address information gaps.
4. To regularly report on the wastewater and marine environment program to the Ministry of Environment (MOE) and the CRD Board, following plan amendment approval.
5. To review the wastewater and marine environment program at five year intervals, following plan amendment approval.

BACKGROUND

The CRD currently holds draft operational certificates under the Core Area Liquid Waste Management Plan (the Plan) for the two existing outfalls (Clover Point and Macaulay Point) and these documents stipulate the effluent and receiving environment monitoring that the CRD must carry out. Comprehensive routine monitoring has been undertaken since 1990 at these outfalls and special one-time investigations have also been undertaken to define more clearly the effects of the outfalls on the receiving environment and address gaps in program knowledge.

The current wastewater and marine environment program is regularly reviewed by staff, consultants, the Marine Monitoring Advisory Group (MMAG) and others, as required, in support of our commitments and collaboration with regulatory staff. These reviews utilize local knowledge and expertise to maintain the scientific credibility and effectiveness of the marine monitoring and assessment program. In 2003, Minister Murray noted that she was not satisfied that the existing monitoring program would be effective in detecting all potential impacts. As a result, the LWMP approval required the continued involvement of MMAG in the program review process. More recently the CRD has collaborated with MOE staff to replace the former review process with a more rigorous regime of environmental investigation for both existing and future discharges. Extensive pre-discharge environmental impact studies are underway in the vicinity of the new outfalls, following this approach. The CRD is committed to maintaining and enhancing the marine monitoring and assessment program with the use of external, objective advice.

ENVIRONMENTAL IMPACT STUDIES AND PRE-DISCHARGE MONITORING

In 2008, Associated Engineering, on behalf of the CRD, retained Golder Associates Ltd. to undertake a Stage 1 environmental impact study (EIS), as required under the BC Municipal Sewage Regulation, for two of the anticipated marine outfall locations (Finnerty Cove servicing Saanich East-North Oak Bay and Albert Head servicing the Westshore). This project was completed in March 2009 (Golder, 2009a) and it involved the compilation of existing information about ecological resources and recreational use in the two areas, along with preliminary computer modelling to predict the environmental concentrations and fate of the outfall plumes. The modelling info was also applied to the ecological resource and recreational use knowledge to identify whether there was any potential for their impairment by the discharges. Finally, gaps in this knowledge base were identified.

Based on the stage 1 EIS results, the identified gaps and additional stage 2 EIS requirements, Golder Associates Ltd. developed a pre-discharge monitoring program. Both the results of the stage 1 EIS and pre-discharge monitoring program design were reviewed by Minister of Environment staff and the MMAG. Comments and suggestions from both were incorporated into the stage 1 EIS report and the pre-discharge monitoring program design.

The pre-discharge monitoring program includes undertaking water column, current meter, sediment chemistry, and biological community assessments to better characterize background environmental conditions prior to discharge and further assess potential for ecological or recreational impairment. Golder Associates has already undertaken the spring 2009 water column assessment for both outfall locations (Golder, 2009b) and a late summer 2009 water column assessment for the Finnerty Cove location (report forthcoming). WorleyParsons has recently been retained to complete the pre-discharge monitoring which is detailed in WorleyParsons (2009) proposal and the work plan provided in Appendix E. The schedule provided in Section 6 of the work plan indicates that the final pre-discharge monitoring report will be completed in mid 2011.

The pre-discharge work will be supplemented by more detailed oceanographic modelling of the predicted plumes, as well as site specific habitat inventories associated with outfall routing. First Nations will also be consulted with respect to their marine fisheries resource concerns. All of the pre-discharge monitoring, modelling and fisheries and habitat assessments will be brought together into a comprehensive report that satisfies the requirements of a stage 2 EIS. The terrestrial components of the EIS are the responsibility of Westland Resource Group Inc.; marine and terrestrial EIS results will eventually be brought together to allow for a cumulative risk assessment of the treatment plants and outfalls together.

An update report will be provided in 2010 after the first year of monitoring is complete, while the compilation and summary of all monitoring data into a report sufficient to satisfy the requirements of the Stage 2 EIS is expected to take place early in 2011.

WASTEWATER AND MARINE ENVIRONMENT PROGRAM DESIGN

Ministry of Environment and CRD staff are collaborating to develop wastewater and marine environmental programs for the current discharge points (Clover and Macaulay points), and also for a generic wastewater and marine environment monitoring program that can be adapted for any current or future CRD core area outfall. The proposed generic program consists of the monitoring and analysis of the following components:

- Effluent quality for comparison to applicable water quality guidelines, to determine loadings of contaminants to the environment, to determine toxicity to marine organisms and to assess treatment plant performance;
- Surface waters and the water column for comparison to applicable water quality guidelines, to assess potential for human health risk, and to assess outfall diffuser performance;
- Deep sea mussels, benthic invertebrates, bottom fish or other suitable organisms to determine the influence of wastewater discharges on the epibenthic zone and predict potential for contaminant transfer up the food chain (including humans); and
- Sediment chemistry for comparison to applicable sediment quality guidelines, to assess the fate of contaminants in the environment, to determine toxicity to marine organisms, and to assess potential for bioaccumulation.

Oceanographic computer modeling will also be used to predict the fate and dilution of the outfall plumes and associated discharged particulate matter, as well as to determine the best times to collect field samples.

The selection of specific monitoring components and sampling stations, and the determination of sampling frequency will be done individually for each future or existing CRD core area outfall based on its location, flow regime and seafloor composition. These outfall specific monitoring programs will be developed in conjunction with Ministry of Environment staff.

In general, it is anticipated that the monitoring programs for each outfall will be based on a 5-year cycle with each component being monitored at least once during each cycle. Data and brief summary reports for each component are expected to be prepared annually with a more comprehensive report, including detailed statistical assessments of spatial and temporal trends, being prepared at the end of each 5-year cycle.

The CRD will continue to solicit external reviews and recommendations of all marine monitoring and assessment work.

The implementation of any monitoring program by the CRD is subject to budget approval.

SUPPORTING APPENDICIES AND DOCUMENTS

The following documents provide further information in support of the above commitments and goals and provide additional background information on work completed to date and work planned for 2010.

Items 1 and 2 were provided to the Ministry of Environment in April and November 2009, respectively. Item 3 is attached as Appendix E.

1. Golder (2009a) *Capital Regional District Wastewater Treatment Plant Discharge Stage 1 Environmental Impact Study*. Submitted to Associated Engineering by Golder Associates Ltd. Burnaby, BC. Report # 08-1421-0019. March 27, 2009
2. Golder (2009b) *Spring 2009 Water Quality Monitoring Survey for Baseline Monitoring at Proposed Outfall Study Areas Located in Finnerty Cove and Albert Head: Data Report*. Submitted to the Capital Regional District by Golder Associates Ltd. Burnaby, BC. Project # 09-1421-0028. August 13, 2009

3. WorleyParsons (2009) *CRD Core Area Wastewater Treatment Pre-Discharge Monitoring Program (Technical Proposal Work Plan)*. Submitted to the Capital Regional District by WorleyParsons. Victoria, BC. September 1, 2009 (CRD Contract # 09-1641)

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 10

PUBLIC AND FIRST NATIONS CONSULTATION AND ENGAGEMENT

GOAL

To carry out the project, including completion of planning, design, construction and subsequent operations, in a manner that incorporates meaningful public and First Nations participation and ensures that public and First Nations concerns are fully integrated into the planning and subsequent implementation phases of the project.

COMMITMENTS

1. PROJECT PLANNING COMMITMENTS

- a) Public Consultation
 - (i) On a regular basis, produce a newsletter with project information and widely distribute it to individual households.
 - (ii) Continue to ensure that information posted on the project website, www.wastewatermadeclear.ca, is current, accurate, informative and balanced.
 - (iii) Continue to provide opportunities for questioning and one-on-one conversations with Capital Regional District (CRD) staff and consultants at open houses and at public and stakeholder meetings.
- b) First Nations Engagement
 - (i) Continue to provide information to First Nations on project design, gather interests and feedback, and use the information where possible to guide project planning.
 - (ii) Resolve issues where possible and refer those not resolvable within the CRD legislative mandate to the provincial or federal government for resolution.

2. PROJECT IMPLEMENTATION COMMITMENTS

- a) Public Consultation
 - (i) Engage neighbourhoods where treatment plants, pump stations, storage tanks or major pipelines are to be constructed in interactive workshops regarding the location, design, construction and operation of the proposed facilities, and general public consultation on broader issues.
 - (ii) Based on the findings of these workshops, develop appropriate mitigative measures to ensure that any potential negative impacts on neighbourhoods are minimized to a less than significant level.
- b) First Nations Engagement

Continue to engage First Nations on interests related to use of federal crown land, impacts on the foreshore, protection of natural resources, outfall locations and affects on marine species, affects on archaeological sites and affects of discharges into inland water bodies.

SUPPORTING APPENDICES

The following documentation in support of these commitments is provided in Appendix F. This supplements material submitted with previous progress reports to the Ministry of Environment in December 2008 and June 2009:

- F1 J. Loveys, Capital Regional District, *Public Consultation Summary Report – Saanich East-North Oak Bay Wastewater Treatment Facility Siting*, July 2009.”
- F2 *Update on First Nations Consultation/Engagement*, November 2009
- F3 J. Loveys, Capital Regional District, *Public Consultation Summary Report – Core Area Wastewater Treatment Project*, May 2009
- F4 Brochures on:
 - a) Wastewater Update, October 2009
 - b) Saanich East-North Oak Bay – Wastewater Treatment Site Selection
 - c) Frequently Asked Questions, March 2009
 - d) How Wastewater Treatment Works
- F5 Media Releases on:
 - a) Capital Regional District Core Area Liquid Waste Management Committee Narrows Focus and Moves Forward on Wastewater Treatment Option 1A, 23 September 2009
 - b) CRD Invites Public to Open Houses and Neighbourhood Workshops to Address Saanich East-North Oak Bay Siting for Wastewater Treatment Facilities, 5 June 2009
- F6 Minutes of Meetings of Core Area Liquid Waste Management Committee with Delegations regarding Saanich East-North Oak Bay Sites on August 12 and August 19, 2009
- F7 Notice on www.wastewatermadeclear.ca regarding Open Houses and Workshops related to the Project.
- F8 Information report, “Public Education for Esquimalt and Victoria”, 10 November 2009

**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 7

SECTION 11

COSTS, COST SHARING, FUNDING AND COSTS PER USER

(REPLACES CHAPTER 17 IN THE EXISTING PLAN)

GOAL

To fund and share the costs of the core area wastewater treatment program in a manner that is equitable and affordable and honours previous funding commitments.

COMMITMENTS

The Capital Regional District (CRD) and the participating municipalities commit to:

1. By the end of 2010, complete a cost sharing agreement with the participating municipalities for sharing the capital operating costs of the project.
2. By mid 2010, complete a funding agreement with the federal and provincial governments regarding the provision of two-thirds funding for the project.
3. By the end of 2010, amend CRD Bylaw No. 2310 – Liquid Waste Management of Core Area and Western Communities Service Establishment Bylaw No. 1, 1995 to provide the required legal authority for implementing the project.
4. Arrange, through the Municipal Finance Authority, financing for the one-third municipal share of the project.

PROJECT ESTIMATED COSTS

The estimated capital cost of the project is \$967,500,000, including the Westshore and Clover Point (actual estimated cost at time of construction).

The estimated annual operational and maintenance cost for the project is \$19,800,000 (2009 dollars).

The above costs are taken from Section 8 of the Stantec report dated 16 September 2009 which is included in Appendix C.

COST SHARING

Over the past year substantial work has been done, with the help of a consultant, towards developing a project cost sharing agreement with the participating municipalities.

Cost sharing alternatives that are under consideration includes the question of whether the system should be treated as a single combined system for cost sharing purposes or as a network of differentiated components with separate cost sharing for each component. Candidate cost sharing options include sharing capital and operating costs based on:

- average dry weather flow
- average annual flow
- design capacity
- various combinations of the above options

FUNDING

Senior government assistance with the capital costs of the project is considered an essential element of Amendment No. 7. A commitment of one-third contribution from the province of British Columbia, along with one-third contribution from the Government of Canada is assumed in making the commitments contained in Amendment No. 7. The CRD will borrow the remaining one-third funding from the Municipal Finance Authority.

COSTS PER USER

The cost per user in each of the participating municipalities is dependent on the duration of borrowing and the level of interest rates at the time, the agreed cost sharing formula between municipalities, the method of cost recovery within municipalities and the procurement of agreed senior government two-thirds funding.

Based on the above, the current estimate of annual cost per average home, assuming two-thirds senior government funding, varies among municipalities from \$250 to \$450.

SUPPORTING APPENDICES

The following documents, attached in Appendix C, provide further information on the derivation of the estimated capital and operating costs provided above.

- C1 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Treatment Program – Wastewater Treatment Plant Option 1A*, December 2009
- C2 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Treatment – Assessment of Wastewater Treatment Options 1A, 1B and 1C – Volume 1-Report*, September 2009
- C3 Stantec Consulting Ltd. and Brown and Caldwell, *Core Area Wastewater Program – Biosolids Management Plan*, November 2009



DRAFT OPERATIONAL CERTIFICATE

ME- _____

Under the Provisions of the Environmental Management Act

Capital Regional District

625 Fisgard Street

P.O. Box 1000

Victoria, British Columbia

V8W 2S6

is authorised to discharge effluent to Haro Strait and reclaimed water to a University of Victoria distribution system from a municipal wastewater collection and treatment system located in Saanich, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the Environmental Management Act and may result in prosecution.

1. AUTHORISED DISCHARGES

1.1 Saanich East Treatment Plant

This subsection applies to the discharge of effluent from a **MUNICIPAL WASTEWATER TREATMENT PLANT**. The site reference number for this discharge is _____.

1.1.1 The maximum authorised rate of discharge is 68 ML/d.

1.1.2 The average dry weather discharge is as follows:

| Year | Average Dry Weather Discharge ML/d |
|------|------------------------------------|
| 2030 | 16.6 |
| 2065 | 17.2 |

1.1.3 The characteristics of the discharge shall not exceed:
5-day Biochemical Oxygen Demand - 45 mg/L
Total Suspended Solids - 45 mg/L

For that portion of average daily flow in excess of two times average dry weather flow, the characteristics of the discharge shall not exceed:

5-day carbonaceous Biochemical Oxygen Demand - 130 mg/L
Total Suspended Solids - 130 mg/L

For all flows:
pH - 6-9 pH units

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- 1.1.4 The authorised works include screening, grit removal, primary clarification, aeration, solids separation using membranes, odour control, disinfection and standby power. Biosolids will initially be dewatered and taken off-site for disposal and, when a downstream regional treatment plant is available, it will be transmitted to it via the East Coast interceptor when sufficient capacity is available to avoid overflows.

The outfall to Haro Strait from the treatment plant will extend at least 1500 m from mean low water and to a depth of at least 30 m below mean low water approximately located as shown on the attached Site Plan A.

Reclaimed water for irrigation or toilet flushing will be disinfected using UV radiation and will be used as described in section 2.12.

- 1.1.5 The authorised works must be complete and in operation when the discharge authorised by this permit commences.
- 1.1.6 The location of the facilities from which the discharge originates is on Lot 1, Section 44, Victoria District, Plan 14502 as shown on the attached Site Plan A.
- 1.1.7 The location of the point of discharge is Haro Strait, southwest of Gordon Head.

2. GENERAL REQUIREMENTS

2.1 Maintenance of Works and Emergency Procedures

The Capital Regional District shall inspect the authorised works regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the Capital Regional District which prevents effective operation of the approved method of pollution control, the Capital Regional District shall notify the Regional Environmental Protection Manager immediately and take appropriate remedial action.

2.2 Bypasses

The Capital Regional District shall ensure that no waste is discharged without being processed through the authorised works, or through downstream authorized works, unless prior written approval is received from the Regional Environmental Protection Manager.

2.3 Plans - New Works

Plans and specifications of the works authorised in Subsection 1.1.4 shall be submitted to the Regional Environmental Protection Manager for review. The works shall be constructed in accordance with such plans.

2.4 Posting of Outfall

The Capital Regional District shall erect a sign along the alignment of the outfall above high water mark. The sign shall identify the nature of the works. The wording and size of the sign requires approval of the Regional Environmental Protection Manager.

2.5 Outfall Inspection

The Capital Regional District shall conduct a dye test on the outfall line (or inspect by another method approved by the Regional Environmental Protection Manager) every five years. An outfall inspection report shall be submitted to the Regional Environmental Protection Manager within 60 days of each inspection.

2.6 Sludge Management

Sludge generated by the treatment plant shall be managed in a manner approved by the Regional Environmental Protection Manager and in accordance with the sludge management strategies developed in the Liquid Waste Management Plan. At no time will sludge be discharged to the environment through overflows from the system.

2.7 Standby Power

The Capital Regional District shall provide auxiliary power facilities to insure that during power outages, the discharge from the authorised works continue to meet the effluent criteria specified in this operational certificate.

2.8 Odour Control

Should objectionable odours, attributable to the operation of the sewage treatment plant, occur beyond the property boundary, as determined by the Regional Environmental Protection Manager, measures or additional works will be required to reduce odour to acceptable levels.

2.9 Disinfection

Although disinfection of the effluent to be discharged through the outfall is not required at this time, suitable provisions shall be made to include UV disinfection facilities for reclaimed water to be used for irrigation or toilet flushing. Space will be allocated for potential future disinfection facilities for all flows.

2.10 Facility Classification and Operator Certification

The Capital Regional District shall have the works authorised by this operational certificate classified (and the classification shall be maintained) by the Environmental Operators Certification Program Society (Society). The works shall be operated and maintained by persons certified within and according to the program provided by the Society. Certification must be completed to the satisfaction of the Regional

Environmental Protection Manager. In addition, the Regional Environmental Protection Manager shall be notified of the classification level of the facility and certification level of the operators, and changes of operators and/or operator certification levels within 30 days of any change.

Alternatively, the works authorised by this operational certificate shall be operated and maintained by persons who the Capital Regional District can demonstrate to the satisfaction of the Regional Environmental Protection Manager, are qualified in the safe and proper operation of the facility for the protection of the environment.

2.11 Effluent Upgrading

Based on receiving environment monitoring data and/or other information obtained in connection with this discharge, the Capital Regional District may be required to provide additional treatment facilities.

2.12 Reclaimed Water Use

Reclaimed water facilities for toilet flushing and irrigation shall be designed and operated in accordance with the Municipal Sewage Regulation Appendix 3 to Schedule 7 "Health And Safety Criteria For Use Of Reclaimed Water" and the "Code of Practice for the Use of Reclaimed Water". The CRD will request an exemption from the provision of two days emergency storage as this will make the use of reclaimed water at this location unfeasible.

The Capital Regional District shall ensure that the University of Victoria or other users develop reclaimed water information and communications material related to the use of reclaimed water, and submit the information and communication to the Capital Regional District, the Regional Environmental Protection Manager and the Chief Medical Health Officer, Vancouver Island Health Authority at least 30 days prior to providing the reclaimed water to users

Copies of the information and communications material shall be provided to all users at least once every year.

3. MONITORING AND REPORTING REQUIREMENTS

3.1 Discharge Monitoring

3.1.1 Sampling And Analyses

The Capital Regional District shall install a suitable sampling facility and obtain a sample of the discharge authorised in Subsection 1.1 in accordance with the following schedule:

| <u>Parameter</u> | <u>Frequency</u> | <u>Type</u> |
|-------------------------------------------------|------------------|-----------------|
| 5-day carbonaceous Biochemical Oxygen Demand | twice per week | 24-hr composite |
| Total Suspended Solids | twice per week | 24-hr composite |
| Ammonia Nitrogen | once per month | 24-hr composite |
| pH | twice per week | grab |
| Faecal Coliform | twice per month | grab |
| Other selected parameters | as directed | as directed |

The composite sample is to consist of samples taken over a 24-hour period in proportion to flow and mixed to form a single sample. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.

3.1.2 Flow Measurement

Provide and maintain suitable flow measuring devices and record once per day the effluent volume discharged over a 24-hour period.

3.1.3 Receiving Environment Monitoring

A receiving environment monitoring program shall be carried out by the Capital Regional District. The program shall be developed in consultation with the Marine Monitoring Advisory Group, First Nations and the Regional Environmental Protection Manager. The main objectives of the monitoring program are to:

- i) assess the need for disinfection of wastewater discharge through the sewage treatment outfall,
- ii) identify components of the marine environment that may be potentially affected by the discharge, and
- iii) establish need and scope for a long-term monitoring program for the discharge.

A pre-discharge monitoring program to determine pre-discharge conditions in the area of the proposed discharge should commence at least two years prior to discharge.

The proposed monitoring program shall be submitted to the Regional Environmental Protection Manager for review. Based on the results of this monitoring program, the Capital Regional District monitoring requirements may be extended or altered by the Regional Environmental Protection Manager.

3.2 Monitoring Procedures

3.2.1 Sampling and Analytical Procedures

Sampling and flow measurements shall be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples", or by suitable alternative procedures as authorised by the Regional Environmental Protection Manager.

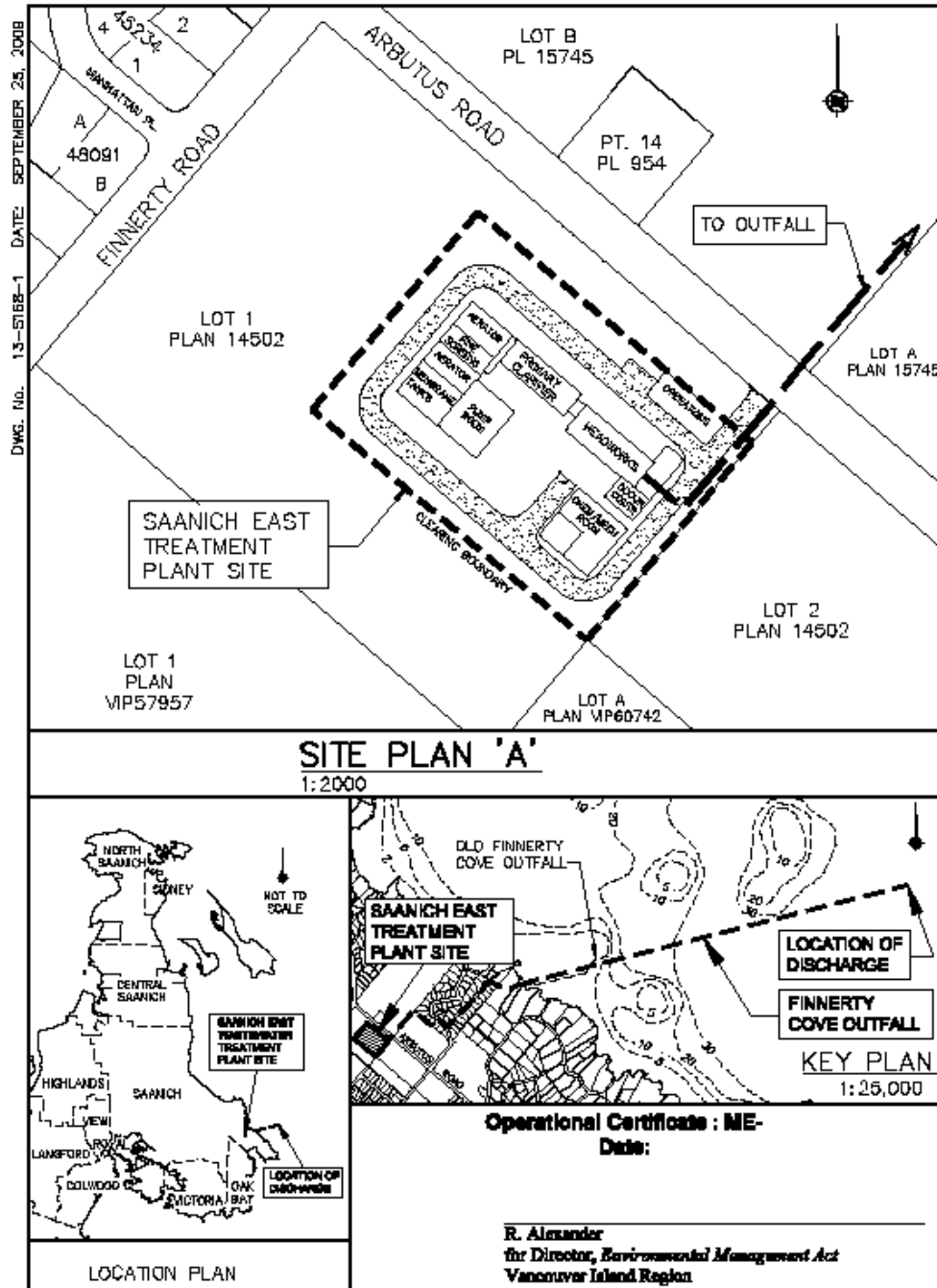
Analyses are to be carried out in accordance with procedures described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials and Discrete Ambient Air", or by suitable alternative procedures as authorised by the Regional Environmental Protection Manager.

Copies of the above manuals may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409), and are also available for inspection at all Environmental Protection offices.

3.3 Reporting

The Capital Regional District shall maintain data analysis of flow measurement for inspection, and every three months, submit the data, suitable tabulated, to the Regional Environmental Protection Manager for the previous quarter. All reports shall be submitted within 30 days of the end of the quarter.

As annual report, suitable for public review, shall be submitted to the Regional Environmental Protection Manager. The report shall include a summary and interpretation by a qualified professional of the discharge and receiving environment monitoring results for the previous year and shall provide an assessment of the impact of this discharge on the receiving environment and recommended changes (if any) to the monitoring program. The first report shall be submitted on or before December 31, 2015.



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R. Alexander
For Director, *Environmental Management Act*
Vancouver Island Region
Operational Certificate Number: ME- _____



DRAFT OPERATIONAL CERTIFICATE

ME- _____

Under the Provisions of the Environmental Management Act

Capital Regional District

625 Fisgard Street

P.O. Box 1000

Victoria, British Columbia

V8W 2S6

is authorised to discharge effluent to Juan de Fuca Strait from a municipal wastewater collection and treatment system located in Saanich, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the Environmental Management Act and may result in prosecution.

1. AUTHORISED DISCHARGES

1.1 McLoughlin Point Treatment Plant

This subsection applies to the discharge of effluent from a **MUNICIPAL WASTEWATER TREATMENT PLANT**. The site reference number for this discharge is _____.

1.1.1 The maximum authorised rate of discharge is 330 ML/d.

1.1.2 The average dry weather discharge is as follows:

| Year | Average Dry Weather Discharge ML/d |
|------|------------------------------------|
| 2030 | 84.2 |
| 2065 | 87.5 |

1.1.3 The characteristics of the discharge shall not exceed:
5-day carbonaceous Biochemical Oxygen Demand - 45 mg/L
Total Suspended Solids - 45 mg/L

For that portion of average daily flow in excess of two times average dry weather flow, the characteristics of the discharge shall not exceed:

5-day carbonaceous Biochemical Oxygen Demand - 130 mg/L
Total Suspended Solids - 130 mg/L

For all flows:
pH - 6 - 9 pH units

- 1.1.4 The authorised works include influent pumping, screening, grit removal, primary clarification, aeration, solids separation, sludge thickening, heat recovery, odour control, standby power, sludge pumping to an offsite processing facility and effluent pumping to a new outfall.

The outfall to Juan de Fuca Strait from the treatment plant will have a multi-port diffuser and will extend at least 1500 m from mean low water and to a depth of at least 60 m below mean low water approximately located as shown on the attached Site Plan A.

Reclaimed water for irrigation or toilet flushing will receive membrane filtration and be disinfected using UV light and will be used as described in section 2.12.

Provision will be made for future disinfection of all the treated effluent, if required.

- 1.1.5 The authorised works must be complete and in operation when the discharge authorise by this permit commences.
- 1.1.6 The location of the facilities from which the discharge originates is at 337 Victoria View Road (Lots A-E...Plan 35322).
- 1.1.7 The location of the point of discharge is Juan de Fuca Strait, near Macaulay Point.

2. **GENERAL REQUIREMENTS**

2.1 **Maintenance of Works and Emergency Procedures**

The Capital Regional District shall inspect the authorised works regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the Capital Regional District which prevents effective operation of the approved method of pollution control, the Capital Regional District shall notify the Regional Environmental Protection Manager immediately and take appropriate remedial action.

2.2 **Bypasses**

The Capital Regional District shall ensure that no waste is discharged without being processed through the authorised works, or through downstream authorized works, unless prior written approval is received from the Regional Environmental Protection Manager or unless the discharge is the result of a greater than 5-year return storm.

2.3 Plans - New Works

Plans and specifications of the works authorised in Subsection 1.1.4 shall be submitted to the Regional Environmental Protection Manager for review. The works shall be constructed in accordance with such plans.

2.4 Posting of Outfall

The Capital Regional District shall erect a sign along the alignment of the outfall above high water mark. The sign shall identify the nature of the works. The wording and size of the sign requires approval of the Regional Environmental Protection Manager.

2.5 Outfall Inspection

The Capital Regional District shall conduct a dye test on the outfall line (or inspect by another method approved by the Regional Environmental Protection Manager) every five years. An outfall inspection report shall be submitted to the Regional Environmental Protection Manager within 60 days of each inspection.

2.6 Sludge Management

Sludge generated by the treatment plant shall be managed in a manner approved by the Regional Environmental Protection Manager and in accordance with the sludge management strategies described in the Liquid Waste Management Plan. At no time will sludge be discharged to the environment through overflows from the system.

2.7 Standby Power

The Capital Regional District shall provide auxiliary power facilities to insure that during power outages, the discharge from the authorised works continue to meet the effluent criteria specified in this operational certificate.

2.8 Odour Control

Should objectionable odours, attributable to the operation of the sewage treatment plant, occur beyond the property boundary, as determined by the Regional Environmental Protection Manager, measures or additional works will be required to reduce odour to acceptable levels.

2.9 Disinfection

Although disinfection of the effluent to be discharged through the outfall is not required at this time, suitable provisions shall be made to include UV disinfection facilities for reclaimed water to be used for irrigation or toilet flushing.

2.10 Facility Classification and Operator Certification

The Capital Regional District shall have the works authorised by this operational certificate classified (and the classification shall be maintained) by the Environmental Operators Certification Program Society (Society). The works shall be operated and maintained by persons certified within and according to the program provided by the Society. Certification must be completed to the satisfaction of the Regional Environmental Protection Manager. In addition, the Regional Environmental Protection Manager shall be notified of the classification level of the facility and certification level of the operators, and changes of operators and/or operator certification levels within 30 days of any change.

Alternatively, the works authorised by this operational certificate shall be operated and maintained by persons who the Capital Regional District can demonstrate to the satisfaction of the Regional Environmental Protection Manager, are qualified in the safe and proper operation of the facility for the protection of the environment.

2.11 Effluent Upgrading

Based on receiving environment monitoring data and/or other information obtained in connection with this discharge, the Capital Regional District may be required to provide additional treatment facilities.

2.12 Reclaimed Water Use

Reclaimed water facilities for toilet flushing and irrigation shall be designed and operated in accordance with the Municipal Sewage Regulation Appendix 3 to Schedule 7 "Health And Safety Criteria For Use Of Reclaimed Water" and the "Code of Practice for the Use of Reclaimed Water".

The Capital Regional District shall ensure that reclaimed water users develop reclaimed water information and communications material related to the use of reclaimed water, and submit the information and communication to the Capital Regional District, the Regional Environmental Protection Manager and the Chief Medical Health Officer, Vancouver Island Health Authority at least 30 days prior to providing the reclaimed water to users

Copies of the information and communications material shall be provided to all users at least once every year.

3. MONITORING AND REPORTING REQUIREMENTS

3.1 Discharge Monitoring

3.1.1 Sampling And Analyses

The Capital Regional District shall install a suitable sampling facility and obtain a

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For Director, *Environmental Management Act*
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sample of the discharge authorised in Subsection 1.1 in accordance with the following schedule:

| <u>Parameter</u> | <u>Frequency</u> | <u>Type</u> |
|----------------------------------------------|------------------|-----------------|
| 5-day carbonaceous Biochemical Oxygen Demand | twice per week | 24-hr composite |
| Total Suspended Solids | twice per week | 24-hr composite |
| Ammonia Nitrogen | once per month | 24-hr composite |
| pH | twice per week | grab |
| Faecal Coliform | twice per month | grab |
| Other selected parameters | as directed | as directed |

The composite sample is to consist of samples taken over a 24-hour period in proportion to flow and mixed to form a single sample. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.

3.1.2 Flow Measurement

Provide and maintain suitable flow measuring devices and record once per day the effluent volume discharged over a 24-hour period.

3.1.3 Receiving Environment Monitoring

A receiving environment monitoring program shall be carried out by the Capital Regional District. The program shall be developed in consultation with the marine Monitoring Advisory Group, First Nations and the Regional Environmental Protection Manager. The main objectives of the monitoring program are to:

- i) assess the need for disinfection of wastewater discharge through the sewage treatment outfall,
- ii) identify components of the marine environment that may be potentially affected by the discharge, and
- iii) establish need and scope for a long-term monitoring program for the discharge.

A pre-discharge monitoring program to determine pre-discharge conditions in the area of the proposed discharge should commence at least two years prior to discharge.

The proposed monitoring program shall be submitted to the Regional Environmental Protection Manager for review. Based on the results of this monitoring program, the Capital Regional District monitoring requirements may be extended or altered by the Regional Environmental Protection Manager.

3.2 Monitoring Procedures

3.2.1 Sampling and Analytical Procedures

Sampling and flow measurements shall be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples", or by suitable alternative procedures as authorised by the Regional Environmental Protection Manager.

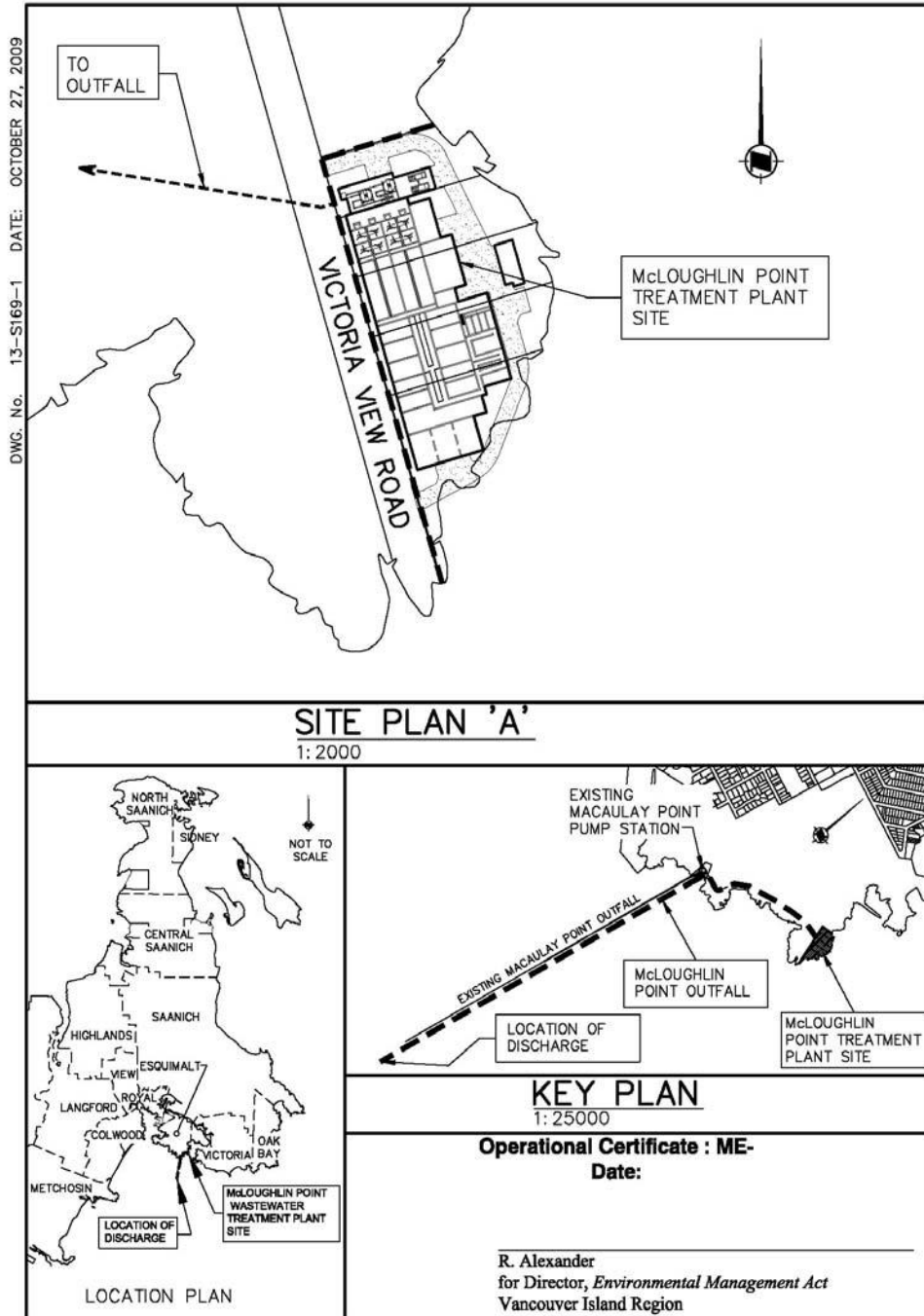
Analyses are to be carried out in accordance with procedures described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials and Discrete Ambient Air", or by suitable alternative procedures as authorised by the Regional Environmental Protection Manager.

Copies of the above manuals may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409), and are also available for inspection at all Environmental Protection offices.

3.3 Reporting

The Capital Regional District shall maintain data analysis of flow measurement for inspection, and every three months, submit the data, suitable tabulated, to the Regional Environmental Protection Manager for the previous quarter. All reports shall be submitted within 30 days of the end of the quarter.

As annual report, suitable for public review, shall be submitted to the Regional Environmental Protection Manager. The report shall include a summary and interpretation by a qualified professional of the discharge and receiving environment monitoring results for the previous year and shall provide an assessment of the impact of this discharge on the receiving environment and recommended changes (if any) to the monitoring program. The first report shall be submitted on or before December 31, 2017.



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R. Alexander
For Director, *Environmental Management Act*
Vancouver Island Region
Operational Certificate Number: ME- _____

DRAFT OPERATIONAL CERTIFICATE

ME- _____

Under the Provisions of the Environmental Management Act

Capital Regional District

625 Fisgard Street

P.O. Box 1000

Victoria, British Columbia

V8W 2S6

is authorised to discharge effluent to Juan de Fuca Strait from a municipal wastewater collection and treatment system located in the Capital Regional District, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the Environmental Management Act and may result in prosecution.

1. AUTHORISED DISCHARGES

1.1 Clover Point Primary Treatment and Outfall

This subsection applies to the discharge of effluent from a **MUNICIPAL WASTEWATER TREATMENT PLANT**. The site reference number for this discharge is _____.

1.1.1 The maximum authorised rate of discharge is 116 ML/d.

1.1.2 The maximum rate of discharge receiving primary treatment is 76ML/d, which based on treating wet weather flows greater than two-times average dry weather flow (>2 x ADWF) and less than four-times average dry weather flow (<4 x ADWF):

1.1.3 The characteristics of the discharge shall not exceed:

| | |
|----------------------------------------------|------------------|
| 5-day carbonaceous Biochemical Oxygen Demand | - 130 mg/L |
| Total Suspended Solids | - 130 mg/L |
| For all flows: | |
| pH | - 6 - 9 pH units |

1.1.4 The authorised works include pumping facilities to transmit up to three-times ADWF to Macaulay/McLoughlin for treatment, and for the remaining wet weather flows provide the following works: screening, grit removal, primary clarification, odour control, standby power, overflow facilities, effluent pumping facilities and an outfall and diffuser extending approximately 1100 m from mean low water to a depth of 67 m below mean low water and related appurtenance approximately located as shown on Site Plan A. Sludge removed by the process will be retained in the system and pumped to Macaulay/McLoughlin Point for treatment.

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1.1.5 The location of the facilities from which the discharge originates is part of Sections 15, 16, 33, 34, 51 and 52, Plan 13, Victoria Land District

1.1.6 The location of the point of discharge is Juan de Fuca Strait, near Clover Point.

2. **GENERAL REQUIREMENTS**

2.1 **Maintenance of Works and Emergency Procedures**

The Capital Regional District shall inspect the authorised works regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the Capital Regional District which prevents effective operation of the approved method of pollution control, the Capital Regional District shall notify the Regional Environmental Protection Manager immediately and take appropriate remedial action.

2.2. **Bypasses**

Except as provided for in this Operational Certificate, the Capital Regional District shall ensure that no waste is discharged without being processed through the authorised works, or through downstream authorized works, unless prior written approval is received from the Regional Environmental Protection Manager or unless the discharge is the result of a greater than 5-year return storm.

2.3 **Plans - New Works**

Plans and specifications of the works authorised in Subsection 1.1.4 shall be submitted to the Regional Environmental Protection Manager for review. The works shall be constructed in accordance with such plans.

2.4 **Posting of Outfall**

The Capital Regional District shall maintain the existing sign along the alignment of the outfall above high water mark. The wording and size of the sign requires approval of the Regional Environmental Protection Manager.

2.5 **Outfall Inspection**

The Capital Regional District shall conduct a dye test on the outfall line (or inspect by another method approved by the Regional Environmental Protection Manager) every five years. An outfall inspection report shall be submitted to the Regional Environmental Protection Manager within 60 days of each inspection.

2.6 **Screenings and Sludge Management**

Screenings will be hauled to Hartland Landfill for disposal. Sludge generated by the treatment plant shall be managed in a manner approved by the Regional Environmental Protection Manager and in accordance with the sludge management strategies described

in the Liquid Waste Management Plan. At no time will sludge be discharged to the environment through overflows from the system.

2.7 Standby Power

The Capital Regional District shall provide auxiliary power facilities to insure that during power outages, the discharge from the authorised works continue to meet the effluent criteria specified in this operational certificate.

2.8 Odour Control

Should objectionable odours, attributable to the operation of the sewage treatment plant, occur beyond the property boundary, as determined by the Regional Environmental Protection Manager, measures or additional works will be required to reduce odour to acceptable levels.

2.9 Disinfection

Disinfection of the effluent to be discharged through the outfall is not required at this time.

2.10 Facility Classification and Operator Certification

The Capital Regional District shall have the works authorised by this operational certificate classified (and the classification shall be maintained) by the Environmental Operators Certification Program Society (Society). The works shall be operated and maintained by persons certified within and according to the program provided by the Society. Certification must be completed to the satisfaction of the Regional Environmental Protection Manager. In addition, the Regional Environmental Protection Manager shall be notified of the classification level of the facility and certification level of the operators, and changes of operators and/or operator certification levels within 30 days of any change.

Alternatively, the works authorised by this operational certificate shall be operated and maintained by persons who the Capital Regional District can demonstrate to the satisfaction of the Regional Environmental Protection Manager, are qualified in the safe and proper operation of the facility for the protection of the environment.

2.11 Effluent Upgrading

Based on receiving environment monitoring data and/or other information obtained in connection with this discharge, the Capital Regional District may be required to provide additional treatment facilities.

3. MONITORING AND REPORTING REQUIREMENTS

3.1 Discharge Monitoring

3.1.1 Sampling And Analyses

The Capital Regional District shall install a suitable sampling facility and obtain a sample of the discharge authorised in Subsection 1.1 in accordance with the following schedule:

| <u>Parameter</u> | <u>Frequency</u> | <u>Type</u> |
|----------------------------------------------|------------------------|-------------|
| 5-day carbonaceous Biochemical Oxygen Demand | every second discharge | composite |
| Total Suspended Solids | every second discharge | composite |
| Ammonia Nitrogen | as directed | composite |
| pH | as directed | grab |
| Faecal Coliform | as directed | grab |
| Other selected parameters | as directed | as directed |

The composite sample is to consist of samples taken over the duration of the discharge or a 24-hour period, whichever is shorter, in proportion to flow and mixed to form a single sample. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.

3.1.2 Flow Measurement

Provide and maintain suitable flow measuring devices and record the effluent volume discharged over a 24-hour period.

3.1.3 Receiving Environment Monitoring

A receiving environment monitoring program shall be carried out by the Capital Regional District. The program shall be developed in consultation with the marine Monitoring Advisory Group, First Nations and the Regional Environmental Protection Manager. The main objectives of the monitoring program are to:

- i) identify components of the marine environment that may be potentially affected by the discharge, and
- ii) establish need and scope for a long-term monitoring program for the discharge.

The proposed monitoring program shall be submitted to the Regional Environmental Protection Manager for review. Based on the results of this monitoring program, the Capital Regional District monitoring requirements may be altered by the Regional Environmental Protection Manager.

3.2 Monitoring Procedures

3.2.1 Sampling and Analytical Procedures

Sampling and flow measurements shall be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples", or by suitable alternative procedures as authorised by the Regional Environmental Protection Manager.

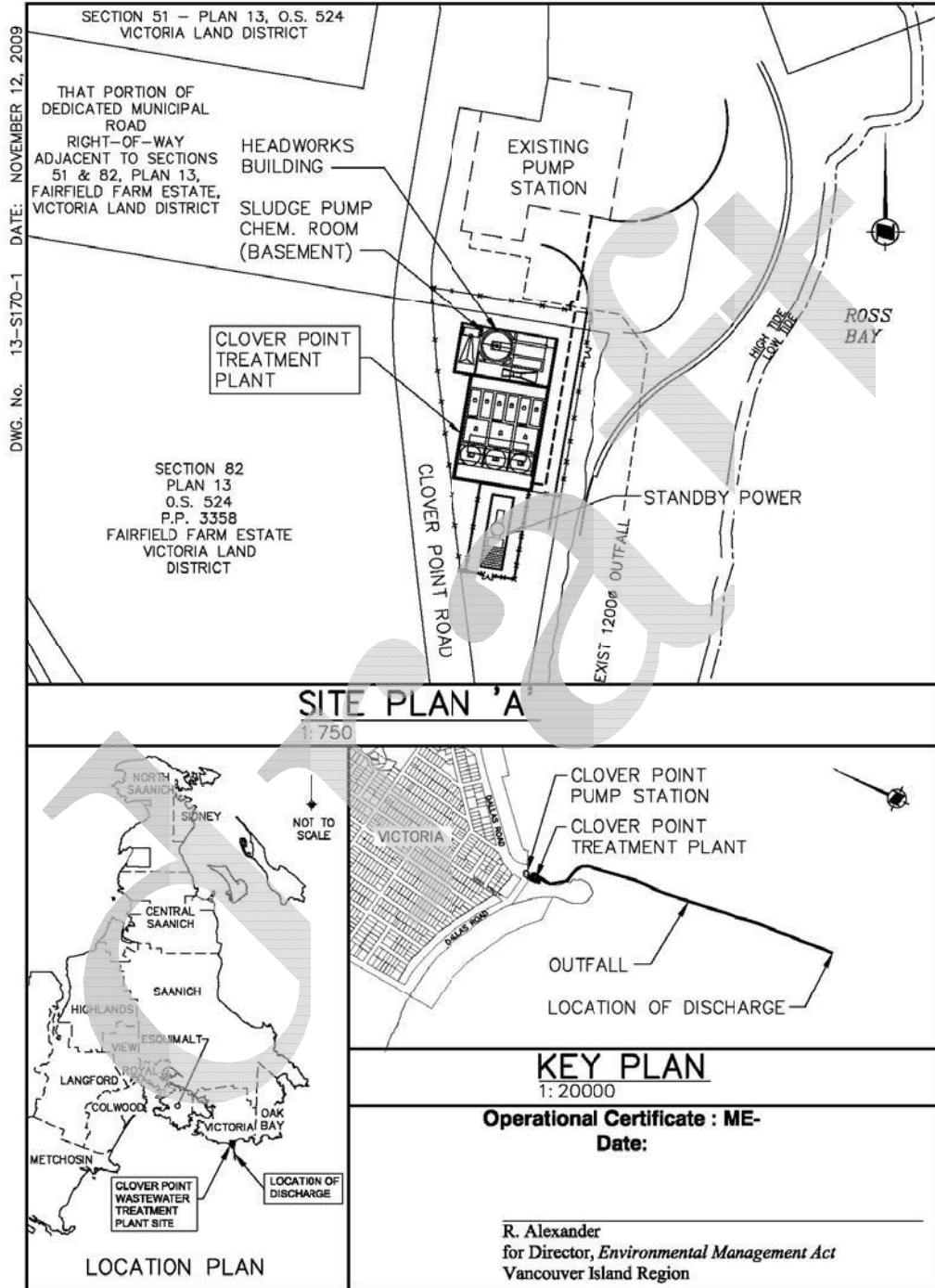
Analyses are to be carried out in accordance with procedures described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials and Discrete Ambient Air", or by suitable alternative procedures as authorised by the Regional Environmental Protection Manager.

Copies of the above manuals may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409), and are also available for inspection at all Environmental Protection offices.

3.3 Reporting

The Capital Regional District shall maintain data analysis of flow measurement for inspection, and every three months, submit the data, suitable tabulated, to the Regional Environmental Protection Manager for the previous quarter. All reports shall be submitted within 30 days of the end of a quarter during which a discharge occurs.

As annual report, suitable for public review, shall be submitted to the Regional Environmental Protection Manager. The report shall include a summary and interpretation by a qualified professional of the discharge and receiving environment monitoring results for the previous year and shall provide an assessment of the impact of this discharge on the receiving environment and recommended changes (if any) to the monitoring program. The first report shall be submitted on or before December 31, 2017.



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