

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

AMENDMENT NO. 8

As Approved by the Minister on August 25, 2010

SUBJECT: CORE AREA WASTEWATER TREATMENT PROGRAM

TYPE OF AMENDMENT: MINISTER DIRECTED

PURPOSE

To submit a Liquid Waste Management Plan Amendment by the end of June 2010 that will substantially comply with the Minister of Environment's direction as set out in his letter dated 09 February 2010.

AMENDMENT

The following Amendment No. 8 modifies and supplements the contents of Amendment No. 7 regarding the proposed system configuration.

AMENDMENT APPROVALS

Capital Regional District Board Approval

June 23, 2010

Ministry of Environment Approval

2010

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

AMENDMENT NO. 8

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LIST OF APPENDICES AND SUPPORTING DOCUMENTS

All documents available at www.wastewatermadeclear.ca.

Appendix A –to 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 – to Section 4

Stantec Consulting Ltd., "CRD Core Area Waste Management Program Design Flows and Loads", June 2010.

Appendix C – to Section 5

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

Appendix D – to Section 6

Stantec Consulting Ltd., *Core Area Liquid Waste Management Program – Management of Wet Weather Flow at Clover Point*, May 2010.

Appendix E – to Section 7

Stantec Consulting Ltd., *Core Area Wastewater Treatment Project – Feasibility Study for Heat Recovery for James Bay and Downtown Victoria*, January 2010.

Appendix F – to Section 8

Westland Resource Group, *Environmental Impact Study of Core Area Wastewater Treatment Facilities: Terrestrial Environment Part 2–McLoughlin Point/Hartland Landfill Facilities*, June 2010.

Appendix G - to Section 9

Golder (2010) Summer 2009 *Water Quality Survey Baseline Monitoring at Proposed Finnerty Cove Outfall Study Area: Data Report*, submitted to the CRD by Golder Associates Ltd., Burnaby, BC Project # 09-0028, January 19, 2010.

Appendix H - to Section 10

1. CRD Staff Report to the Core Area Liquid Waste Management Committee, *Public Consultation Update on Site Selection for a Wastewater Treatment Facility*, 12 May 2010
2. CRD staff report to the CALWMC, *Update on Public Participation Program – Core Area Wastewater Treatment Program*, 24 March 2010.
3. Postings on wastewatermadeclear.ca of educational meetings, public forums and feedback opportunities.
4. Update on First Nations Consultation and Engagement, June 2010.

Appendix I - to Section 11

Letter from Capital Regional District Board Chair Geoff Young to the Honourable Bill Bennett regarding the “*Business Case in Support of the Application for Provincial Funding, Capital Regional District Core Area and West Shore Wastewater Treatment Program*”, 31 March 2010.

Referenced Documents (submitted previously) – Referenced in Section 9

1. Golder (2009a) *Capital Regional District Wastewater Treatment Plant Discharge Stage 1 Environmental Impact Study*. 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*. August 13, 2009.
3. WorleyParsons (2009) *CRD Core Area Wastewater Treatment Pre-Discharge Monitoring Program (Technical Proposal Work Plan)*. September 1, 2009

All appendices and supporting documents available at www.wastewatremadeclear.ca.

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

AMENDMENT NO. 8

SECTION 1

(Modifies Section 1 in Amendment No. 7)

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.

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 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 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 configuration (Options 1A, 1B and 1C). The resulting report was titled *Core Area Wastewater Treatment, Assessment of Wastewater Treatment Options 1A, 1B and 1C*.
- Development of a biosolids management plan. The resulting plan was titled *Core Area Wastewater Program, Biosolids Management Plan*.

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

- Kerr Wood Leidal and Associates carried out extensive flow modelling and analysis work to develop preliminary design flows for the proposed works.
- Westland Resource Group carried out siting studies, terrestrial environmental impact studies, and environmental and social reviews of proposed treatment plant sites and ancillary facilities.
- 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 in 2009. Further information on this work is provided in Section 9.

- WorleyParsons was retained to complete the pre-discharge monitoring work for the outfalls referred to above. This work provides the basis for the Stage 2 environmental impact study. 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) was submitted to the Ministry of Environment in 2009. Ernst & Young's final report was submitted to the Ministry of Environment and the Ministry of Community and Rural Development in April 2010.

Starting early in this wastewater treatment program, the CRD carried out an extensive community engagement process with the public, First Nations and stakeholder groups. Much of this has been documented and submitted to the Ministry of Environment with previous progress reports and amendments. Substantial additional documentation, particularly in relation to treatment plant siting, is provided in Appendix H 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 6.1A of section 6 (page 6.3).

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.

Wet weather flows up to four times ADWF from the Macaulay Point tributary area will receive the equivalent of 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 from this system will receive at least primary treatment.

As indicated in figure 6.1A, a 12,000m³ wet weather flow attenuation tank will be constructed at Arbutus Road in Saanich.

At Clover Point, a pump station will divert up to three times ADWF via a forcemain to McLoughlin Point in Esquimalt for secondary treatment. This will reduce the total suspended solids load being discharged at Clover Point by about 99%. Any remaining wet weather flows at Clover Point will receive fine screening prior to discharging through the Clover Point outfall. By 2030, flows above four times ADWF are expected to 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 for flows up to two times ADWF. The flows treated at this location will have originated in Oak Bay, Saanich, Victoria, Esquimalt, Colwood, Langford, and View Royal. Wet weather flows up to four times ADWF will be given primary treatment and any flows above this level will be screened until 2030, by which time such excess flows are expected to be eliminated.

Existing raw sewage screening will be retained at Clover Point and Macaulay Point pump stations and grit removal facilities will be added at both locations.

A new outfall will also be provided adjacent to the existing Macaulay Point outfall to discharge treated effluent at least 1.6 kilometres offshore from the McLoughlin treatment plant. Biosolids from the McLoughlin plant will be pumped to Hartland landfill for processing. Processing will include thermophilic

anaerobic digestion, dewatering, drying and transport to markets. Markets are expected to include fuel for cement kilns, paper mills and other energy-using facilities.

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).
Amendment No. 7	Core Area Wastewater Treatment Program (Approved 09 February 2010)

Amendment No. 8 modifies and supplements the contents of Amendment No. 7 regarding the proposed system configuration.

MINISTER OF ENVIRONMENT REQUIREMENTS

The Minister, in his letter dated 21 July 2006, directed the Capital Regional District (CRD) to amend its Liquid Waste Management 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. Much of this information has already been provided in Amendments No. 6 and 7.

In his letter dated 09 February 2010, the Minister directed that a further Plan amendment be submitted by 30 June 2010 and that it include the following:

1. Identify site(s) for treatment of Westshore wastewater;
2. Identify site(s) for biosolids processing;
3. The environmental impact studies for the selected sewage treatment facility sites;
4. A progress report on marine environmental impact assessment work carried out on the selected new outfall locations;
5. The final draft operational certificates for selected sewage treatment facilities;
6. An updated public and First nations consultation summary report; and
7. A copy of the business case, submitted by the CRD to the Ministry of Community and Rural Development including the results of the assessment of public/private partnerships and procurement details.

The primary purpose of Amendment No. 8 is to address these seven requirements as listed in the Minister's letter dated 09 February 2010 and to incorporate any proposed changes to the system configuration.

PORTIONS OF PLAN EXCLUDED FROM AMENDMENT NO. 8

Amendment No. 8 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.

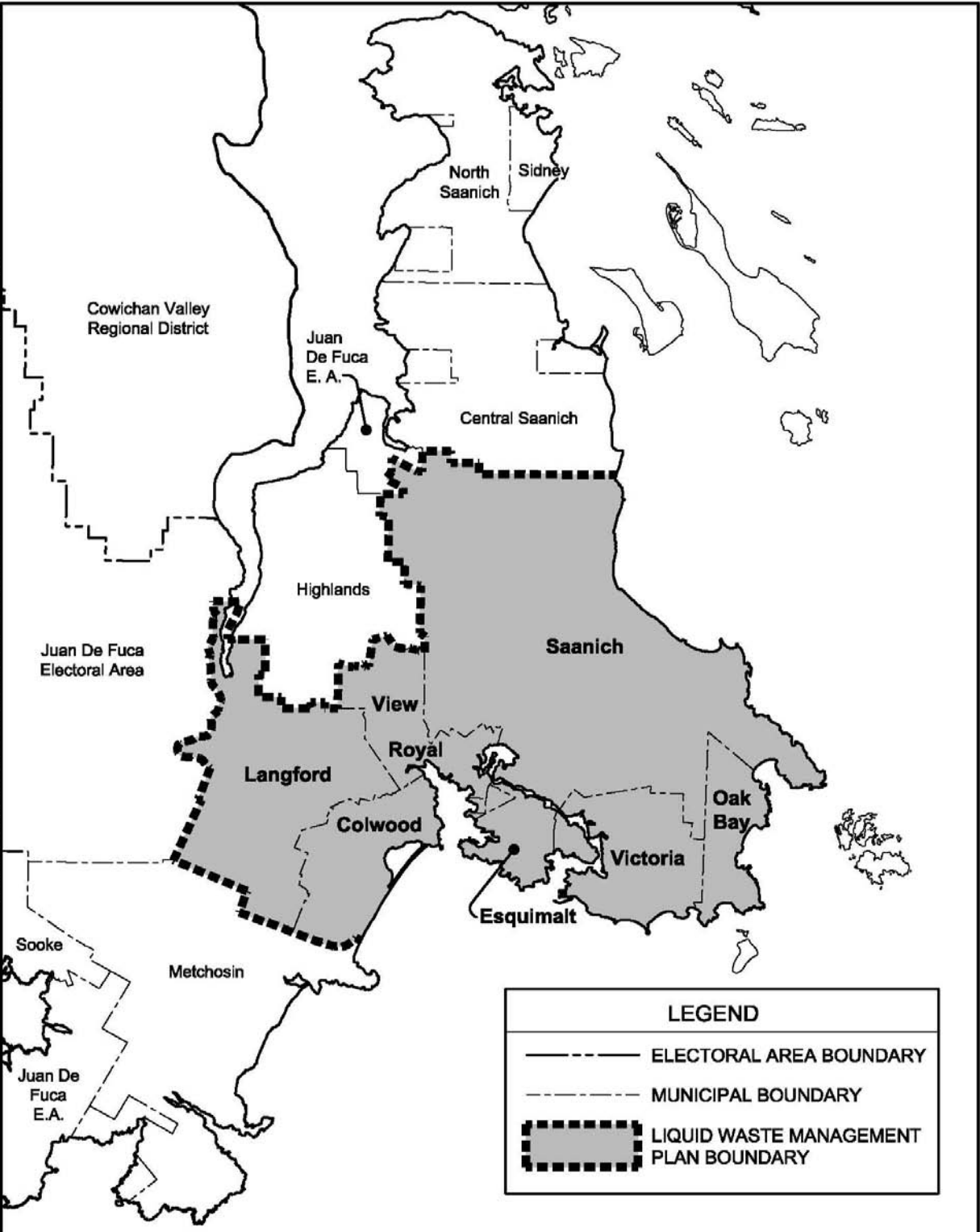
Increasing areas of Colwood and Langford are served by sewers, with plans for further expansion. In the long term, both municipalities are expected to be fully served by sewers.

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 has “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

 Making a difference...together	CORE AREA LIQUID WASTE MANAGEMENT PLAN PLAN AREA	FIGURE 1.1
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**CAPITAL REGIONAL DISTRICT
CORE AREA LIQUID WASTE MANAGEMENT PLAN**

AMENDMENT NO. 8

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, screens 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 vary among 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 sewered 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.

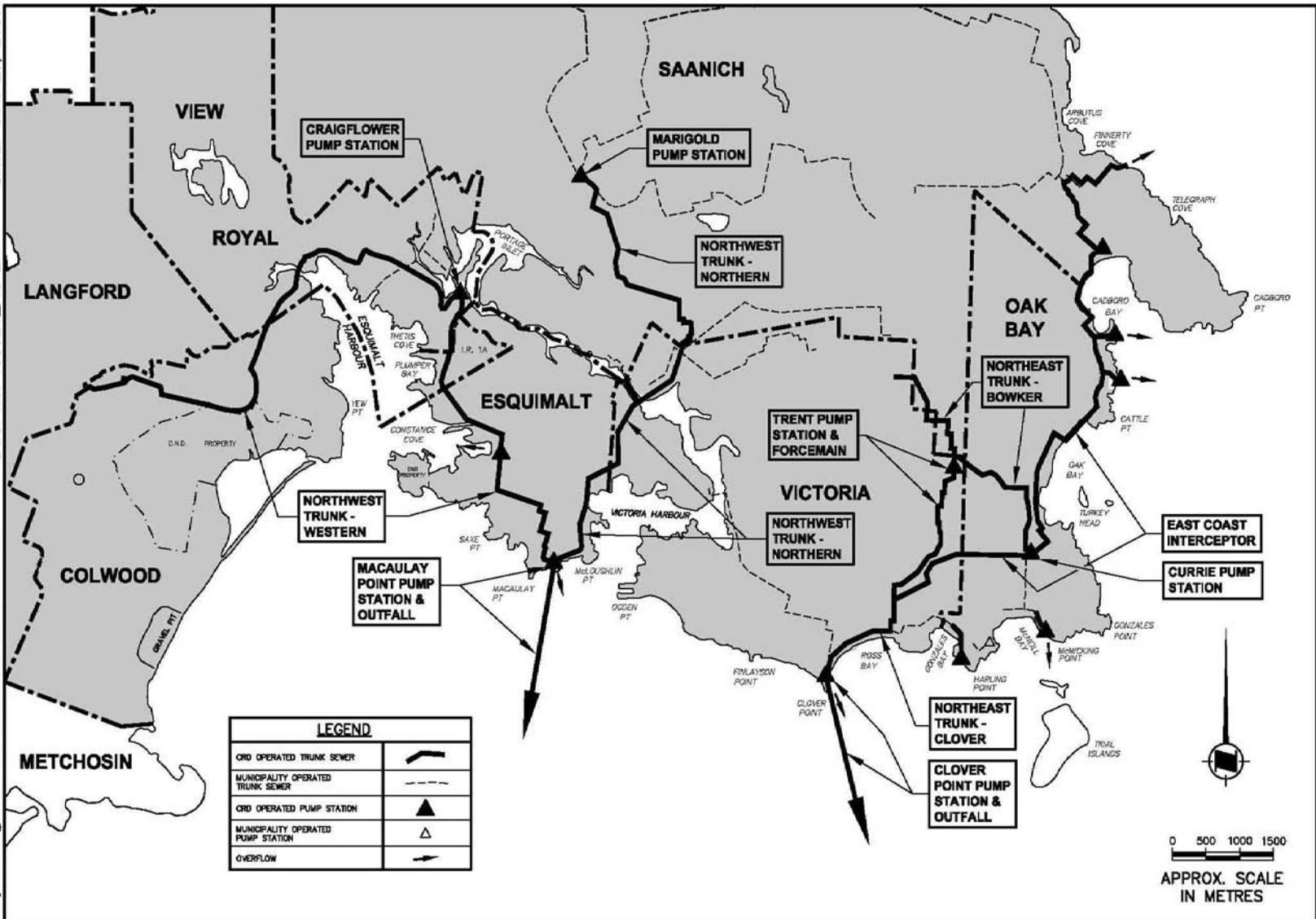
The Macaulay Point pump station, located at the head of the outfall, provides the pressure necessary for the outfall operation. In 1989, fine screens were installed in the station to remove sewage solids, plastic, and floatable materials larger than 6 mm. The screenings are transported to Hartland landfill 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.

Capital Regional District | Environmental Services
 DWG. No. 13S024_FIG 2.1 DATE: OCT. 29, 2009



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 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. 8

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.

APPENDIX A

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.

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

AMENDMENT NO. 8

SECTION 4

(Modifies Section 4 in Amendment No. 7)

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

(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) equivalent populations
- 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 MUNICIPAL 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)

Municipality	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 significantly reduced 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.

SEWERED EQUIVALENT POPULATION PROJECTIONS

Table 4.4 shows the existing and projected sewered residential population and equivalent population for the industrial, commercial; and institutional (ICI) sectors up to 2030 for each municipality for a low and a high rate of growth of 1.3% and 2.1% respectively (Stantec May 2010). As indicated in table 4.4 the

projected total equivalent population for the year 2030 is 493,474 persons based on a high rate of growth. Using a low rate of growth, the projected sewer equivalent population in 2030 is 436,032 persons. The high rate of growth population projection includes a residential population of 342,266 persons, and an equivalent population of 151,208 persons for institutional, commercial and industrial sectors.

Table 4.4
Sewered Equivalent Population Projections

Municipality	2008/2009	2030 – Low Rate of Growth @ 1.3%	2030 – High Rate of Growth @ 2.1%
Saanich	137,430	149,892	166,513
Victoria	114,539	122,669	141,734
View Royal	12,257	17,418	22,972
Oak Bay	21,674	22,173	26,304
Esquimalt	25,295	29,601	26,866
Colwood	8,933	35,526	34,548
Langford	20,964	58,753	74,737
TOTALS 341,093		436,032	493,474

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*, and in the Stantec memo on design flows and loads (Appendix B) 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 and in the design flow and load tables provided in Appendix B assume that, as a result of increased water conservation, the per-capita average domestic sewage flow will reduce from the current 225/250 L/cap/day to 195 L/cap/day in 2030.

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. Total indoor water consumption decreased by about 15% in the period 2004 to 2009, despite an annual population growth rate of about 1% during this period.

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 attends and distributes 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 AND LOADS

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.

The technical memo provided in Appendix B and titled *Core Area Wastewater Management Program – Design Flows and Loads* (Stantec May 2010) describes how the design flows and loads were derived for this project. The memo updates the information detailed in discussion paper 033-DP-2 (previously submitted to the Ministry and also available on www.wastewatertomadeclear.ca) and adds BOD and TSS load projections which are determining factors in sizing treatment processes.

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, except at Clover Point, where flows above three times ADWF will be fine-screened prior to discharge.

The selected design wastewater BOD and TSS concentrations used are consistent with the results of the wastewater sampling characterization program which has been going on for several years.

The flows and loads have been calculated assuming that low flow fixtures will continue to be installed to replace existing fixtures and that the I&I program described in section 5 will be implemented.

There is an opportunity for phasing the treatment capacity required to serve the Westshore. Capacity for the Westshore will be provided at the McLoughlin plant with additional capacity provided at a Westshore plant when required in the future.

Capacity redundancy will be provided as required by the MSR. Proposed design hydraulic flows for the McLoughlin treatment plant are provided in table 4.5.

Table 4.5
McLoughlin Point Treatment Plant Design Hydraulic Flows
(based on Stantec's *Design Flows and Loads* memo dated May 2010)

Item	2030		2065	
	Flow (ML/d)	Action	Flow (ML/d)	Treatment
Design ADWF	107.8	Secondary treatment	107.8	On-site secondary
Total design flow of 2x ADWF	215.6	Secondary treatment	215.6	On-site secondary
2x ADWF – 3x ADWF (from Clover)	51.9	Primary treatment	51.9	On-site primary only
2x ADWF – 4x ADWF (from Macaulay)	111.7	Primary treatment	111.7	On-site primary only
Wet Weather Flow (total)	163.60	Primary treatment	163.60	On-site primary only
>4 x ADWF (tributary)	≈20 ¹	Screening	0 ¹	No flow >4 x ADWF expected beyond 2030 ²
Filtration for Reuse	6		6	
Biosolids		Processing at Hartland		Processing at Hartland

(1) *Reduced assuming an effective I&I reduction program*

(2) *See commitments in Section 5 aimed at achieving this goal.*

APPENDIX B

Stantec Consulting Ltd., *CRD Core Area Wastewater Management Program – Design Flows and Loads*, May 2010.

SUPPORTING DOCUMENTATION PREVIOUSLY SUBMITTED

Discussion papers and reports previously provided to the Ministry of Environment with progress reports or LWMP amendments are available at www.wastewatertomadeclear.ca

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

AMENDMENT NO. 8

SECTION 5

(Modifies Section 5 in Amendment No. 7)

**MANAGEMENT OF INFILTRATION AND INFLOW AND CONTROL OF WASTEWATER OVERFLOWS
(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 and eventually eliminate 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, and 13.

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.
3. Implement the overflow reduction plans contained in the sanitary sewer overflow management

plan, which was submitted to the Ministry of Environment in June 2008. These plans are summarized as follows:

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

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

Table 5.2
Prioritized Order of Colwood Overflow Reduction Plan

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

Table 5.3
Prioritized Order of Esquimalt Overflow Reduction Plan

Item No.	Work Name	Description	Estimated Year of Completion	Estimated Cost (\$2008) to Complete
1.	Sewer Relining	Relining and repairs to sewer mains rated poor and poorest	Completed	n/a
2.	Combination Manhole Separation	<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

Table 5.6
 Prioritized Order of Saanich Overflow Reduction Plan

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

Table 5.7
Prioritized Order of Victoria Overflow Reduction Plan

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

Table 5.8
Prioritized Order of View Royal Overflow Reduction Plan

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

APPENDIX C

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

SUPPORTING DOCUMENTATION PREVIOUSLY SUBMITTED

Discussion papers and reports previously provided to the Ministry of Environment with progress reports or LWMP amendments are available at www.wastewatermadeclear.ca

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

AMENDMENT NO. 8

SECTION 6

(Modifies Section 6 in Amendment No. 7)

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

2. WASTE WATER TREATMENT

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

- a) Wet weather flow attenuation tanks and pump station at Arbutus Road in Saanich.
- b) A pump station at Clover Point that will pump up to three times the average dry weather flow (ADWF) to McLoughlin Point for secondary treatment.
- c) 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.
- d) A biosolids processing and resource recovery facility at Hartland Landfill and a biosolids transmission system to convey the biosolids from McLoughlin Point to this location for treatment.
- e) Primary treatment of any discharges over four-times ADWF after 2030.
- f) New grit removal facilities at the existing Clover Point and Macaulay Point pump stations. The raw sewage screening facilities at both locations will be retained.

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) Dewatering and 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 LOCATION

As indicated in the attached draft operational certificate, the proposed treatment plant will be located at the following lot legal description:

McLoughlin Point

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

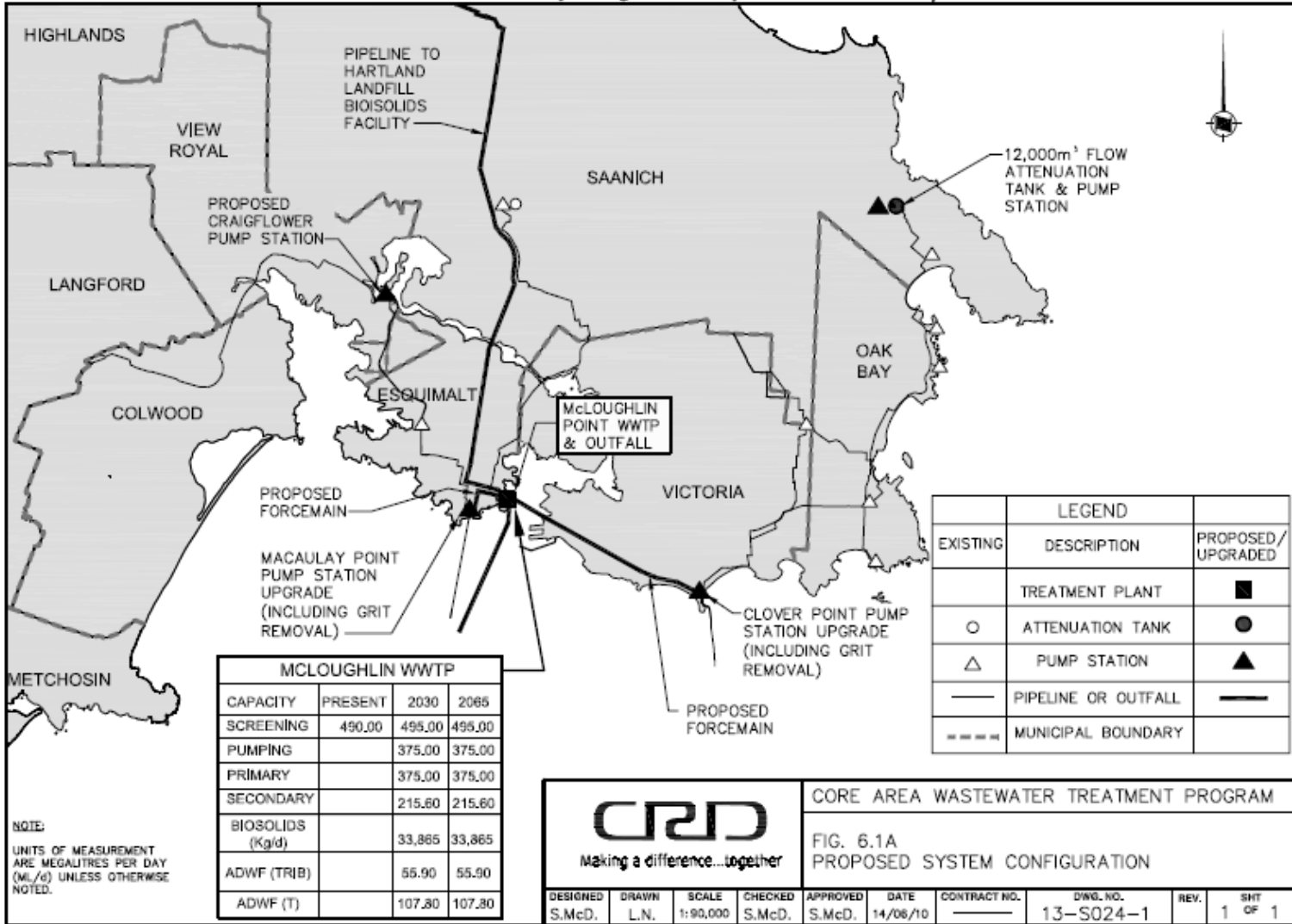
APPENDIX D

Stantec Consulting Ltd., *Core Area Liquid Waste Management Program – Management of Wet Weather Flow at Clover Point*, May 2010

SUPPORTING DOCUMENTATION PREVIOUSLY SUBMITTED

Discussion papers and reports previously provided to the Ministry of Environment with progress reports or LWMP amendments are available at www.wastewatermadeclear.ca

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

AMENDMENT NO. 8

SECTION 7

(Modifies Section 7 in Amendment No. 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 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, a business case for each resource recovery facility, including execution of 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.
- 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 source separated 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 in vehicles or at the biosolids processing facility.
- d) Recover waste heat from the digesters to warm the raw sludge being fed to them, thereby reducing digester heating costs.
- e) Dewater and 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 treatment plant buildings using heat exchangers and hot water loops.
- b) Use effluent source heat pumps to meet the demand to provide cost-effective heat to:
 - (i) existing developments that have compatible heating infrastructure; and/or
 - (ii) new developments using district heating systems.

4. 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.

5. 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 to replace anthropogenic fossil fuels.

APPENDIX E

Stantec Consulting Ltd., *Core Area Wastewater Treatment Program – Feasibility Study for Heat Recovery for James Bay and Downtown Victoria*, January 2010.

SUPPORTING DOCUMENTATION PREVIOUSLY SUBMITTED

Discussion papers and reports previously provided to the Ministry of Environment with progress reports or LWMP amendments are available at www.wastewatertomadeclear.ca

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

AMENDMENT NO. 8

SECTION 8

(Modifies Section 8 in Amendment No. 7)

**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 program, in a consistent and responsible manner.

COMMITMENTS

1. FACILITY SITING COMMITMENTS

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

- a) Avoid or minimize adverse effects to ecosystems and neighbourhoods.
- b) Provide opportunities for energy recovery and reuse, where viable markets are available.
- c) Minimize impacts of traffic, noise, visual aesthetics, and odour.
- d) Are compatible with surrounding land and marine uses.
- e) Maximize effective use of existing infrastructure.
- f) Minimize impacts to known significant cultural resources.
- g) Minimize use of energy and resources.
- h) Provide a system with reasonable lifetime costs for the treatment and conveyance facilities and outfalls.
- i) Respect and respond to the interests of residents.
- j) Respect and respond to the interests of aboriginal peoples of the region.

2. ENVIRONMENTAL STUDIES COMMITMENTS

The CRD and participating municipalities commit to:

- a) Prepare a terrestrial environmental impact study for the project that satisfies requirements of the Ministry of Environment.
- b) Prepare environmental and social reviews and environmental protection plans for all facilities.
- c) Engage the public and First Nations in environmental studies and facility siting and design
- d) Monitor environmental and community effects of the facilities.
- e) 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 certificate provided in Section 12. 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, hydrology, ecological, archaeological, heritage, traffic 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 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 and the Westshore were developed specifically for the wastewater treatment program. Field work was conducted on the ecology, archaeology, geology, hydrology, traffic 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.wastewatermadeclear.ca. In December 2009, the CALWMC approved the CRD-owned Finnerty-Arbutus property as the location for the wastewater treatment facility in Saanich East. In April 2010, the CRD met with institutional land owners and held public open houses to determine whether the facility site should be adjusted to reduce environmental impacts. Input also was sought on what should be done with the lands not used for the treatment facility. In June 2010 it was determined that substantial cost savings could be achieved by providing sufficient treatment capacity to serve the Saanich East area in the McLoughlin Point treatment plant, and by constructing wet weather flow attenuation tanks near Arbutus Road in Saanich, to minimize downstream system overflows.

The findings of the Westshore siting investigations were presented to the Westshore Wastewater Treatment Program Subcommittee in November 2009. The subcommittee developed a short-list of potential wastewater treatment facility sites in the Westshore and, in January 2010, recommended the site on Wishart Road, next to the Colwood City Hall, currently the City of Colwood Public Works Yard. The City of Colwood Council subsequently approved the location for a wastewater treatment facility. Information about the proposed Westshore site was presented to the public at open houses in January 2010. It is proposed to defer construction of a Westshore plant until there is insufficient capacity in the

McLoughlin plant to accommodate flows from the Westshore.

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. In October 2009, open houses were held in Esquimalt and Victoria to present information about the core area wastewater treatment program to the public. In December 2009, the CALWMC approved wastewater treatment facilities sites at McLoughlin Point in the Town of Esquimalt and Clover Point in the City of Victoria. The CRD subsequently signed a first right of refusal agreement with Imperial Oil, the owner of the McLoughlin Point site. The Clover Point site is owned by the City of Victoria.

It was determined that the McLoughlin Point site would not be large enough to accommodate a treatment facility that could treat the liquid and solid fractions of core area wastewater. The CRD identified a northern portion of the CRD-owned Hartland landfill property for facilities to process wastewater sludge.

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 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. 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.

Later this year the CRD will complete environmental and social reviews (ESR) for McLoughlin Point and Hartland North. The ESRs will use methods similar to those 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 have been conducted of heat recovery and water reuse opportunities in 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 City 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 water bodies. 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 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.

An EIS has been completed for the proposed wastewater treatment and biosolids processing facility sites, and for the major pump station facilities. Each major facility or group of facilities is studied in a separate volume of the EIS. Land use and environmental information has been collected and mapped for terrestrial facilities. Fieldwork and detailed environmental investigations, including archaeological impact assessments, have been conducted to identify potential effects of construction and operation of the treatment and ancillary facilities on the terrestrial environment. Mitigation measures have been proposed to avoid or reduce any adverse effects. The public and First Nations will be engaged to share findings and review information. The portion of the EIS for the Saanich East facility was submitted to the Ministry of Environment in December 2009. The EIS for the other sites (McLoughlin Point treatment plant and Hartland North biosolids processing facility) is complete and is attached as Appendix F.

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.

Federal Environmental Assessment Requirements

The CRD has been engaging federal agencies in discussion of environmental assessment needs and parameters since early 2009. Meetings were held with representatives of the Canadian Environmental Assessment Agency and other federal departments and provincial ministries to examine the scope of the wastewater program, its schedule, potential triggers for assessments under the *Canadian Environmental Assessment Act*, and the likely scope of study required. In December 2009, Infrastructure Canada informed the CRD that their agency would be responsible for overseeing the scope and preparation of environmental assessment documents to meet federal requirements.

A Project Description is now being prepared that meets the requirements of Infrastructure Canada. The CRD expects to receive information from federal agencies on environmental assessment requirements in mid-2010, and to initiate the necessary investigations thereafter.

APPENDIX F

Westland Resource Group, *Environmental Impact Study of Core Area Wastewater Treatment Facilities; Terrestrial Environment Part 2 – McLoughlin Point / Hartland Landfill Facilities*, May 2010

SUPPORTING DOCUMENTATION PREVIOUSLY SUBMITTED

Discussion papers and reports previously provided to the Minister of Environment with progress reports or LWMP amendments are available at www.wastewatertomadeclar.ca

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

AMENDMENT NO. 8

SECTION 9

(Modifies Section 9 in Amendment No. 7)

**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 (EIS) 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 WMEP 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 that effluent and receiving environment monitoring must be carried 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 WMEP 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 review the existing WMEP and enhance it 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 potential outfall locations, following this rigorous 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 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 information 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 has included undertaking water column, drogue, 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 undertook the first two water column assessments in the spring of 2009 for both potential outfall locations (Golder, 2009b) and in late summer 2009 for the Finnerty Cove location only (Golder 2010). WorleyParsons has continued the pre-discharge monitoring as detailed in the WorleyParsons (2009) work plan provided in Appendix E of LWMP Amendment No. 7. Since Amendment No. 7, WorleyParsons has undertaken two additional seasonal water column assessments (Winter 2009-10 and Spring 2010) at both Finnerty Cover and Albert head locations.

WorleyParsons has also initiated an assessment of outfall routes with respect to potential shoreline crossings and paths along the seafloor. Three potential routes are being assessed for the Finnerty Cove location and one potential route for the Albert Head location. This exercise has involved nearshore sonar work to fill in bathymetric data gaps, along with preliminary shoreline habitat assessments. The next step in this process has involved the deployment of surface drogues and moored current meters to characterize surface and sub-surface currents over various tidal regimes. Current meters were deployed at both locations in late May 2010 and are anticipated to be in place for approximately one month. An update report for the Finnerty Cove and Albert Head locations will be provided in 2010 after the first year of monitoring is complete.

The CRD has also consulted with a number of First Nations communities, including the Tsawout, Songhees, Esquimalt, and Beecher Bay, and has reviewed their marine fisheries resource use information. This information was provided to the CRD on a confidential basis, but the RD will ensure that the information is assessed appropriately in the context of the EIS and in relation to existing and potential shellfish harvesting closures under the Canadian Shellfish Sanitation program (CSSP).

As the CRD moves further into the system design process, the needs for outfalls at Finnerty Cove and Albert Head are being assessed. Should it be determined that one or both of these outfalls are unnecessary, either now or in the future, WorleyParsons EIS monitoring effort will be shifted to implement an EIS monitoring program at either the Clover Point or Macaulay Point outfall location, depending on which one becomes the principle outfall in the CRD system design. Monitoring results from Finnerty Cove and Albert head will be useful regardless of whether outfalls are installed in these locations, particularly the water column and current meter information. This data will benefit the oceanographic and plume modeling work that is anticipated for the Clover Point or Macaulay Point outfall locations. Other EIS monitoring needs for Clover Point or Macaulay Point will be determined in consultation with MOE staff and WorleyParsons.

Regardless of the monitoring and outfall locations, all pre-discharge and outfall routing work will be supplemented by the more detailed oceanographic modeling of the predicated plumes, as well as site specific habitat inventories. All of the results will be brought together into a comprehensive report to satisfy the requirements of a stage 2 EIS. Although all terrestrial components of the EIS are the responsibility of Westland Resource Group (see section 8 of this Amendment), the marine and terrestrial EIS results will be brought together to allow for a cumulative risk assessment of both the treatment plants and outfalls.

It is still anticipated that the final report to satisfy the requirements of the Stage 2 EIS for the Finnerty Cove and Albert head locations could be completed by mid-2011. The completion date for a similar report for either the Macaulay Point or Clover Point outfall cannot be anticipated at this time, as the EIS monitoring requirements have yet to be determined.

WASTEWATER AND MARINE ENVIRONMENT PROGRAM DESIGN

As mentioned previously, MOE and CRD staff are collaborating to develop enhanced wastewater and marine environmental programs specifically for the current discharge points (Clover and Macaulay points), and also a generic program that could 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 MOE 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.

APPENDIX G

1. Golder (2010) *Summer 2009 Water Quality Survey-Baseline Monitoring at Proposed Finnerty Cove Outfall Study Area: Data Report*, January 2010

SUPPORTING DOCUMENTS

The following documents, which were previously submitted to the Ministry of Environment, provide additional background information on work completed to date and work planned to complete the marine environmental impact work.

1. Golder (2009a) *Capital Regional District Wastewater Treatment Plant Discharge Stage 1 Environmental Impact Study*. 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*. August 13, 2009
3. WorleyParsons (2009) *CRD Core Area Wastewater Treatment Pre-Discharge Monitoring Program (Technical Proposal Work Plan)*. September 1, 2009

SUPPORTING DOCUMENTATION PREVIOUSLY SUBMITTED

Discussion papers and reports previously provided to the Minister of Environment with progress reports or LWMP amendments are available at www.wastewatermadeclear.ca

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

AMENDMENT NO. 8

SECTION 10

(Modifies Section 10 in Amendment No. 7)

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 use general public consultation as described in 1a) above, on broader issues.
 - (ii) Based on the findings of the workshops and general public consultation, 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.

APPENDIX H

1. CRD staff report to CALWMC, *Public Consultation Update on Site Selection for a Wastewater Treatment Facility, Core Area Wastewater Treatment Program*, 12 May 2010
2. CRD staff report to the CALWMC, *Update on Public Participation Program – Core Area Wastewater Treatment Program*, 24 March 2010.
3. Postings on wastewatermadeclear.ca of educational meetings, public forums and feedback opportunities.
4. Update on First Nations Consultation and Engagement, June 2010.

SUPPORTING DOCUMENTATION PREVIOUSLY SUBMITTED

Discussion papers and reports previously provided to the Minister of Environment with progress reports or LWMP amendments are available at www.wastewatermadeclear.ca

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

AMENDMENT NO. 8

SECTION 11

(Modifies Section 11 in Amendment No. 7)

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. 2312 – 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 \$782,686,000 (at time of construction).

The estimated annual operational and maintenance cost for the project is \$14,571,000 (2010 dollars).

The above costs are based on an updated estimate completed by Stantec in June 2010.

COST SHARING

Over the past year and a half, 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 the project plan. 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. 8. The CRD will borrow the remaining one-third funding from the Municipal Finance Authority.

BUSINESS CASE IN SUPPORT OF FUNDING

The business case in support of the application for provincial funding of the program was submitted to the Honourable Bill Bennet, Ministry of Community and Rural Development, along with a cover letter dated 31 March 2010, which is attached in Appendix I. A copy of the business case was also provided to the Honourable Barry Penner, Minister of the Environment. A revision to the provincial business case is currently being prepared to incorporate the changes resulting from Amendment No. 8.

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 household, assuming two-thirds senior government funding, varies among municipalities from \$210 to \$500.

APPENDIX I

Letter from Capital Regional District Board Chair Geoff Young to the Honourable Bill Bennett regarding the "*Business Case in Support of the Application for Provincial Funding, Capital Regional District Core Area and West Shore Wastewater Treatment Program*", 31 March 2010.

SUPPORTING DOCUMENTATION PREVIOUSLY SUBMITTED

Discussion papers and reports previously provided to the Minister of Environment with progress reports or LWMP amendments are available at www.wastewatertomadeclar.ca

Draft Operational Certificate ME-?????

Under the Provisions of the Environmental Management Act

**Capital Regional District
625 Fisgard Street
PO Box 1000
Victoria, British Columbia
V8W 2S6**

is authorized to discharge effluent to the Juan de Fuca Strait and reclaimed water to a reclaimed water distribution system from a municipal wastewater collection and treatment system located in Victoria, 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. **AUTHORIZED DISCHARGES**

1.1 This subsection applies to the discharge of **effluent from a municipal wastewater treatment plant** at McLoughlin Point to the Juan de Fuca Strait. The site reference number for this discharge is ??????.

1.1.1 The maximum authorised rate of discharge is 379,100 m³/d.

1.1.2 The maximum daily discharge loadings* for 5 – day Carbonaceous Biochemical Oxygen Demand (CBOD) and Total Suspended Solids (TSS) for the final discharge to the outfall from the municipal wastewater treatment plant (to be used for the calculation of annual operational certificate fees) shall be:

*daily discharge loading is the total amount of contaminants discharged per day (contaminant concentration x the rate of discharge)

McLoughlin		
Year	CBOD tonnes/day	TSS tonnes/day
2016	15.15	15.15
2020	16.00	16.00
2025	16.91	16.91
2030	17.06	17.06
2035	17.06	17.06
2040	17.06	17.06
2045	17.06	17.06
2050	17.06	17.06
2055	17.06	17.06
2060	17.06	17.06
2065	17.06	17.06

1.1.3 The average dry weather flow is as follows:

Year	Average Dry Weather flow m3/d
2016	93,500
2030	107,800
2065	107,800

1.1.4 For that portion of the daily flow up to two times the average dry weather flow the characteristics of the discharge shall not exceed:

5 – day Carbonaceous Biochemical
Oxygen Demand - 45 mg/L
Total Suspended Solids - 45 mg/L
pH - 6.0 – 9.0 pH Units

and for that portion of the daily flow in excess of two times the average dry weather flow and less than four times the 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
pH - 6.0 – 9.0 pH Units

and for that portion of the daily flow in excess of four times the average dry weather flow the characteristics of the discharge shall be equivalent to or better than typical screened municipal sewage.

All flows shall be recombined prior to discharge through the outfall.
After December 31, 2030 there shall be no discharge in excess of four times the average dry weather flow.

Date Issued:
Date Amended:
(most recent)

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

- 1.1.5 The authorised works are influent pumping, screening, grit removal, primary clarification, biological aerated filter treatment process, solids separation, sludge thickening and pumping to an offsite processing facility, heat recovery works, odour control, standby power and an outfall with multiport diffuser extending 1800 m from mean low water to a depth of 60 m below mean low water, and related appurtenances approximately located as shown on attached Site Plan A.
- 1.1.6 The authorised works must be complete and in operation when the discharge authorised by this operational certificate commences.
- 1.1.7 The location of the facilities from which the discharge originates is at 337 Victoria View Road (Lots A-E... plan 35322).
- 1.1.8 The location of the point of discharge is Juan de Fuca Strait near Macaulay Point.
- 1.2 This subsection applies to the discharge of **reclaimed water from a sewage treatment facility** at McLoughlin Point for use on site. The site reference number for this discharge is ??????.
- 1.2.1 The maximum authorized rate of discharge from the sewage treatment facility to the reclaimed water distribution system is 6,000 m³/d.
- 1.2.2 The authorized discharge period is 365 days per year.
- 1.2.3 The characteristics of the discharge from the sewage treatment facility to the reclaimed water distribution system shall not exceed:
- | | |
|--|---|
| pH | - 6 to 9 pH Units |
| Turbidity (before disinfection) | - 2 NTU (24 hour average)
- 5 NTU (maximum) |
| 5-day Carbonaceous Biochemical Oxygen Demand | - 10 mg/L |
| Fecal Coliform | - 2.2 CFU /100 mL (median of last 7 samples)
- 14 CFU/100 mL (maximum in any sample) |
- Total residual chlorine shall be maintained at 0.5 mg/L or greater at the point of initial use.
- 1.2.4 The authorized works are chemical addition and coagulation works, ultra-filtration membrane bio-reactor, ultra violet disinfection facilities, chlorination facilities, sludge handling facilities, odour control facilities, standby power generation facilities, pumping facilities and redundancy equipment.

Date Issued:
Date Amended:
(most recent)

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

1.2.5 The authorized works must be completed and in operation before discharge to the reclaimed water distribution system commences.

1.2.6 The location of the facilities from which the discharge originates is at 337 Victoria View Road (Lots A-E... plan 35322).

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. The Environmental Protection Manager may reduce or suspend the operation of the Capital Regional District to protect the environment until the approved method of pollution control has been restored.

2.2 **Bypasses**

The Capital Regional District shall ensure that no waste is discharged without being processed through the authorised works or through authorised works at another location, unless prior written approval is received from the Director.

The reclaimed water sewage treatment facility shall have provision to overflow automatically to the outfall. Treated sewage that does not meet the characteristics of discharge stipulated in Section 1.2.3 above shall immediately be diverted to the outfall until such time as the standards are met. Turbidity shall be monitored continuously prior to disinfection. A turbidity exceedance above 5 NTU shall result in the automatic diversion of effluent to the outfall. The discharger shall record each occasion of diversion to the outfall, including the date, duration, and volume of the diverted effluent.

2.3 **Process Modifications**

The Regional Environmental Protection Manager shall be notified prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge.

2.4 **Plans - New Works**

Plans and specifications of the works authorized in Sections 1.1.5 and 1.2.4 shall be certified by a qualified professional licensed to practice in the Province of British Columbia, and shall be made available to the Regional Environmental Protection Manager for inspection at any time. A qualified professional must

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certify that the works have been constructed in accordance with the plans before discharge commences.

2.5 **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 the approval of the Director.

2.6 **Outfall Inspection**

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

2.7 **Sludge Management**

Sludge generated by the treatment plants shall be managed in a manner approved by the Director and in accordance with the sludge management strategies described in the Capital Regional District Core Area Liquid Waste Management Plan.

2.8 **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.

2.9 **Odour Control**

Should objectionable odours, attributable to the operation of the sewage treatment plants, 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.

Once the municipal wastewater treatment plant commences operation, the Capital Regional District shall meet annually for three years, and thereafter as directed by the Regional Environmental Protection Manager, with representatives of the neighbourhood to consider any odour related issues associated with the treatment facility, to assess the effectiveness of the odour control facilities at the plant and to discuss and establish appropriate remediation strategies, if necessary.

2.10 **Disinfection**

Although disinfection of the effluent discharged through the outfall is not required at this time, suitable provisions should be made to include disinfection facilities in the future. If disinfection is by chlorination, dechlorination facilities will also be required.

2.11 **Facility Classification and Operator Certification**

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

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

2.12 **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.

2.13 **Operating Plan**

The Capital Regional District shall develop an operating plan, to be prepared by a qualified professional, which provides for the proper operation and maintenance of sewage conveyance, treatment, disposal and reclaimed water use facilities including the monitoring details, emergency procedures, and staff education and certification. The plan shall be certified by the qualified professional that it is adequate for the works being installed and the proposed reclaimed water uses. The plan shall be submitted to the Regional Environmental Protection Manager for review 30 days before construction of the municipal wastewater treatment plant.

2.14 **Reclaimed Water Use**

Reclaimed water facilities for on-site toilet flushing and irrigation shall be designed and operated in accordance with the Municipal Sewage Regulation

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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”, as revised in accordance with the Ministry of Environment’s Policy Intentions paper dated November 2009.

The Capital Regional District shall develop reclaimed water user information and communications material related to the use of reclaimed water, and submit the information and communication material to the Regional Environmental Protection Manager and the Chief Medical Health Officer, Vancouver Island Health Authority 30 days before construction of the reclaimed water distribution system.

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

3. **MONITORING AND REPORTING REQUIREMENTS**

3.1 **Discharge Monitoring**

3.1.1 Flow Measurement

Provide and maintain a suitable flow measuring device and record once per day the volume discharged over a 24-hour period for the following:

- The volume discharged from the municipal wastewater treatment plant to the marine outfall;
- The volume discharged from the biological aerated filter treatment process;
- The volume of reclaimed water discharged from the sewage treatment plant to the reclaimed water distribution system.

3.1.2 Sampling and Analysis

- a) This section applies to the discharge authorized in Subsection 1.1 from the municipal wastewater treatment plant to the outfall into Juan de Fuca Strait:

The Capital Regional District shall install suitable sampling facilities and obtain samples of the discharges from the municipal wastewater treatment plant at the following locations:

- a sampling location representing that portion of the daily discharge up to two times the average dry weather flow;
- a sampling location representing that portion of the daily discharge in excess of two times the average dry weather flow up to four times the average dry weather flow.

- a sampling location at a point after which the above discharges are recombined.

Carry out analyses of the samples in accordance with the following schedule from the date of discharge commencement:

<u>Parameter</u>	<u>Frequency</u>	<u>Type</u>
5-day Carbonaceous Biochemical Oxygen Demand	five times per week	24-hr composite
Total Suspended Solids	five times per week	24-hr composite
Ammonia Nitrogen	twice per month	24-hr composite
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.

- b) This section applies to the discharge authorized in Subsection 1.2 from the sewage treatment facility to the reclaimed water distribution system:

The Capital Regional District shall install a suitable sampling facility and obtain a sample of the discharge from the sewage treatment plant to the reclaimed water distribution system and carry out analyses in accordance with the following schedule:

<u>Parameter</u>	<u>Frequency</u>	<u>Type</u>
5-day Carbonaceous Biochemical Oxygen Demand	once per week	24-hr composite
Turbidity (prior to disinfection)	continuous	on - line
Fecal Coliform	daily	grab
pH	weekly	grab
Total residual chlorine (at point of initial use)	daily	grab

Proper care is to be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.

3.2 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 Vancouver Island Health Authority, First Nations and the Regional Environmental Protection Manager.

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The proposed monitoring program shall be developed in accordance with the goals and commitments in the approved Capital Regional District Core Area Liquid Waste Management Plan and shall be submitted to the Regional Environmental Protection Manager for review on or before ?????. Based on the results of this monitoring program, the Capital Regional District monitoring requirements may be extended or altered by the Director.

3.3 **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 authorized by the Director.

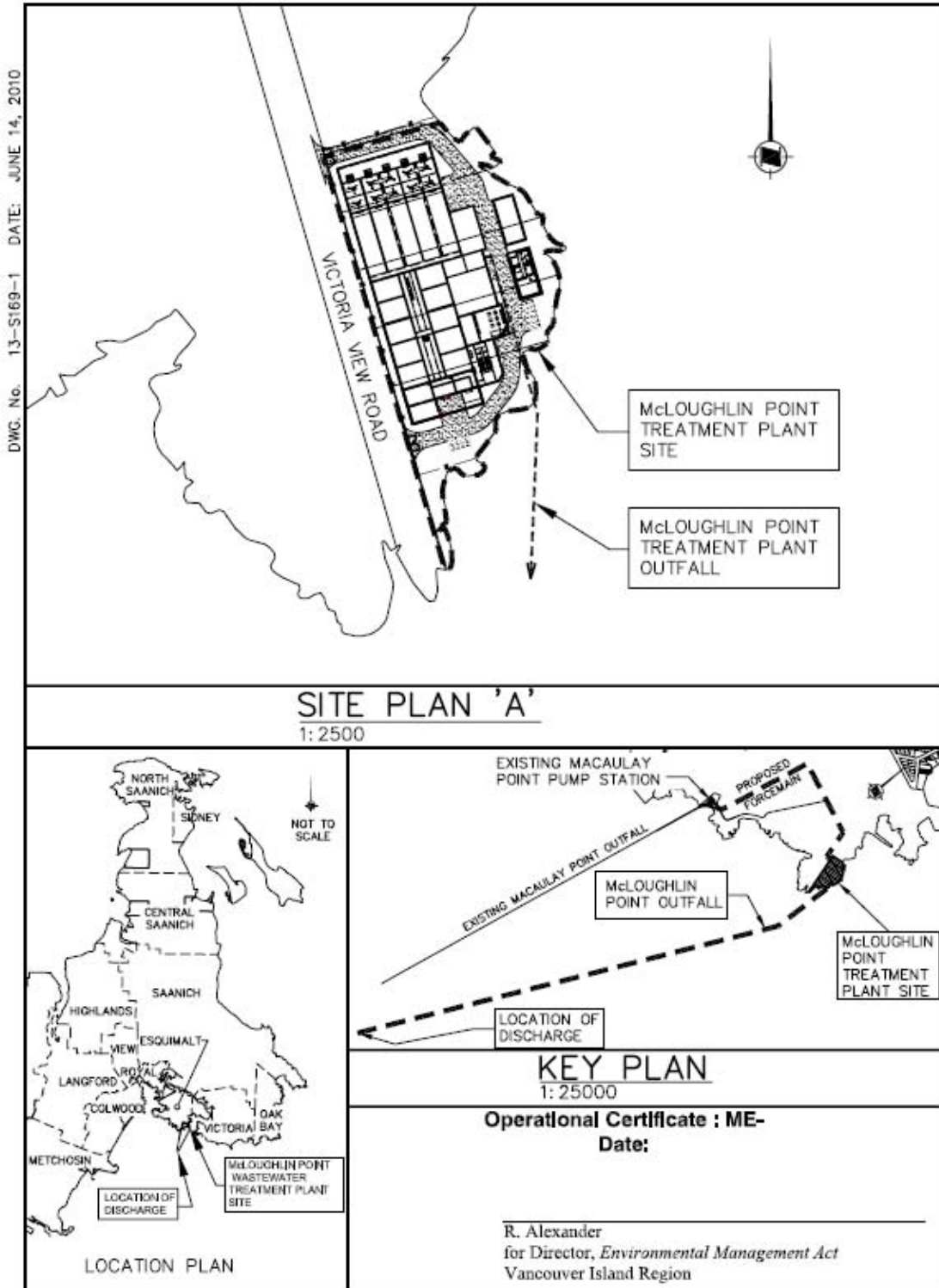
Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air", or by suitable alternative procedures as authorized by the Director.

A copy of the above manual may be purchased from 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). A copy of the manual is also available for inspection at all Environmental Protection offices.

3.4 **Reporting**

Maintain data of analyses and flow measurements for inspection and every three months submit the discharge data to the Regional Environmental Protection Manager. All reports shall be submitted within 30 days of the end of the quarter. Quarterly reports should identify any data which exceed the allowable limits as well as describe corrective action (to be) taken to remedy the cause of the exceedence(s).

Reporting and interpretation of the receiving environment monitoring data shall be carried out in accordance with the approved Capital Regional District Core Area Liquid Waste Management Plan. The terms of reference for the reports and frequency of submission to the Regional Environmental Protection Manager shall be established in consultation with the Regional Environmental Protection Manager.



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Task Description	Dur - m	Start	Finish	2010												2011												2012												2013												2014												2015												2016																																																																							
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Start Detailed Planning work	0	30-Jun-10																																																																																																																																																	
Submit LWMP Amendment #8	0		30-Jun-10																																																																																																																																																
Final site selection - McLoughlin & Macaulay	0		30-Jun-10																																																																																																																																																
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McLoughlin, Macaulay & Tunnel Construction start - permits received	0		24-Jul-12																																																																																																																																																
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Core Area facilities operational	0		16-Dec-16																																																																																																																																																
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Outfall Macaulay twinning DB Contractor design to 100%	3	23-Aug-12	26-Nov-12																																																																																																																																																
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Tunnel across Victoria Harbour design for RFP	8	30-Jun-10	11-Mar-11																																																																																																																																																
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1 of 3

CRD - Core Area Wastewater Treatment Program
Preliminary Program Schedule - Option 1A Prime-2

09 June 2010



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