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**EEE 13-38**

**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE**
**MEETING OF WEDNESDAY, OCTOBER 9, 2013**

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**SUBJECT** **DRAFT AMENDMENT NO. 9 TO THE CORE AREA LIQUID WASTE MANAGEMENT PLAN – CORE AREA WASTEWATER TREATMENT PROGRAM**

## ISSUE

Over the past three years, since Amendment No. 8 was submitted to the Minister of Environment in June 2010, the Core Area Wastewater Treatment Program has been further developed and refined. This has resulted in a requirement to make a number of changes to the Core Area Liquid Waste Management Plan (CALWMP).

## BACKGROUND

A summary of the proposed changes to the CALWMP, as proposed in Amendment No. 9, is attached as Appendix A. Applicable excerpts of the CALWMP Amendment No. 8 are attached as Appendix B. The most significant changes are as follows:

1. *The scheduled project completion date moves from the end of 2016 to the end of 2018.*

   The additional time is required to make up for time lost when the project was put on hold for an extended period until all senior government funding was secured. The Federal and Provincial funding agreements are for work to be completed by the end of 2018.

2. *The initial storage volume of the proposed Arbutus Road Attenuation Tank is reduced from 12,000 cubic metres to 5,000 cubic metres.*

   This attenuation tank is required to enable the transmission of all Saanich East flows to the proposed McLoughlin Point treatment plant. The original 12,000 cubic metre capacity tank was based on a 2004 consultant's study that indicated an original 6,000 cubic metre tank in 2010 and an additional 6,000 cubic metre tank in 2005, so a 12,000 cubic metre tank was proposed in Amendment No. 8. The consultant, Kerr Wood Leidal, has now updated the original study using flow data collected since 2004. Based on the current flow data and water reduction trends, the consultant now recommends that a 5,000 cubic metre facility be constructed initially, and that "space should be reserved to double the size of the facility at some time in the future beyond 2030 should I&I increase beyond current levels."

3. *New sewage screening facilities are proposed for both Clover Point and Macaulay Point pump stations.*

   The commitment in Amendment No. 8 was to provide new grit removal facilities at both pump stations but to retain the existing raw sewage screens. On further consideration, it has been concluded that the existing screening facilities at both pump stations should be replaced at the same time as the grit removal facilities.

4. *Biosolids processing to produce only dry fuel for cement kilns, pulp mills or waste to energy facilities is revised to include other beneficial uses that comply with CRD Board Policy.*

   The commitment in Amendment No. 8 was to dewater and dry the digested biosolids to be used as a fuel for cement kilns, pulp mills or waste to energy facilities. On further consideration, this restricts the ability of proponents for the Biosolids Energy Centre to recommend other innovative, alternative technologies that may result in significantly improved system performance and cost savings while providing products for beneficial use in strict compliance with CRD Board policy. This policy will be discussed at the Committee of the Whole on October 30, 2013.

In addition to the above, there are a number of proposed wording changes in Amendment No. 9 intended to clarify ambiguities or to enable proponents to recommend alternative technologies that may result in improved system performance or cost savings.

## ALTERNATIVES

1. That the Core Area Liquid Waste Management Committee (CALWMC) refer the proposed Amendment No. 9 to the Technical and Community Advisory Committee (TCAC) for consideration and that its recommendations on the proposed amendment be brought back to the next CALWMC meeting.

2. That the CALWMC request changes to the proposed Amendment No. 9 to the Core Area Liquid Waste Management Plan, as attached in Appendix A, prior to forwarding it to the TCAC for consideration and its recommendations.

## ENVIRONMENTAL IMPLICATIONS

The proposed changes to the CALWMP, as outlined above, support the CRD goals and objectives of pursuing resource recovery opportunities and completing the wastewater treatment system to operate in a carbon neutral or better manner.

A 5,000 cubic metre attenuation tank will ensure that the Municipal Wastewater Regulations are met regarding overflows from the east coast interceptor, with the exception of those caused by the combined sewer system in the Uplands area of Oak Bay. An update on this item is anticipated to come before Committee in early 2014. The new screening facilities at both Clover Point and Macaulay Point outfalls are expected to provide more reliable and effective screening and reduce wear and tear on the pumps at those facilities.

The changes proposed in regards to biosolids stabilization, allowing technologies other than thermophillic anaerobic digestion, will maintain commitments to recover biogas and phosphorous from the process. The biosolids products will be produced for beneficial use in strict compliance with CRD Board policy, to be discussed in depth at the Committee of the Whole meeting on October 30, 2013.

## ECONOMIC IMPLICATIONS

Most of the changes in draft Amendment No. 9 are expected to have little or no impact on project costs, with the exception of items 2, 3 and 4 described under "Background" above. As Item 2 will result in a reduction of project costs, while item 3 will result in an approximately similar increase in costs, the overall estimated cost of the project remains substantially unchanged. However, item 4 could potentially generate significant cost savings, depending on the alternative technologies brought forward by the proponents.

## INTERGOVERNMENTAL IMPLICATIONS

Staff have reviewed the series of proposed changes with ministry of environment staff. The amendments are considered minor and have been requested to be received in the form of a letter to the minister. The proposed amendments are to be forwarded to the TCAC for consideration as the next step.

## CONCLUSION

Amendment No. 9 is required to incorporate changes into the Core Area Liquid Waste Management Plan that have been made to the Core Area Wastewater Treatment Program since June 2010. The changes include a smaller initial Arbutus Road attenuation tank, the addition of new raw sewage screening facilities at both Clover Point and Macaulay Point pump stations and the potential for innovative, alternative biosolids processing technologies.

## RECOMMENDATION

That the Core Area Liquid Waste Management Committee refer the proposed Amendment No. 9 to the Technical and Community Advisory Committee for consideration and that its recommendations on the proposed amendment be brought back to the next Core Area Liquid Waste Management Committee meeting.

Dan Telford, P.Eng.
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DT:jt
Attachment: 2

# CORE AREA LIQUID WASTE MANAGEMENT PLAN

## DRAFT AMENDMENT NO. 9 – SUMMARY

### PURPOSE

Over the past three years, since Amendment No. 8 was submitted to the Minister of Environment in June 2010, the Core Area Wastewater Treatment Program has been further developed and refined. This has resulted in a requirement to make a number of changes to the Core Area Liquid Waste Management Plan (CALWMP), as revised by Amendment No. 8. The purpose of Amendment No. 9 is to incorporate these changes into the CALWMP by modifying the applicable clauses in Amendment No. 8.

### BACKGROUND

The changes to the CALWMP, as proposed in Amendment No. 9, are as follows:

1. The scheduled project completion date moves from the end of 2016 to the end of 2018.
   The additional time is required to make up for time lost when the project was put on hold for an extended period until all senior government funding was secured. The Federal and Provincial funding agreements are for work to be completed by the end of 2018.

   **Amendment to Program Schedule:**
   Amend page 1.2 of Section 1, and Commitments 1 and 2 on page 6.1 of Section 6, by deleting the phrase *"by the end of 2016"* and replacing it with *"by the end of 2018"*, and also, in Section 13, by deleting the Preliminary Program Schedule, dated 09 June 2010 and replacing it with the Program Schedule, dated 30 September 2013, which is attached as Appendix 2.

2. The initial storage volume of the proposed Arbutus Road attenuation tank is reduced from 12,000 cubic metres to 5,000 cubic metres.

   This attenuation tank is required to enable the transmission of all Saanich East flows to the proposed McLoughlin Point treatment plant. The original 12,000 cubic metre capacity tank was based on a 2004 consultant's study and was the ultimate size that would be required if inflow and infiltration (I&I) continued to increase beyond 2025. The consultant, Kerr Wood Leidal, has now updated the original study using flow data that has been collected since 2004. The consultant now recommends that a 5,000 cubic metre facility be constructed initially, and that "space should be reserved to double the size of the facility at some time in the future beyond 2030 should I&I increase beyond current levels." The consultant's report is attached to this Amendment as Appendix 1.

**Amendment to the Proposed Capacity of Arbutus Road Attenuation Tank:**
Amend page 1.2 of Section 1 by deleting *"As indicated in figure 6.1A, a 12,000 $m^3$ wet weather flow attenuation tank will be constructed at Arbutus Road in Saanich."* and replacing it with *"As indicated in figure 6.1A, a 5,000 $m^3$ wet weather flow attenuation tank will be constructed at Arbutus Road in Saanich*." The revised figure 6.1A is attached as Appendix 3.

3. New sewage screening facilities are proposed for both Clover Point and Macaulay Point pump stations.

The commitment in Amendment No. 8 was to provide new grit removal facilities at both pump stations, but to retain the existing raw sewage screens. On further consideration, it has been concluded that the existing screening facilities at both pump stations should be replaced when the grit removal facilities are replaced.

**Amendment to Add New Screening Facilities to Clover Point and Macaulay Point Pump Stations:**
Amend Commitment 2.f) on page 6.1 of Section 6 by deleting *"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."* and replacing it with *"New grit and screening facilities at the Clover Point and Macaulay Point pump stations."*

4. Biosolids processing to produce only dry fuel for cement kilns, pulp mills or waste to energy facilities is revised to include other beneficial uses that comply with CRD Board Policy.

The commitment in Amendment No. 8 was to dewater and dry the digested biosolids to be used as a fuel for cement kilns, pulp mills or waste to energy facilities. On further consideration, it has been concluded that this restricts the ability of proponents for the Biosolids Energy Centre to recommend other innovative alternative technologies that may result in significantly improved system performance and cost savings while providing products for beneficial use that are in strict compliance with CRD Board.

**Amendment to Biosolids Processing:**
Amend Commitment 3.a) on page 6.2 of Section 6 by deleting *"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."* and replacing it with *"Using a solids stabilization process to stabilize and reduce solids, kill pathogens and generate biogas for use onsite or offsite."*

Amend Commitment 3.b) on page 6.2 of Section 6 by deleting "*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."* and replacing it with *"Preparing the biosolids for beneficial use."*

5. In addition to the above, there are a number of proposed wording changes in Amendment No. 9 intended to clarify ambiguities or to enable proponents to recommend innovative alternative technologies that may result in improved system performance or cost savings. These changes include the replacement of the words *"thermophilic anaerobic digestion"* with the words *"solids stabilization"* to enable the biosolids processing system to be designed and operated to economically produce a product that is suitable for its proposed use or disposal method.

**Amendments Regarding the Recovery of Energy from Biosolids:**

Amend Commitment 2.a) on page 7.1 of Section 7 by deleting *"Provide thermophilic anaerobic digesters to produce biogas from wet sludge, reduce solids mass and provide pathogen destruction."* and replacing it with *"Provide solids stabilization to produce biogas from wet sludge, reduce solids mass and provide pathogen destruction."*

Amend Commitment 2.b) on page 7.1 of Section 7 by deleting *"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."* and replacing it with *"Provide additional capacity in the stabilization process to accept source separated food waste and/or fats, oils or greases (FOG) to enhance the production of biogas."*

Amend Commitment 2.c) on page 7.1 of Section 7 by deleting *"Upgrade 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."* and replacing it with *"Use the biogas generated by the solids stabilization process onsite or offsite."*

Amend Commitment 2.d) on page 7.1 of Section 7 by deleting *"Recover waste heat from the digesters to warm the raw sludge being fed to them, thereby reducing digester heating costs."* and replacing it with "*Recover waste heat, where practical, from the solids stabilization process to reduce energy consumption."*

Amend Commitment 2.e) on page 7.1 of Section 7 by deleting *"Dewater and thermally dry the digested biosolids to be used as a fuel for cement kilns, paper mills or waste to energy facilities."* and replacing it with *"Prepare the biosolids for beneficial use."*

**Amendment Regarding Phosphorous Recovery:**

Amend Commitment 4 on page 7.2 of Section 7 by deleting *"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."* and replacing it with *"The Capital Regional District and the participating municipalities will recover phosphorous fertilizer from the solids stabilization process."*

**Amendment Regarding Greenhouse Gas Reduction and Carbon Footprint:**

Amend Commitment 5 on page 7.2 of Section 7 by deleting *"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."* by replacing it with *"The Capital Regional District and the participating municipalities will complete the wastewater treatment system in a manner that will result in operations being carbon neutral, or better."*

Attachments: 3

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# Technical Memorandum

**DATE:** September 4th, 2013

**TO:** Malcolm Cowley, P.Eng., Capital Regional District

**FROM:** Chris Johnston, P.Eng.

**RE:** **CORE AREA WASTEWATER MANAGEMENT PROGRAM**
**Updated Memorandum Summarizing the Determination of Storage Volumes Along the East Coast Interceptor**
**Our File 283.365-300**

## Introduction

Kerr Wood Leidal Associates Ltd. (KWL), as part of the *Northeast Trunk Sewer and East Coast Interceptor Sewer Upgrade Options Study, CRD, September 2004* previously assessed flows in the Capital Regional District's (CRD's) East Coast Interceptor (ECI) and developed a number of options to eliminate overflows from storms up to the 5-year return period. The preferred option included a peak flow attenuation tank in the Arbutus area, an upgrade to the existing Currie Road Pumping Station, a new peak flow pumping station at Trent Street, and conveyance system improvements between Currie Road and Clover Point pumping stations. The study developed preliminary sizing for the Arbutus tank and determined that a 6,000 cubic metre tank would be needed immediately and expanded to a 12,000 cubic metre facility in 2025 based on an estimated growth in inflow and infiltration.

Since 2004, considerable data has been collected on the performance of the ECI/NET system, and the impact of water efficiency programs such as low-flow fixtures. As well, the Core Area Wastewater Treatment Program (CAWTP) was initiated leading to the creation of a new design criteria and the sizing of new treatment facilities. A memorandum was prepared in October 21, 2010 that utilizes this new data set and criteria change to refine the previous 2004 analysis and confirm the sizing of the proposed storage facility. The purpose of this memorandum is to summarize the updated 2010 analysis.

## Regulatory Requirements

The current Core Area Liquid Waste Management Plan (CALWMP) submitted to the Province by the CRD commits the CRD to intercept and convey all flows up to the 5-year storm through to the Clover Point Pumping Facility for marine locations along the East Coast of Greater Victoria. A commitment for Oak Bay to separate the combined sewer areas of the Uplands is additionally mandated by the Ministry of Environment. All flows in excess of the 5-year storm will be permitted to discharge through approved overflow facilities at Finnerty Cove and McMicking Point.

## Approach to Analysis

The approach adopted for this updated analysis is the following:

- Use nearly 400,000 flow monitoring data records in the simulation of historical flow. Calibration of the model was achieved by directly comparing measured level of flow over the overflow weir at Arbutus to the model output. The level at the weir was identified as a critical calibration parameter, and sensitivity analyses were performed to identify the level of confidence in this reading (discussed below).
- The NET/ECI system is controlled through a set of logic controls administered through the operations centre at Macaulay Point. For example, during rain events, downstream level measurements can implement controls upstream to throttle pump station flows to protect downstream residents from sewer backups. This same functionality has been modeled to identify the impact of controls on overflow frequency and volume.
- Validation of the model was confirmed by comparing modeled overflows with recorded overflow events (discussed below).
- Create several data sets of information based on the 11 years of continuous data, namely: a base case scenario using the raw data, a 2030 data set based on the latest population projections and water fixture replacement programs, and an additional 2030 data set using predicted inflow and infiltration escalation rates based on previous CRD research.
- Run the data sets through the upgraded hydraulic model to determine the size of storage facility required to prevent overflows from occurring in storms less than the 5-year return period.
- Develop design scenarios to investigate the sensitivities of various design parameters, proposed operational controls, and measuring sensor accuracies.
- Select the preferred tank size.

Of interest, the 2004 study was limited to a flow monitoring period of three winter seasons (1999 to 2002).

## Existing Overflows Along the NET/ECI and Model Calibration

Table 1 shows a summary of the current number of overflows along the NET/ECI for the period of 2000 to 2007 upstream of the Clover pump station (reference: *Sanitary Sewer Overflow Management Plan*, CRD, June 2008).

**Table 1: Recorded Overflows Upstream of Clover Point: 2000 - 2007**

| Overflow Name | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Finnerty Cove | 1 | 3 | 3 | 6 | 2 | 3 | 4 | 7 | **29** |
| Currie PS/McMicking Point | 1 | 6 | 2 | 7 | 3 | 7 | 8 | 9 | **43** |
| Humber PS | 4 | 3 | 1 | 5 | 3 | 6 | 8 | 5 | **34** |
| Rutland PS | 4 | 6 | 2 | 8 | 8 | 10 | 8 | 7 | **53** |

Under the existing condition, baseline data set (existing operational control conditions with the current facilities in place), the model predicted a similar number of overflow events as shown in Table 1.

## Decreasing Unit Wastewater Rates

Design flows were calculated as part of the *Wastewater Flow Management Strategy Discussion Paper*[1]. This document summarizes that for the "Fixture Reduction Rates Scenario", the sanitary flow will be equal to 196 L/cap/day for the year 2030. A review of the 2010 data indicates that the sanitary flow is approximately 195 L/cap/day. Of interest, the adjusted unit rate measured in 2001 was 223 L/c/d indicating that there has been a decline in unit rates over the past decade. This is similar to trends throughout the CRD and North America both in terms of water consumption and sewage generation. This unit rate is below the 225 L/cap/d value used in the 2004 analysis indicating that this component of the previous storage tank sizing was conservative. Further, since the existing rate of 195 L/c/d already matches the projected rate in the "Fixture Reduction Rates Scenario", it can be concluded that toilet and appliance replacements are happening faster in the Arbutus/Finnerty area.

## Continuous Model Simulation of Future Improvements

Under the future condition with the proposed upgrades in the CAWTP, several storm events came close to triggering an overflow event, but only the December 15, 1999 event produced a 2,000 cu.m. overflow upstream of the Clover Point Pump Station (excluding the combined sewer areas tributary to the Humber and Rutland pump stations). However, it should be noted that the major storm event on October 20, 2003 would have likely produced an overflow, had it not been preceded by an extended dry period (the soil was able to absorb a significant portion of the event).

The return period of the December 15, 1999 event is estimated to be close to five years at the critical 12 to 24 hour duration based on a comparison of rainfall recorded at the Penryhn rain Gauge to the historical Intensity-Duration-Frequency curves for the area. Therefore, the storage facility should be sized large enough to capture this event.

## Selection of Preferred Storage Volume

The results of this analysis were then run for twelve sensitivity scenarios based on varying the domestic flow, I&I and Oak Bay combined sewer separation rate. Although significant care has been taken in confirming the accuracy of the flow data used in this analysis, it is important to note that there are some significant data resolution factors associated with predicting future overflow volumes from storm events using the 4 metre long sharp crested weir at the Arbutus flow monitoring station. For this reason, a sensitivity analysis was performed to derive appropriate factors of safety to add to any particular scenario. The sensitivity analysis includes analyzing the historical storm events using a 1 to 2 cm drift in the measurement equipment over an average storm duration. The appropriate factor of safety is calculated to be 2,000 cu.m.

The preferred tank size based on the sensitivity analysis is 5,000 cubic metres as summarized in Table 2.

**Table 2: Preferred Tank Sizing**

| Option | Description | Storage Volume (cu.m) |
|---|---|---|
| Base Case | 2,000 cu.m raw storage volume, plus 2,000 cu.m. factor of safety based on above, and 25% provision for operational control. | 5,000 |

[1] CH2M Hill, Associated Engineering and Kerr Wood Leidal Associates, Capital Regional District Core Area Wastewater management Program, Wastewater Flow management Strategy Discussion Paper – Design Flow Tables, 033-Dp-2, January 2009.

The provision for operational control is based on the fact that storage facilities will not operate exactly as the theoretical model used in this study. This is due to the fact that the SCADA system will have inherent issues such as time lags, hydraulic constraints, sensor resolution, or other equipment limitations. Depending where the tank is actually situated, the operational control could be up to 25% of the total storage volume.

This sizing is confirmed by the 'I&I increase' sensitivity analysis, which identifies an ultimate tank size of 10,000 cu.m., of which 5,000 cu.m. is recommended for a future expansion beyond 2030.

The analyses assume that Uplands combined sewers will be separated by Oak Bay as stipulated by the Ministry of Environment when they approved the Core Area LWMP. Never-the-less, Oak Bay and the Core Area Liquid Waste Management Committee inquired whether a larger tank could help solve Oak Bay's combined sewer overflows in addition to meeting MOE's requirements. Therefore, options for reducing overflows to a 5-year event without Uplands sewer separation were identified in KWL's October 20, 2010 memo "ECI Storage and Flows – Uplands Sewers Not Separated". Using findings from this analysis, CRD report #EWW 10-96 identified that a larger tank plus significant downstream conveyance upgrades would be required, at an estimated additional cost of $25M would be required to address overflows resulting from Uplands combined sewers if Oak Bay does not separate.

## Summary

Based on the Table 2 analysis, the recommendation is to construct a 5,000 cubic metre storage facility along the Penryhn siphon preferably at the top end of the siphon next to the existing Arbutus Flume and Finnerty Cove Overflow facility. It is also recommended that based on the sensitivity analysis, space should be reserved to double the size of the facility at some time in the future beyond 2030 should I&I increase above current levels.

The revision in sizing from the previous 6,000 cu.m in the 2004 study to the current 5,000 cu.m. sizing is predominately due to a measured reduction in sewage generation rates (i.e. from 223 in 2001 to 195 L/c/day in 2010) as well as an analysis method using a significantly longer data set. The provision to increase the tank volume from 5,000 cu.m. to 10,000 cu.m (12,000 cu.m in the 2004 study), is still valid based on predicted I&I research. However, the estimated year in which this increase in storage is required has moved from 2025 to outside the CAWTP 2030 time frame, and is therefore not included in the proposed capital plan expenditures.

**KERR WOOD LEIDAL ASSOCIATES LTD.**

Prepared by:

Chris Johnston, P.Eng.
Project Manager

CJ/am
Encl.

## Statement of Limitations

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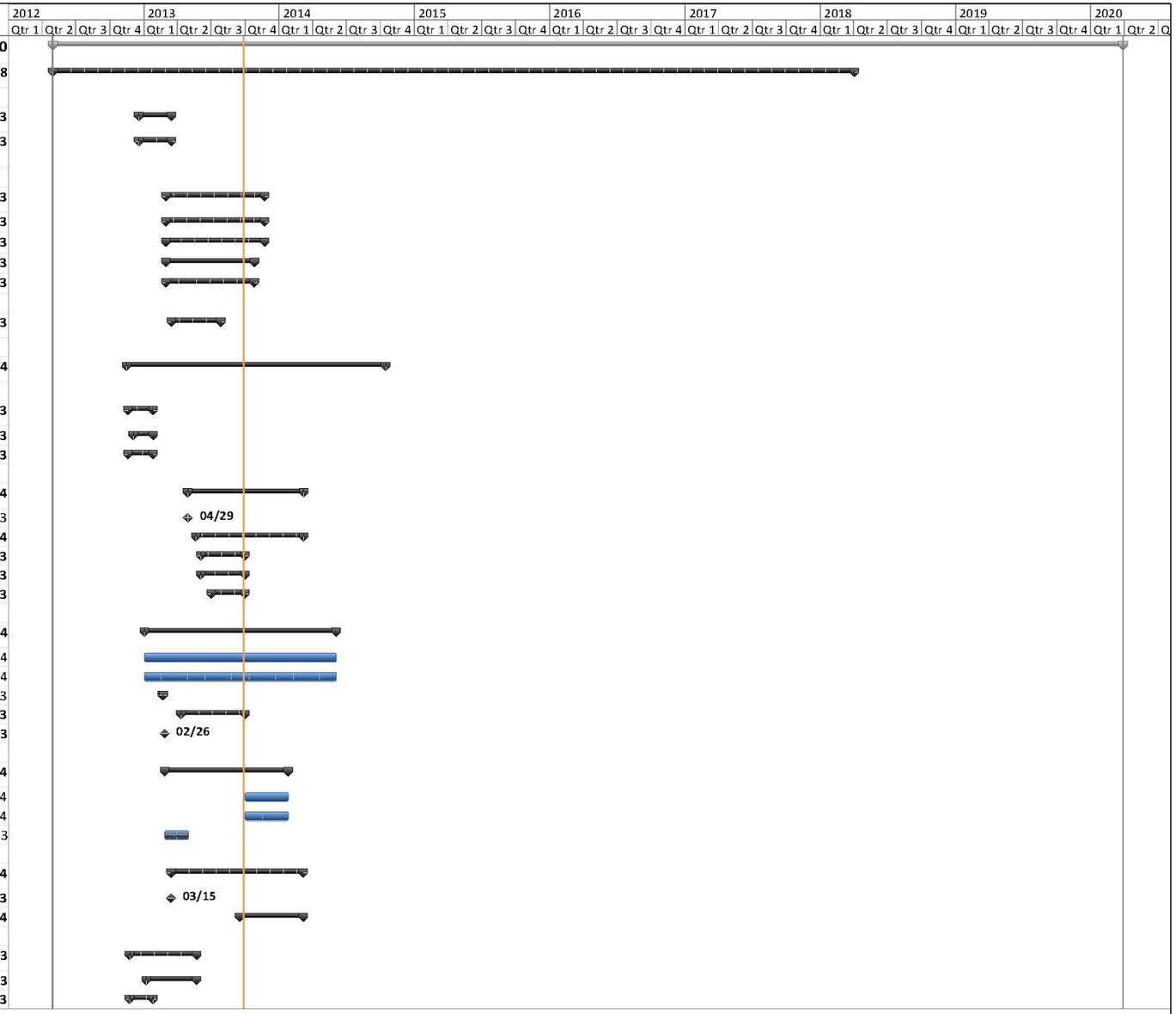
## Revision History

| Revision # | Date | Status | Revision | Author |
|---|---|---|---|---|
| 0 | Sept. 4, 2013 | For Review | | CJ |
| | | | | |

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 0 | **CAWTP** | **100.3 mons** | **Mon 04/30/12** | **Fri 03/27/20** |
| 1 | **KEY MILESTONES** | **74.65 mons** | **Mon 04/30/12** | **Tue 04/03/18** |
| 14 | | | | |
| 15 | **ENVIRONMENTAL** | **3.15 mons** | **Tue 12/18/12** | **Fri 03/15/13** |
| 16 | **ENVIRONMENTAL REVIEW AND APPROVAL (McLoughlin, Clover, Macaulay & Conveyance)** | **3.15 mons** | **Tue 12/18/12** | **Fri 03/15/13** |
| 21 | | | | |
| 22 | **PROGRAM PLANS** | **9.2 mons** | **Fri 03/01/13** | **Fri 11/22/13** |
| 23 | **Project Implementation Plan** | **9.2 mons** | **Fri 03/01/13** | **Fri 11/22/13** |
| 31 | **Project Management Plan** | **9.2 mons** | **Fri 03/01/13** | **Fri 11/22/13** |
| 39 | **Program Budget** | **8.25 mons** | **Fri 03/01/13** | **Fri 10/25/13** |
| 50 | **Program Schedule** | **8.25 mons** | **Fri 03/01/13** | **Fri 10/25/13** |
| 57 | | | | |
| 58 | **COMMISSION BRIEFING MATERIAL** | **4.6 mons** | **Fri 03/15/13** | **Fri 07/26/13** |
| 64 | | | | |
| 65 | **ENVIRONMENTAL REMEDIATION** | **24.15 mons** | **Thu 11/15/12** | **Tue 10/14/14** |
| 70 | | | | |
| 71 | **DESIGN** | **2.4 mons** | **Mon 11/19/12** | **Fri 01/25/13** |
| 72 | **CADD and Design Standard** | **1.9 mons** | **Mon 12/03/12** | **Fri 01/25/13** |
| 75 | **Design Criteria** | **2.38 mons** | **Mon 11/19/12** | **Fri 01/25/13** |
| 78 | | | | |
| 79 | **LAND ISSUES** | **10.85 mons** | **Mon 04/29/13** | **Fri 03/07/14** |
| 80 | McLoughlin Point Site Purchase | 0 days | Mon 04/29/13 | Mon 04/29/13 |
| 81 | **Biosolids Site** | **10.1 mons** | **Tue 05/21/13** | **Fri 03/07/14** |
| 86 | **DND** | **4.15 mons** | **Mon 06/03/13** | **Mon 09/30/13** |
| 89 | **Transport Canada** | **4.15 mons** | **Mon 06/03/13** | **Mon 09/30/13** |
| 92 | **Victoria Harbour Authority** | **3.15 mons** | **Tue 07/02/13** | **Mon 09/30/13** |
| 95 | | | | |
| 96 | **REZONING / STAKEHOLDER MANAGEMENT** | **18 mons** | **Wed 01/02/13** | **Tue 06/03/14** |
| 97 | Program Wide Open Houses | 18 mons | Wed 01/02/13 | Tue 06/03/14 |
| 98 | Program Wide Public Meetings | 18 mons | Wed 01/02/13 | Tue 06/03/14 |
| 99 | **Haro Woods** | 0.15 mons | Wed 02/20/13 | Sat 02/23/13 |
| 102 | **McLoughlin** | **5.95 mons** | **Thu 04/11/13** | **Mon 09/30/13** |
| 110 | **Craigflower Pump Station** | **0 mons** | **Tue 02/26/13** | **Tue 02/26/13** |
| 112 | | | | |
| 113 | **DEVELOPMENT PERMIT APPLICATION PROCESS** | **11.5 mons** | **Tue 02/26/13** | **Fri 01/24/14** |
| 114 | McLoughlin Wastewater Treatment Plant | 4 mons | Tue 10/01/13 | Fri 01/24/14 |
| 115 | Biosolids / Energy Recovery Facility (Rezoning & DP) | 4 mons | Tue 10/01/13 | Fri 01/24/14 |
| 116 | Craigflower Pump Station | 45 days | Tue 02/26/13 | Tue 04/30/13 |
| 117 | | | | |
| 118 | **INFRASTRUCTURE WORK** | **12.3 mons** | **Fri 03/15/13** | **Thu 03/06/14** |
| 119 | **McLoughlin Wastewater Treatment Plant** | **0 mons** | **Fri 03/15/13** | **Fri 03/15/13** |
| 121 | **Biosolids / Energy Recovery Facility** | **6 mons** | **Mon 09/16/13** | **Thu 03/06/14** |
| 123 | | | | |
| 124 | **PROGRAM WIDE PROCUREMENT** | **6.3 mons** | **Fri 11/23/12** | **Wed 05/22/13** |
| 125 | **SCADA** | **4.85 mons** | **Mon 01/07/13** | **Wed 05/22/13** |
| 134 | **Legal Services Advisor** | **2.15 mons** | **Fri 11/23/12** | **Thu 01/24/13** |




Project: CAWTP
Date: Fri 09/27/13

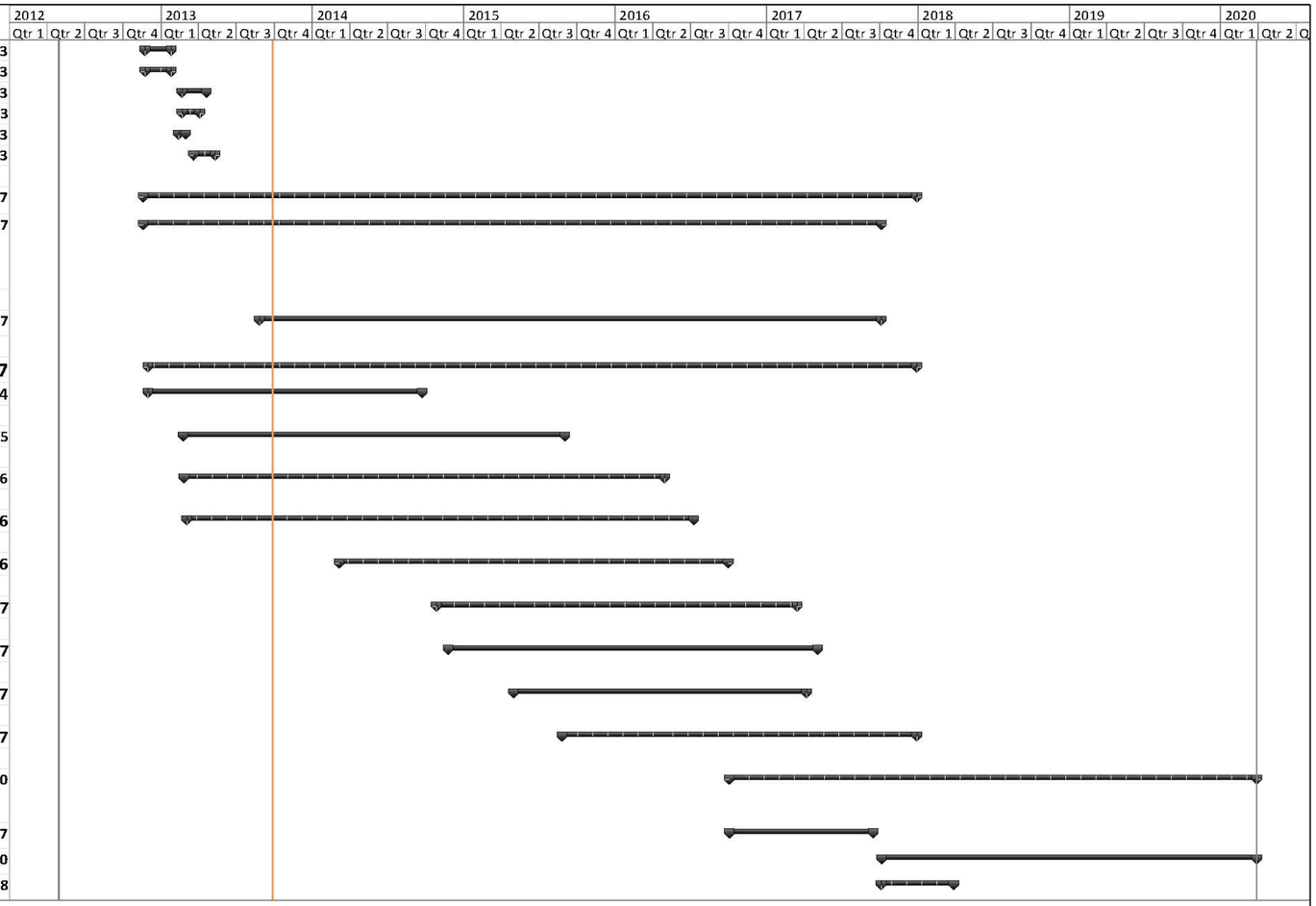
| | | | | | |
|---|---|---|---|---|---|
| Task | Project Summary | Inactive Milestone | Manual Summary Rollup | Deadline | |
| Split | External Tasks | Inactive Summary | Manual Summary | Critical | |
| Milestone | External Milestone | Manual Task | Start-only | Critical Split | |
| Summary | Inactive Task | Duration-only | Finish-only | Progress | |

**DRAFT**
**AUGUST 31, 2013**



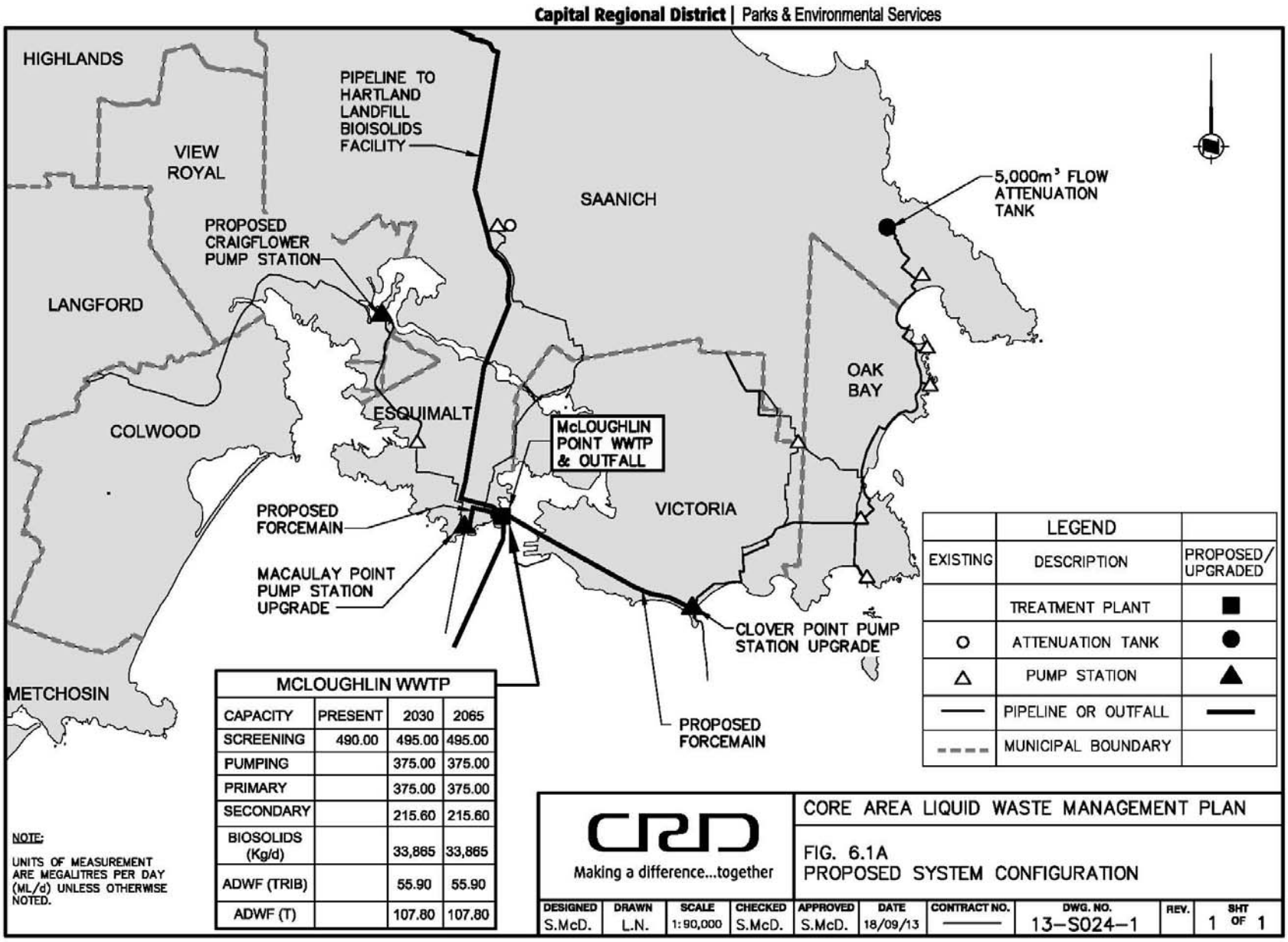
1422601

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 139 | Fairness Advisor | 2.15 mons | Fri 11/23/12 | Thu 01/24/13 |
| 144 | Business / Financial Advisor | 2.15 mons | Fri 11/23/12 | Thu 01/24/13 |
| 149 | Risk / Insurance Advisor | 2.15 mons | Wed 02/20/13 | Fri 04/19/13 |
| 154 | Insurance Broker Services | 1.55 mons | Wed 02/20/13 | Wed 04/03/13 |
| 159 | Conflict of Interest Adjudicator | 0.7 mons | Tue 02/12/13 | Thu 02/28/13 |
| 162 | Communications Consultant | 1.85 mons | Wed 03/20/13 | Fri 05/10/13 |
| 167 | | | | |
| 168 | **DESIGN, PROCUREMENT & CONSTRUCTION** | 64.45 mons | Mon 11/19/12 | Thu 12/28/17 |
| 169 | **MCLOUGHLIN POINT WASTEWATER TREATMENT PLANT (PLANT, HARBOUR CROSSING, OUTFALL) (DBF)** | 61.55 mons | Mon 11/19/12 | Wed 10/04/17 |
| 288 | | | | |
| 289 | **BIOSOLIDS / ENERGY CENTRE (DBFO)** | 51.75 mons | Mon 08/26/13 | Tue 10/03/17 |
| 314 | | | | |
| 315 | **CONVEYANCE PROJECTS** | 64 mons | Fri 11/30/12 | hu 12/28/17 |
| 316 | CRAIGFLOWER PUMP STATION (DBB) | 22.85 mons | Fri 11/30/12 | Mon 09/22/14 |
| 348 | | | | |
| 349 | ARBUTUS ROAD ATTENUATION TANK (DBB) | 31.8 mons | Sat 02/23/13 | Tue 09/01/15 |
| 405 | | | | |
| 406 | CLOVER PUMP STATION (DB) | 40.1 mons | Mon 02/25/13 | Fri 04/29/16 |
| 459 | | | | |
| 460 | CLOVER FORCEMAIN (DBB) | 42.25 mons | Mon 03/04/13 | Fri 07/08/16 |
| 518 | | | | |
| 519 | ECI / TRENT TWINNING (DBB) | 32.35 mons | Fri 03/07/14 | Thu 09/29/16 |
| 570 | | | | |
| 571 | MACAULAY PUMP STATION (DB) | 30.05 mons | Mon 10/27/14 | Tue 03/14/17 |
| 617 | | | | |
| 618 | MACAULAY FORCEMAIN (DBB) | 30.8 mons | Tue 11/25/14 | Wed 05/03/17 |
| 675 | | | | |
| 676 | CURRIE PUMP STATION (DBB) | 24.4 mons | Fri 05/01/15 | Thu 04/06/17 |
| 720 | | | | |
| 721 | CURRIE FORCEMAIN (DBB) | 29.5 mons | Wed 08/26/15 | Thu 12/28/17 |
| 771 | | | | |
| 772 | **PROGRAM COMMISSIONING, HANDOVER & START-UP** | 44.5 mons | Mon 10/03/16 | Fri 03/27/20 |
| 773 | Commissioning Plan | 12 mons | Mon 10/03/16 | Thu 09/14/17 |
| 778 | McLoughlin Wastewater Treatment Plant | 31.8 mons | Thu 10/05/17 | Fri 03/27/20 |
| 784 | Biosolids / Energy Recovery Facility | 6.05 mons | Wed 10/04/17 | Tue 03/27/18 |




Project: CAWTP
Date: Fri 09/27/13

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Task | Project Summary | Inactive Milestone | Manual Summary Rollup | Deadline |
| Split | External Tasks | Inactive Summary | Manual Summary | Critical |
| Milestone | External Milestone | Manual Task | Start-only | Critical Split |
| Summary | Inactive Task | Duration-only | Finish-only | Progress |




| MCLOUGHLIN WWTP | | | |
|---|---|---|---|
| CAPACITY | PRESENT | 2030 | 2065 |
| SCREENING | 490.00 | 495.00 | 495.00 |
| PUMPING | | 375.00 | 375.00 |
| PRIMARY | | 375.00 | 375.00 |
| SECONDARY | | 215.60 | 215.60 |
| BIOSOLIDS (Kg/d) | | 33,865 | 33,865 |
| ADWF (TRIB) | | 55.90 | 55.90 |
| ADWF (T) | | 107.80 | 107.80 |

**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 12,000$m^3$ 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 |

Chapter 16 Trunk Sewer System Infrastructure Upgrading
Operational Certificate ME-18363 – Dockside Green (Victoria) Society

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.

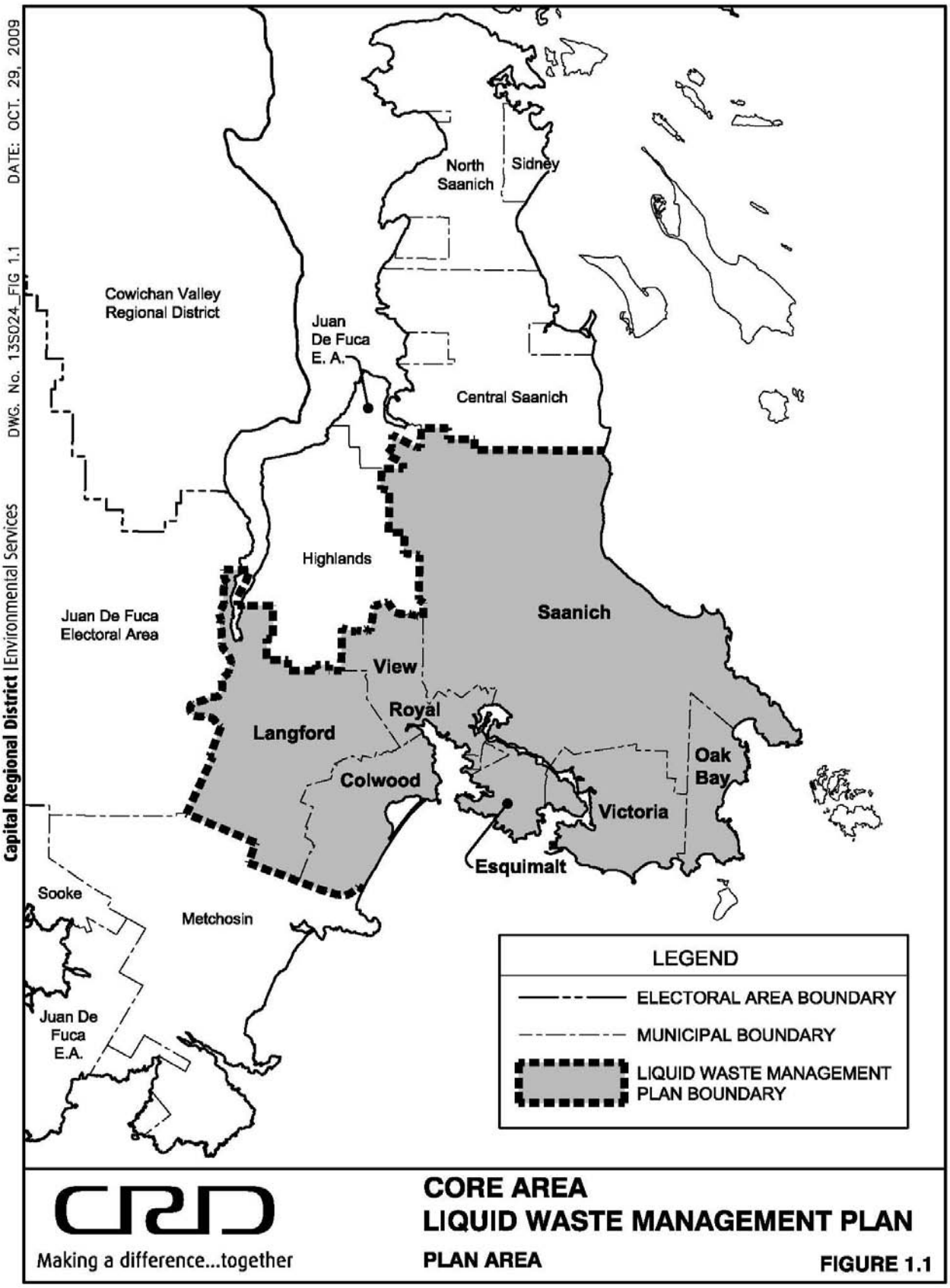
Increasing areas of Colwood and Langford are served by sewers, with plans for further expansion. In the long term, both municipalities are expected to be fully served by sewers.

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.


DATE: OCT. 29, 2009
DWG. No. 13S024_FIG 1.1
Capital Regional District | Environmental Services
North Saanich
Sidney
Cowichan Valley Regional District
Juan De Fuca E. A.
Central Saanich
Highlands
Juan De Fuca Electoral Area
Saanich
View
Royal
Langford
Colwood
Oak Bay
Victoria
Esquimalt
Sooke
Metchosin
Juan De Fuca E.A.
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

**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

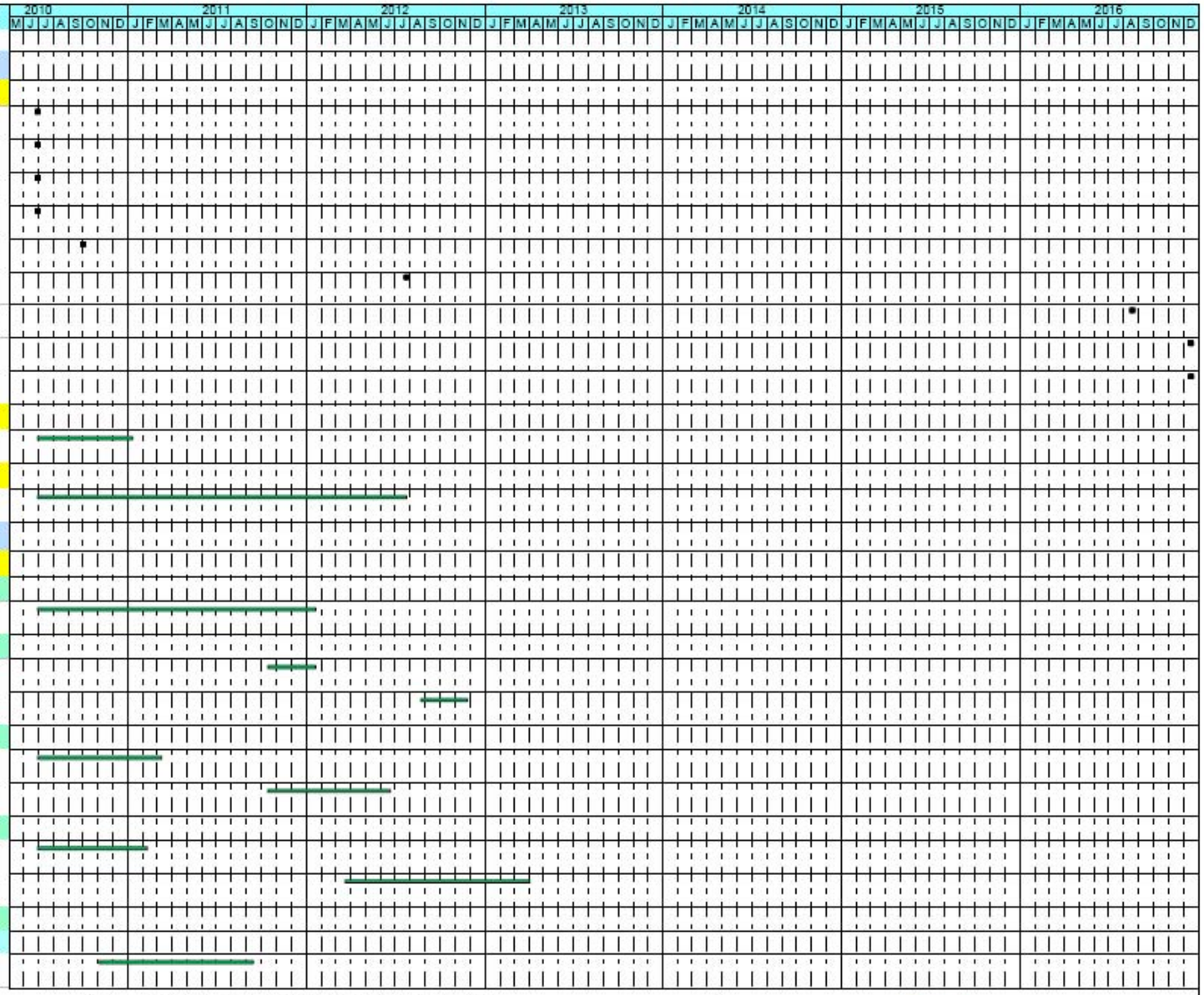
Stantec Consulting Ltd., *Core Area Liquid Waste Management Program – Management of Wet Weather Flow at Clover Point*, May 2010

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

Capital Regional District | Environmental Sustainability
12,000m³ FLOW ATTENUATION TANK & PUMP STATION
OAK BAY
SAANICH
VICTORIA
McLOUGHLIN POINT WWTP & OUTFALL
CLOVER POINT PUMP STATION UPGRADE (INCLUDING GRIT REMOVAL)
PROPOSED FORCEMAIN
PIPELINE TO HARTLAND LANDFILL BIOSOLIDS FACILITY
PROPOSED CRAIGFLOWER PUMP STATION
ESQUIMALT
MACAULAY POINT PUMP STATION UPGRADE (INCLUDING GRIT REMOVAL)
PROPOSED FORCEMAIN
HIGHLANDS
VIEW ROYAL
LANGFORD
COLWOOD
METCHOSIN
LEGEND
EXISTING
DESCRIPTION
PROPOSED/ UPGRADED
TREATMENT PLANT
ATTENUATION TANK
PUMP STATION
PIPELINE OR OUTFALL
MUNICIPAL BOUNDARY
McLOUGHLIN WWTP
CAPACITY PRESENT 490.00
2030 495.00
2065 495.00
SCREENING 490.00 495.00 495.00
PUMPING 375.00 375.00
PRIMARY 375.00 375.00
SECONDARY 215.60 215.60
BIOSOLIDS (Kg/d) 33,865 33,865
ADWF (TRIB) 55.90 55.90
ADWF (T) 107.80 107.80
NOTE:
UNITS OF MEASUREMENT ARE MEGALITRES PER DAY (ML/d) UNLESS OTHERWISE NOTED.
CRD
Making a difference...together
CORE AREA WASTEWATER TREATMENT PROGRAM
FIG. 6.1A
PROPOSED SYSTEM CONFIGURATION
DESIGNED S.McD.
DRAWN L.N.
SCALE 1:90,000
CHECKED S.McD.
APPROVED S.McD.
DATE 14/06/10
CONTRACT NO.
DWG. NO. 13-S024-1
REV.
SHT 1 OF 1

| Task Description | Dur - m | Start | Finish |
|---|---|---|---|
| **PROJECT WIDE** | | | |
| **MILESTONES** | | | |
| Funding approved | 0 | | 30-Jun-10* |
| 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 |
| Final site selection - SENOB Attenuation Tanks | 0 | | 01-Oct-10 |
| McLoughlin, Macaulay & Tunnel Construction start - permits received | 0 | | 24-Jul-12 |
| SENOB Attenuation Tanks Operational | 0 | | 18-Aug-16 |
| Core Area facilities operational | 0 | | 16-Dec-16 |
| Hartland Biosolids and Resource Recovery Facilities operational | 0 | | 16-Dec-16 |
| **Environmental Impact Study (Provincial ) - EIS** | | | |
| EIS McLoughlin, Clover, Macaulay & Conveyancing | 6 | 30-Jun-10 | 11-Jan-11 |
| **CEAA Assessment (Federal)** | | | |
| CEAA McLoughlin, Clover, Macaulay & Conveyancing | 24 | 30-Jun-10 | 24-Jul-12 |
| **DESIGN, PROCUREMENT & CONSTRUCTION STRATEGY** | | | |
| **DESIGN** | | | |
| **Conveyance / Pumping - DBB** | | | |
| Conveyance / Pumping Design 100% | 18 | 30-Jun-10 | 20-Jan-12 |
| **Outfall Macaulay - DB** | | | |
| Outfall Macaulay twinning Design for RFP | 3 | 14-Oct-11 | 20-Jan-12 |
| Outfall Macaulay twinning DB Contractor design to 100% | 3 | 23-Aug-12 | 26-Nov-12 |
| **Tunnel - DB** | | | |
| Tunnel across Victoria Harbour design for RFP | 8 | 30-Jun-10 | 11-Mar-11 |
| Tunnel across Victoria Harbour DB Contractor design to 100% | 8 | 14-Oct-11 | 21-Jun-12 |
| **Hartland Biosolids Facility - DB** | | | |
| Hartland Biosolids Facility design for RFP | 7 | 30-Jun-10 | 09-Feb-11 |
| Hartland Biosolids Facility DB Contractor design to 100% | 12 | 21-Mar-12 | 03-Apr-13 |
| **Liquid Waste** | | | |
| **SENOB Attenuation Tanks - DBB** | | | |
| SENOB Attenuation Tanks Design to 100% | 10 | 03-Nov-10 | 15-Sep-11 |

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CRD - Core Area Wastewater Treatment Program

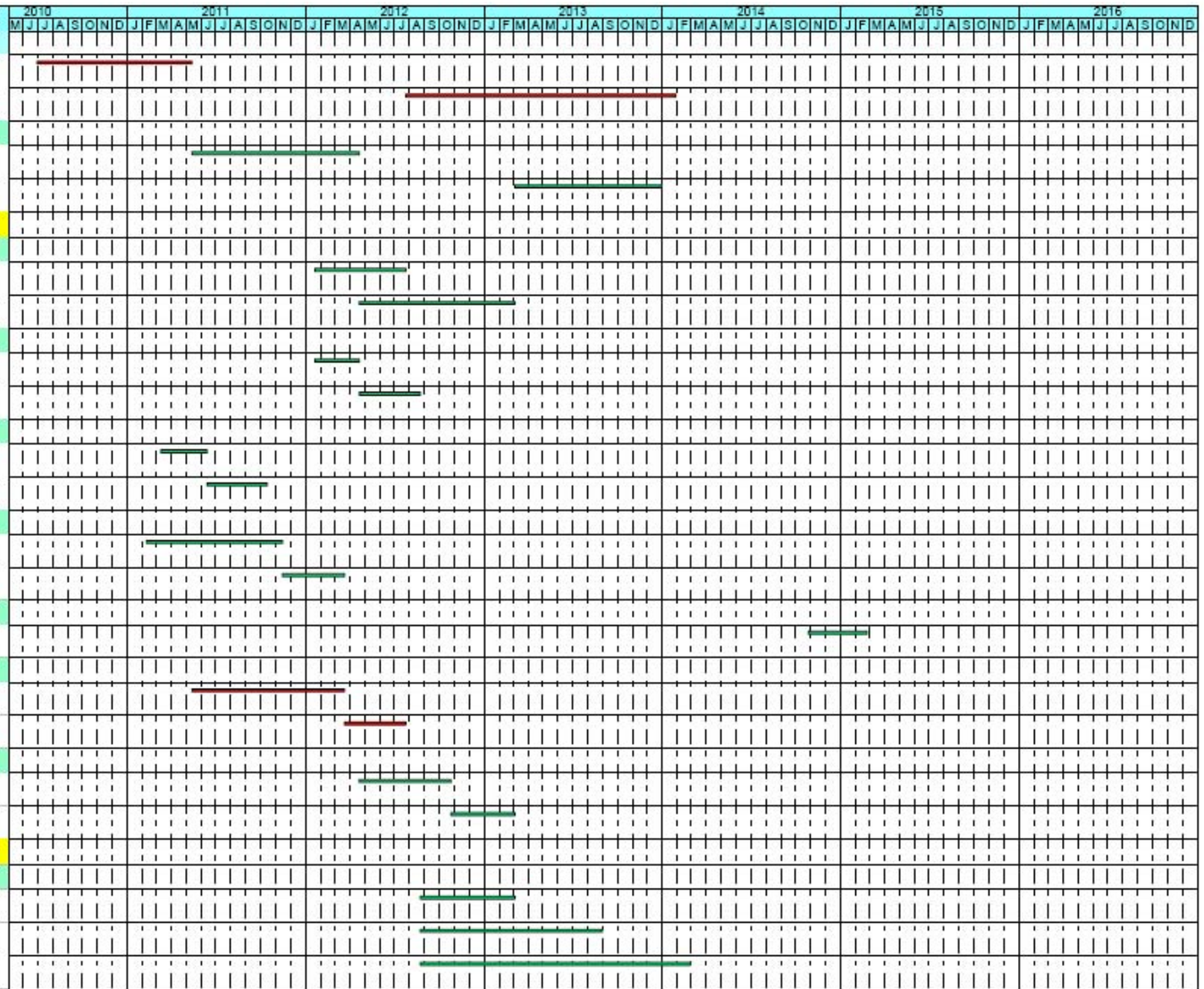
Preliminary Program Schedule - Option 1A Prime-2

09 June 2010

1 of 3

Stantec

| Task Description | Dur - m | Start | Finish |
|---|---|---|---|
| **McLoughlin Plant & Clover Point Pump Station - DB** | | | |
| McLoughlin Plant & CP Pump Station Design for RFP | 10 | 30-Jun-10 | 13-May-11 |
| McLoughlin Plant & CP Pump Station DB Contractor Design to 100% | 18 | 24-Jul-12 | 29-Jan-14 |
| **Hartland Resource Recovery - DBO / DBFO** | | | |
| Hartland Resource Recovery Design for RFP | 11 | 13-May-11 | 20-Apr-12 |
| Hartland Resource Recovery DBO/DBFO Contractor design to 100% | 10 | 04-Mar-13 | 30-Dec-13 |
| **CONTRACTOR PROCUREMENT** | | | |
| **Conveyance / Pumping - DBB (Several Contracts)** | | | |
| Conveyance / Pumping DBB bid period | 6 | 20-Jan-12 | 24-Jul-12 |
| Conveyance / Pumping DBB bid review / award | 10 | 20-Apr-12 | 04-Mar-13 |
| **Outfall Macaulay - DB** | | | |
| Outfall Macaulay twinning DB bid period | 3 | 20-Jan-12 | 20-Apr-12 |
| Outfall Macaulay twinning DB bid review / award | 4 | 20-Apr-12 | 23-Aug-12 |
| **Tunnel - DB** | | | |
| Tunnel across Victoria Harbour DB bid period | 3 | 11-Mar-11 | 13-Jun-11 |
| Tunnel across Victoria Harbour DB bid review / award | 4 | 13-Jun-11 | 14-Oct-11 |
| **Hartland Biosolids Facility - DB** | | | |
| Hartland Biosolids Facility DB Bid period | 9 | 09-Feb-11 | 15-Nov-11 |
| Hartland Biosolids Facility DB Bid review / award | 4 | 15-Nov-11 | 21-Mar-12 |
| **SENOB Attenuation Tanks - DBB** | | | |
| SENOB Attenuation Tanks tender period, evaluation & award | 4 | 27-Oct-14 | 24-Feb-15 |
| **McLoughlin Plant & Clover Point Pump Station - DB** | | | |
| McLoughlin Plant & Clover Point Pump Station DB bid period | 10 | 13-May-11 | 21-Mar-12 |
| McLoughlin Plant & Clover Point Pump Station DB Review / award | 4 | 21-Mar-12 | 24-Jul-12 |
| **Hartland Resource Recovery - DBO / DBFO** | | | |
| Hartland Resource Recovery DBO/DBFO bid period | 6 | 20-Apr-12 | 25-Oct-12 |
| Hartland Resource recovery DBO/DBFO review / award | 4 | 25-Oct-12 | 04-Mar-13 |
| **CONSTRUCTION** | | | |
| **Conveyance / Pumping - DBB** | | | |
| Conveyances Macaulay to McLoughlin Phase 1 - winter work only | 6 | 23-Aug-12 | 04-Mar-13 |
| Pumpstation Retrofit McLoughlin / Macaulay | 12 | 23-Aug-12 | 30-Aug-13 |
| Pumpstations & Conveyances to Hartland Landfill | 18 | 23-Aug-12 | 27-Feb-14 |

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CRD - Core Area Wastewater Treatment Program

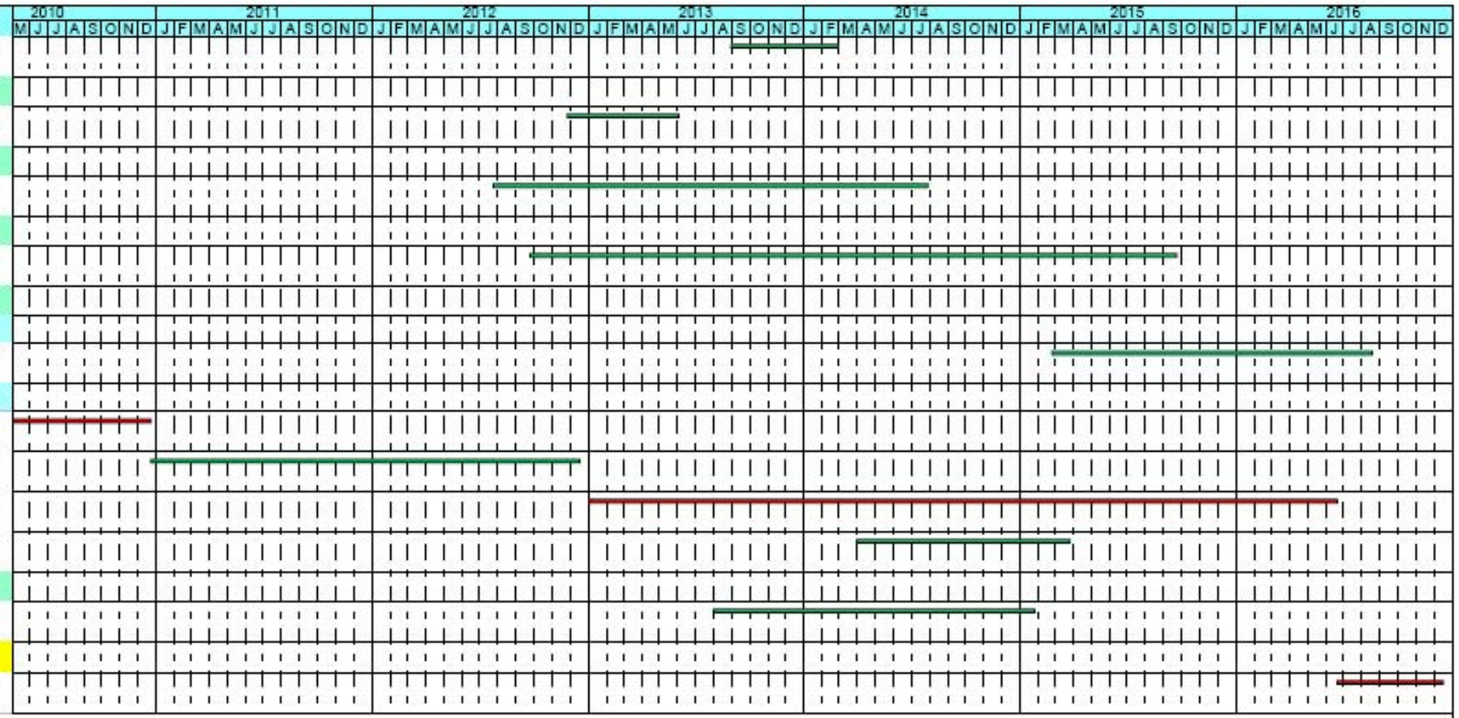
Preliminary Program Schedule - Option 1A Prime-2

09 June 2010

2 of 3

Stantec

| Task Description | Dur - m | Start | Finish |
|---|---|---|---|
| Conveyances Macaulay to McLoughlin Phase 2 - winter work only | 6 | 30-Aug-13 | 27-Feb-14 |
| **Outfall Macaulay - DB** | | | |
| Outfall Macaulay twinning | 6 | 26-Nov-12 | 03-Jun-13 |
| **Tunnel - DB** | | | |
| Tunnel across Victoria Harbour construction | 24 | 24-Jul-12 | 29-Jul-14 |
| **Hartland Biosolids Facility - DB** | | | |
| Hartland Biosolids Facility construction | 36 | 25-Sep-12 | 23-Sep-15 |
| **Liquid Waste** | | | |
| **SENOB Attenuation Tanks - DBB** | | | |
| SENOB Attenuation Tanks construction | 18 | 24-Feb-15 | 18-Aug-16 |
| **McLoughlin Plant & Clover Point Pump Station - DB** | | | |
| McLoughlin site remediation overburden | 15 | 01-Sep-09* | 23-Dec-10 |
| McLoughlin site remediation balance | 23 | 23-Dec-10 | 17-Dec-12 |
| McLoughlin Plant construction | 42 | 02-Jan-13 | 20-Jun-16 |
| Clover Point Pumpstation retrofit construction | 12 | 31-Mar-14 | 26-Mar-15 |
| **Hartland Resource Recovery - DBO / DBFO** | | | |
| Hartland Resource Recovery Construction | 18 | 01-Aug-13 | 26-Jan-15 |
| **COMMISSIONING** | | | |
| Overall system commissioning | 6 | 20-Jun-16 | 16-Dec-16 |




Making a difference...together

CRD - Core Area Wastewater Treatment Program

Preliminary Program Schedule - Option 1A Prime-2

09 June 2010

3 of 3

Stantec

**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.wastewatermadeclear.ca