

Notice of Meeting and Meeting Agenda Core Area Liquid Waste Management Committee

Wednesday, April 13, 2016

9:00 AM

6th Floor Boardroom
Capital Regional District
625 Fisgard St.
Victoria, BC V8W 1R7

L. Helps (Chair), R. Atwell (Vice-Chair), M. Alto, S. Brice, D. Blackwell, J. Brownoff,
V. Derman, B. Desjardins (Board Chair), C. Hamilton, B. Isitt, N. Jensen, C. Plant,
Chief R. Sam, D. Screech, L. Seaton, Chief A. Thomas, G. Young

1. Approval of Agenda

2. Presentation

- 2.1. [16-506](#) Presentation: The Honourable Peter Fassbender, Minister of
Community, Sport and Cultural Development

3. Adoption of Minutes

- 3.1. [16-452](#) Approval of the Minutes of March 23, 2016

Recommendation: That the minutes of the March 23, 2016, meeting of the Core Area Liquid Waste
Management Committee be adopted.

Attachments: [2016-03-23 Minutes CALWMC](#)

4. Chair's Remarks

5. Presentations/Delegations

6. Committee Business

- 6.1. [16-503](#) Fairness and Transparency Advisor - Final Report

Recommendation: That the Core Area Liquid Waste Management Committee recommend to the Capital
Regional District Board:
That the staff report and the final report of the Fairness and Transparency Advisor be
received for information.

(WP - Colwood, Esquimalt, Langford, Oak Bay, Saanich, Victoria, View Royal)

Attachments: [Staff Report: Fairness & Transparency Advisor Final Report](#)

[Appendix A - FTA Terms of Reference](#)

[Appendix B - FTA Final Report](#)

- 6.2. [16-491](#) Update on Municipal Referral Process - Core Area Wastewater and Resource Recovery System
- Recommendation:** That the report be received for information.
- Attachments:** [Staff Report: Municipal Referral Process, Wastewater & Resource Recovery](#)
[Attachment1: Letter from Mayor Helps, 5 April 2016, Confirmation](#)
[Attachment2: City of Victoria Staff Report & Presentation Slides](#)
[Attachment3: City of Victoria Motion, 7 April 2016, Guiding Policy](#)
- 6.3. [16-489](#) Core Area Sewage and Resource Recovery System 2.0 - Budget Update No. 5
- Recommendation:** That the Core Area Liquid Waste Management Committee receive this budget update for information.
- Attachments:** [Staff Report: Budget Update No. 5](#)
[Appendix A: Budget Table](#)
- 6.4. [16-394](#) Previous Westside Options Analysis
- Recommendation:** That, pending the outcome of discussions at the Core Area Liquid Waste Management Committee, Esquimalt and Victoria City Councils, and to ensure that the Westside Select Committee participant communities continue to work towards a solution that meets the objectives of the Committee, staff be directed to revive the work done in part last fall on a Westside Solution--specifically focusing on a one or two plant option and the opportunity to include treatment of solids at a facility on the Westside. [As recommended to the Core Area Liquid Waste Management Committee by the Westside Select Committee at their meeting on March 8, 2016.]
- Attachments:** [Committee Report: To CALWMC from WTRRSC March 8, 2016](#)
[Consultant Report \(Oct 2015\): Westside WWTP Siting Analysis Ph 2](#)
[Staff Report \(Nov 2015\): Technical Analysis for Evaluation of Sites](#)
[Appendix \(Nov 2015\): Westside Technical Team Analysis](#)
- 6.5. [16-514](#) Accountability and Representation in Governance of Components of Eastside and Westside Sub-systems
- Recommendation:** That the report be received for information.
- Attachments:** [Staff Report: Governance of East and West Side SubSystems](#)
- 6.6. [16-428](#) Winter Shoreline Bacterial Levels - Core Area and Saanich Peninsula
- Recommendation:** That the Core Area Liquid Waste Management Committee receive this report for information.
- Attachments:** [Staff Report: Winter Shoreline Bacterial Levels](#)
[Appendix A: Sampling Station Maps and Sampling Results](#)

7. Correspondence

- 7.1. [16-477](#) Correspondence: PPP Canada, 30 March 2016, re Extension of the Conditional Financial Agreement for the Biosolids Energy Centre with the CRD

Recommendation: That the correspondence from PPP Canada, 30 March 2016, be received for information.

Attachments: [Letter: PPP Canada, Extension of Conditional Financial Agreement](#)

- 7.2. [16-490](#) Correspondence: CAO R. Lapham, CRD, 30 March 2016, to Mayor Desjardins and Esquimalt Council, re Clarification Regarding Land Use Approvals - Wastewater Treatment

Recommendation: That the correspondence from CAO R. Lapham, CRD, 30 March 2016, to Mayor Desjardins and Esquimalt Council, be received for information.

Attachments: [Letter: CRD to Esquimalt, March 2016, Land Use Approvals](#)

- 7.3. [16-518](#) Correspondence: Ministry of Environment, 30 March 2016, re Core Area Liquid Waste Management Plan Amendment No. 10

Recommendation: That it be recommended to the Capital Regional District Board:
That the correspondence from the Ministry of Environment of 30 March 2016 be received for information.

(WP Colwood, Esquimalt, Langford, Oak Bay, Saanich, Victoria, View Royal)

Attachments: [Letter: From MOE re CALWMP Amendment No 10, March 30, 2016](#)

- 7.4. [16-509](#) Correspondence: US Ambassador Heyman, 22 March 2016, re Wastewater Treatment

Recommendation: That the correspondence from US Ambassador Heyman of 22 March 2016 be received for information.

Attachments: [Letter: US Ambassador Heyman, 2016 March 22, Wastewater Treatment](#)

8. New Business

9. Adjournment

[16-108](#) Reference: Core Area Liquid Waste Management Committee Project Charter

Attachments: [Project Charter](#)

Next Meeting: May 11, 2016

To ensure quorum, please advise Nancy More (250-360-3024) if you or your alternate CANNOT attend.

Meeting Minutes
Core Area Liquid Waste Management
Committee

Wednesday, March 23, 2016

9:00 AM

6th Floor Boardroom

PRESENT

DIRECTORS: L. Helps (Chair), R. Atwell (Vice Chair), M. Alto, L. Wergeland (for S. Brice),
D. Blackwell, J. Brownoff, V. Derman, B. Desjardins (Board Chair), C. Hamilton, B. Isitt,
D. Screech (9:20), L. Seaton, Chief A. Thomas, G. Young

STAFF: R. Lapham, Chief Administrative Officer; L. Hutcheson, General Manager, Parks and
Environmental Services; D. Lokken, General Manager, Finance and Technology; T. Robbins, General
Manager, Integrated Water Services; S. Hallatt, Manager, Aboriginal Initiatives; B. Reems, Corporate
Officer, and N. More, Committee Clerk (Recorder)

ALSO PRESENT: Director D. Howe, Alternate Director C. Day

ABSENT: N. Jensen, C. Plant, Chief R. Sam

The meeting was called to order at 9:00 a.m.

1. Approval of Agenda

MOVED by Director Brownoff, **SECONDED** by Director Alto,
That the agenda be approved with the supplementary agenda.

MOVED by Director Hamilton, **SECONDED** by Director Desjardins,
That the agenda be amended to add under item 5.12 the motions recommended
to the Committee by the Westside Wastewater Treatment and Resource Recovery
Select Committee, as recorded in items 5.2 and 5.3 of the Westside Select
Committee's March 8, 2016, minutes.

CARRIED

MOVED by Director Brownoff, **SECONDED** by Director Alto,
That the motions recommended to the Committee by the Westside Wastewater
Treatment and Resource Recovery Select Committee, as recorded in items 5.2
and 5.3 of the Select Committee's March 8, 2016, minutes, be added to item 5.12,
and the agenda be approved as amended with the supplementary agenda.

CARRIED

2. Adoption of Minutes

2.1. [16-427](#) Approval of the Minutes of February 24 and 26, and March 2 and 9, 2016

MOVED by Director Blackwell, **SECONDED** by Director Derman,
That the following minutes of the Core Area Liquid Waste Management
Committee be adopted: February 24, February 26, March 2, and March 9, 2016.

CARRIED

3. Chair's Remarks

Chair Helps remarked on the day's agenda.

4. Presentations/Delegations

4.1. 16-455 Delegation: David Langley, re: item 5.5

David Langley spoke of the fresh water supply in the region and against sewage water reuse. He expressed that the relative costs and benefits of secondary and tertiary treatment need to be identified in all stages of option assessments, and that tertiary treatment could not be assumed to be a good idea. The delegation provided a written submission, on file at Legislative and Information Services.

4.2. 16-456 Delegation: Ian Back, re: item 5.10

Ian Back presented the Committee with a handout listing costing information he suggested be provided to the Committee and the public for consideration, including information principles, challenges, and minimums. He made recommendations regarding the format of the next costing report. The delegation provided a written submission, on file at Legislative and Information Services.

4.3. 16-457 Delegation: Hans Larsen, re: item 5.10

Hans Larsen spoke against building an underground wastewater treatment plant and in favour of building an aboveground plant. He provided information on trenchless tunneling with minimum disruption aboveground for the installation of conveyance pipes. The delegation provided a written submission, on file at Legislative and Information Services.

5. Committee Business

5.1. [16-436](#) Update on Municipal Referrals - Core Area Wastewater and Resource Recovery System

R. Lapham provided highlights of the report. On the motion, the Committee discussed the purpose and the effect of referring the matter to the municipalities.

Director Screech entered the meeting at 9:20 a.m.

The Committee discussed the process, First Nations consultation and the timelines.

The Committee discussed authority to release the funds, the need to run the public engagement concurrently, amenities, and the potential to split the main motion into two parts.

**MOVED by Director Desjardins, SECONDED by Director Derman,
That the matter be referred to the communities to determine how they would like to deal with the lead of the community engagement process in their respective communities and that the process be funded from the Core Area Liquid Waste Management Program Phase 2 Planning budget.**

MOVED by Director Isitt, **SECONDED** by Director Brownoff,
That the motion be amended to add that the municipalities report back to the
Core Area Liquid Waste Management Committee on April 13, 2016.
CARRIED

MOVED by Director Desjardins, **SECONDED** by Director Derman,
That the matter be referred to the communities to determine how they would like
to deal with the lead of the community engagement process in their respective
communities and that the process be funded from the Core Area Liquid Waste
Management Program Phase 2 Planning budget; and, that the municipalities
report back to the Core Area Liquid Waste Management Committee on April 13,
2016.

DEFEATED

OPPOSED Alto, Atwell, Blackwell, Brownoff, Derman, Hamilton, Helps, Isitt,
Screech, Seaton, Thomas, Wergeland, Young

MOVED by Director Isitt, **SECONDED** by Director Alto,
That the City of Victoria be requested to co-operate with the CRD on the
community engagement process for the proposed facility at Clover Point, and
that the process be funded from the Core Area Liquid Waste Management
Program Phase 2 Planning Process; and that the City of Victoria be invited to
provide comment to the Core Area Liquid Waste Management Committee on this
approach by April 13, 2016.

CARRIED

OPPOSED Young

MOVED by Director Desjardins, **SECONDED** by Director Hamilton,
That the matter be referred to Esquimalt to determine how they would like to
deal with the lead of the community engagement process in their community,
that the process be funded from the Core Area Liquid Waste Management
Program Phase 2 Planning budget; and that Esquimalt report back to the Core
Area Liquid Waste Management Committee on April 13, 2016.

CARRIED

OPPOSED Young

5.2. [16-189](#) Fairness and Transparency Advisor Reports - January and February, 2016

MOVED by Director Desjardins, **SECONDED** by Director Derman,
That the following Fairness and Transparency Advisor Reports be received for
information:

1. January 2016
2. February 2016

CARRIED

5.3. [16-184](#) 2016 CRD Board Standing Committee Terms of Reference and Work
Programs (CALWMC)

MOVED by Director Alto, **SECONDED** by Director Blackwell,

1. That the attached report "Update to 2016 Capital Funding - Core Area
Wastewater Program" be received for information; and
2. That the terms of reference for the 2016 Core Area Liquid Waste Management
Committee as attached in Appendix A be approved; and
3. That the Core Area Liquid Waste Management Committee recommend to the

Capital Regional District Board:

That the Committee priorities and work program as outlined in the Priorities Dashboard, be confirmed.

CARRIED

5.4. [16-199](#) Available Funding Options - Core Area Wastewater Program

MOVED by Director Desjardins, SECONDED by Director Derman,

That the Core Area Liquid Waste Management Committee recommend to the Capital Regional District Board:

That the report Available Funding Options - Core Area Wastewater Program be received for information.

CARRIED

5.5. [16-206](#) Regional Water System - Supply and Demand

T. Robbins provided clarification on work underway to evaluate the impacts of climate change on precipitation levels.

MOVED by Director Derman, SECONDED by Director Atwell,

That the report be received for information.

CARRIED

**5.6. [16-373](#) Core Area Wastewater Treatment Program and Year End Budget Update
No. 31**

MOVED by Director Desjardins, SECONDED by Director Derman,

That the Core Area Liquid Waste Management Committee recommend to the Capital Regional District Board:

That the Core Area Wastewater Treatment Program and Year End Budget Update No. 31 be received for information.

CARRIED

**5.7. [16-387](#) Core Area Sewage and Resource Recovery System 2.0 - Budget Update
No. 4**

MOVED by Director Blackwell, SECONDED by Director Derman,

That the budget update be received for information.

CARRIED

5.8. [16-364](#) Sustainability Development Technology Fund

MOVED by Director Alto, SECONDED by Director Desjardins,

That the Core Area Liquid Waste Management Committee recommend to the Capital Regional District Board:

That the report be received for information.

CARRIED

**5.9. [16-49](#) Motion with Notice: Accountability and Representation in Governance of
Components of Eastside and Westside Sub-systems**

MOVED by Director Young, SECONDED by Director Blackwell,

That staff be directed to report back at the next meeting on procedural changes and/or governance enhancements that will ensure that each participant who is anticipated to use or pay for a component of the eastside or westside wastewater

treatment sub-systems is included in the governance system directing the design and eventual operation of that component of the system.

CARRIED

OPPOSED Desjardins

- 5.10. [16-257](#) Motion with Notice: Mechanism for Future Options (Derman, Plant)

MOVED by Director Derman, **SECONDED** by Director Screech,
That the proposed motion be tabled indefinitely.

CARRIED

- 5.11. [16-258](#) Motion with Notice: Compliance with Charter Goals (Derman, Plant)

MOVED by Director Derman, **SECONDED** by Director Screech,
That the proposed motion be tabled indefinitely.

CARRIED

OPPOSED Desjardins

- 5.12. [16-201](#) Westside Wastewater Treatment and Resource Recovery Select Committee Agenda Packages and Motion

MOVED by Director Brownoff, **SECONDED** by Director Blackwell,
That the following Westside Wastewater Treatment and Resource Recovery Select Committee agenda packages be received for information.

1. February 2, 2016

2. March 8, 2016

CARRIED

The Committee was presented with a recommendation from the Westside Wastewater Treatment and Resource Recovery Select Committee, as listed in item 5.2 of the Select committee's March 8, 2016, minutes.

MOVED by Director Derman, **SECONDED** by Director Blackwell,
That the following motion recommended by the Westside Wastewater Treatment and Resource Recovery Committee be postponed until the April 13, 2016, meeting:

That, pending the outcome of discussions at the Core Area Liquid Waste Management Committee, Esquimalt and Victoria City Councils, and to ensure that the Westside Select Committee participant communities continue to work towards a solution that meets the objectives of the Committee, staff be directed to revive the work done in the part last fall on a Westside Solution --specifically focusing on a one or two plant option and the opportunity to include treatment of solids at a facility on the Westside.

CARRIED

The Committee was presented with a recommendation from the Westside Wastewater Treatment and Resource Recovery Select Committee, as listed in item 5.3 of the Select committee's March 8, 2016, minutes. L. Hutcheson provided background on the matter.

MOVED by Director Hamilton, **SECONDED** by Director Alto,
That the analysis of potential cost savings for wet weather flows be expanded, with an expanded scope to include all flows currently being discharged at Macaulay Point.

CARRIED

- 5.13. [16-280](#) Eastside Wastewater Treatment and Resource Recovery Select Committee Agenda Package for Information
- MOVED by Director Alto, SECONDED by Director Derman,
That the Eastside Wastewater Treatment and Resource Recovery Select Committee agenda package of February 17, 2016, be received for information.
CARRIED**

6. Correspondence

Chief Thomas left the meeting at 10:02 a.m.

**MOVED by Director Desjardins, SECONDED by Director Derman,
That correspondence items 6.1 thru 6.9 be received for information.
CARRIED**

- 6.1. [16-302](#) Correspondence from Harbour Resource Partners, 18 Feb. 2016, re: Harbour Resource Partners Affordable and Bylaw Compliant Solution for the CRD CALWMP Liquid Treatment Plant

This Correspondence was received for information.

- 6.2. [16-303](#) Correspondence from Esquimalt and Songhees Nations, 19 Feb. 2016, re: CRD Sewage Treatment Facility-Rock Bay Lands

This Correspondence was received for information.

- 6.3. [16-304](#) Correspondence from Burnside Gorge Community Association, 22 Feb. 2016

This Correspondence was received for information.

- 6.4. [16-342](#) Correspondence from Tourism Victoria to CRD Directors, 25 Feb. 2016, re: Sewage Treatment

This Correspondence was received for information.

- 6.5. [16-354](#) Correspondence Between Chair of the Core Area Liquid Waste Management Committee and Esquimalt Mayor, re: Core Area Wastewater Treatment

This Correspondence was received for information.

- 6.6. [16-375](#) Correspondence Between Core Area Liquid Waste Management

Committee Directors, 23 Feb. 2016, re: Comments on IRM for Feb. 24

This Correspondence was received for information.

- 6.7. [16-388](#) Correspondence from Harbour Resource Partners, 3 March 2016, re: Harbour Resource Partners Affordable and Bylaw Compliant Solution for the CRD CALWMP Liquid Treatment Plant

This Correspondence was received for information.

- 6.8. [16-393](#) Correspondence: Washington State Legislature to Mayor of Victoria, 03 March 2016, re: CRD Sewage Treatment

This Correspondence was received for information.

- 6.9. **16-449** Correspondence from CRD Board Chair Desjardins to Minister of Environment, Mary Polak, 17 March 2016, re: CRD Core Area Liquid Waste Management Plan Amendment No. 10

This Correspondence was received for information.

7. New Business

8. Motion to Close the Meeting

- 8.1. [16-447](#) Motion to Close the Meeting

MOVED by Director Hamiton, **SECONDED** by Director Blackwell,
That the meeting be closed in accordance with the Community Charter Part 4, Division 3, 90 (1) (a) personal information about an identifiable individual who holds or is being considered for a position as an officer, employee or agent of the regional district or another position appointed by the regional district; and (k) negotiations and related discussions respecting the proposed provision of a regional service that are at their preliminary stages and that, in the view of the board, could reasonably be expected to harm the interests of the regional district if they were held in public; and (2)(b) the consideration of information received and held in confidence relating to negotiations between the regional district and a provincial government or the federal government or both, or between a provincial government or the federal government or both and a third party.
CARRIED

9. Adjournment

MOVED by Director Atwell, **SECONDED** by Director Atwell,
That the meeting be adjourned at 11:32 a.m.
CARRIED

CHAIR

RECORDER



Making a difference...together

REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE MEETING OF WEDNESDAY, APRIL 13, 2016

SUBJECT **Fairness and Transparency Advisor – Final Report**

ISSUE

To provide the final report of the Fairness and Transparency Advisor.

BACKGROUND

Kim Cholette was appointed as the Fairness and Transparency Advisor (FTA) by the Board on August 12, 2015 for a term that expired on March 31, 2016. The FTA Terms of Reference (Appendix A) were approved by the Board on October 15, 2015.

The Terms of Reference linked the work of the FTA to the Core Area Sewage Treatment project (the "Project") work plan and the FTA's mandate was to ensure the process of costing the options, working with the host jurisdiction(s) and preparing an amendment to the Liquid Waste Management Plan was fair, transparent, impartial and objective.

The tasks associated with the phase of the Project that the FTA was retained to assist with were originally anticipated to conclude by the end of 2015. At its meeting of October 14, 2015, the CRD Board approved an updated Project Charter, Schedule and Work Plan that included tasks that were scheduled to conclude by March 31, 2016. As these tasks were relevant to the FTA's mandate, Ms. Cholette's term was extended to March 31, 2016.

The Project has now completed the Options Development Phase by submitting an amendment to the Liquid Waste Management Plan. The Project has now moved into the Planning Phase and as a result the FTA role has concluded.

From September 2015 to March 2016, the FTA investigated and rendered decisions on 30 complaints. A summary of the complaints and decisions are available on the CRD website at <https://www.crd.bc.ca/project/wastewater-planning/fta-landing-page/reports>. Ms. Cholette has prepared a final report that is attached as Appendix B. This report outlines the accomplishments of the FTA over the term.

The updated Project Charter budgeted \$280,000 for expenses associated with the Technical Oversight Panel and the FTA. Over the course of the term, the FTA has billed a total of \$154,398.25 (excluding applicable taxes).

The pace of the Project moved quickly and at times it was challenging to provide timely information to the FTA to meet the process timelines. The FTA worked independent of staff and the political process. The FTA was committed to providing timely decisions to complainants and worked diligently to ensure that the issues raised by complainants were independently and impartially assessed. The FTA also ensured the issues raised by the complainants and her assessment of those issues were provided to the CALWMC in a timely fashion so that the CALWMC could consider the impact of those issues on the Project process and factor the issues into committee discussions and deliberations.

Moving forward in the Project process, a traditional procurement Fairness Advisor will be retained to act as an independent third party observer in all matters related to the Project Concept Call. In contrast to this FTA role, the procurement advisor's scope will be narrowly focused on the steps taken in the formal procurement process.

CONCLUSION

Over the term, the FTA successfully provided for the independent review of public concerns and the relaying of decisions on those concerns directly to the CALWMC. The role has now concluded as the Project has moved into the Planning Phase.

RECOMMENDATION

That the Core Area Liquid Waste Management Committee recommend to the Capital Regional District Board:

That the staff report and the final report of the Fairness and Transparency Advisor be received for information.

Submitted by:	Brent Reems, MA, LLB, Senior Manager Legislative & Information Services
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

Attachment: Appendix A - Terms of Reference, Fairness and Transparency Advisor
Appendix B - Final Report of Fairness and Transparency Advisor

Fairness and Transparency Advisor
Terms of Reference

Background

On March 11, 2015, the CRD Board approved a work plan for the Core Area Sewage Treatment project (the "Project") that includes three phases of work: Options Development, Planning and Implementation. The approved Work Plan Overlay is attached as Appendix A.

The Westside and Eastside Select Committees are scheduled to bring forward solution sets for siting options to the Core Area Liquid Waste Management Committee ("CALWMC") starting in July of 2015. Subsequently, detailed feasibility assessments and cost estimates for the solution sets will be conducted and brought forward for consideration and a decision will be made on siting for the Project. This phase of the work will involve developing an amendment to the provincially-approved Liquid Waste Management Plan and working with the host municipality(ies) to ensure that site zoning is achieved. These tasks are anticipated to conclude by the end of 2015.

Mandate

The Fairness and Transparency Advisor (FTA) will ensure the CRD's process of costing the options, working with the host jurisdiction(s) and preparing an amendment to the Liquid Waste Management Plan is fair, transparent, impartial and objective.

Principles

The FTA will be guided by the following principles:

Independence. The FTA will be appointed by the CRD Board and will carry out the responsibilities of the role independent of all Board and staff structures within the CRD. The FTA will report to the Board through the CALWMC, but will not be required to report or give evidence to the CRD Board or any committee about anything learned in the exercise of the FTA's function.

Accessibility. The FTA will be accessible to residents of the Core Area municipalities and the CRD will publicize its operations and availability.

Impartiality. The FTA will act in consideration of and with respect for the legitimate interests and concerns of all affected parties.

Confidentiality. The FTA will ensure confidentiality of all personal information and will not release any personal information unless written permission has been received from the affected person or otherwise required by law.

Duties

The FTA's principal duties are:

1. to receive complaints from residents and property owners of the Core Area municipalities related to aspects of the Project that fall within the FTA's mandate;
2. to investigate any such complaint;
3. to monitor the process and undertake investigations on the FTA's own initiative related to aspects of the Project that fall within the FTA's mandate;
4. to report to the Board through the CALWMC the results of an investigation;
5. to provide monthly status reports to the CALWMC;
6. to make recommendations to the Board through the CALWMC to help strengthen the fairness, transparency or objectiveness of the process followed relating to aspects of the Project that fall within the FTA's mandate.
7. at the conclusion of the term, to provide a written report to the Board through the CALWMC addressing the extent to which the CRD followed a fair, transparent and open process in executing the aspects of the Project that were within the FTA's mandate.

Term

The FTA's term will commence upon appointment and will expire on March 31, 2016.

Discretion

Subject to these Terms of Reference, the FTA has the sole discretion to:

1. decide whether to investigate a complaint;
2. determine what the scope of an investigation will be; and
3. set the procedures for an investigation.

Access to Information

The FTA will have access to any CRD files, records, reports, documents and information needed in fulfilling the functions of the role. Requests by the FTA for information should be handled in a convenient and expeditious manner.

The FTA may seek information from contacts external to the CRD (such as participating municipalities) but will not have any right to access information outside of the CRD's custody and control.

The FTA is subject to the *Freedom of Information and Protection of Privacy Act*.

Reporting and Recommendations

The FTA may bring to the attention of the Board through the CALWMC any policies, rules or processes which appear unclear or unfair or inequitable and may suggest changes that the FTA determines are appropriate in the circumstances.

In addition to monthly reporting, the FTA will issue any supplementary report or investigative report or recommendations to the CALWMC.

The FTA will have the right to speak to a report or recommendations made to the CALWMC or the Board through the CALWMC.

Prohibited Functions

Although the FTA is authorized to function in the widest possible context and with a minimum of constraints, the FTA will not:

1. release any personal information regarding an individual complainant unless permission has been given by the complainant or as required by law;
2. exercise a judicial function or make binding decisions in any case;
3. act as the advocate of any party during the investigation of a complaint;
4. exercise authority beyond the legal authority of the CRD;
5. have authority to impose remedies or sanctions, or to enforce or change any policy, rule or procedure.
6. become involved in matter where there may be an actual or perceived conflict of interest.

Budget and Staff

The budget for the operation of the FTA will be set by CRD staff in consultation with the FTA.

Arrangements for office accommodation and administrative support will be set by CRD staff in consultation with the FTA.

Review of Terms of Reference

These terms of reference will be reviewed by the FTA prior to the commencement of the term and the prospective FTA will have the opportunity to make recommendations on changes to the Board through the CALWMC.

Approved CRD Board October 14, 2015
Revised by CRD Board on December 9, 2015

CRD WASTEWATER PLANNING PROJECT FAIRNESS & TRANSPARENCY ADVISOR (FTA) FINAL REPORT

March 31, 2016

This report summarizes the activities of the Fairness and Transparency Advisor (FTA) between August 12, 2015 and March 31, 2016 with respect to oversight of options selection process for wastewater treatment for the Core Area.

Overall the FTA received 30 complaints, reviewed 28, and issued 16 decisions (as 13 complaints were dealt with in one decision). The FTA made recommendations for action with respect to 11 complaints, while finding no breaches of fairness in the remaining 5 complaints.

Mandate

The mandate of the FTA was to ensure that the process of costing the options, working with the host jurisdiction(s) and preparing an amendment to the Liquid Waste Management Plan was fair, transparent, impartial and objective. The FTA did not have the power to impose remedies or to undo decisions of the Core Area Liquid Waste Management Committee (CALWMC) or the CRD.

Activities

Table 1: FTA Activities

Activity	Hours Worked
Setting up procedures	62
Monitoring	27.7
Meetings	26
Complaints	603.25
Other admin	100.1
Advice	1.7
Total	820.75

Over the course of the FTAs involvement in the Core Area wastewater treatment project, several activities were performed to oversee the fairness and transparency of the process. Each of these are noted in the table and briefly described below.

The total number of hours billed during this period (spanning August 2015 to March 2016) is 820.75 hours, for a total of \$154,398.25.

Establishing Procedures

The FTA established the process for the review of complaints and own-initiative investigations, as well as the FTA's role as it relates to the provision of advice. The procedures developed reflected administrative fairness principles and were intended to ensure a rapid review and adjudication of issues. Subsequently, the FTA created public web content concerning the FTA role and the scope of the FTA's mandate.

Monitoring

Over the course of the term, the FTA reviewed and monitored upcoming meetings of the various committees, flagging any potential issues associated with transparency, impartiality, or fairness. In this capacity, the FTA reviewed agendas, minutes and video footage of committee meetings.

Meetings

While this was a very minor aspect of the role, the FTA did in the initial weeks, attend a few committee meetings in order to introduce the role and explain the processes to committee members.

Advice

When requested, the FTA provided advice to committee chairs and other staff with regard to ensuring process fairness and transparency. This advice typically focused on public participation in the consultation process and project and procedural aspects of project decision-making processes.

Complaints (requests for review)

The most significant aspect of the FTA's mandate and role focused on reviewing complaints from the public with respect to fairness and transparency issues.

Complaints process



Below is a brief explanation of the process for receiving; screening, reviewing and deciding on a complaint. Upon receipt of a written complaint an acknowledgement was provided to both the complainant and the CRD within 3 working days. During this phase, a written summary of the complaint was provided and posted on the CRD webpage.

The FTA then screened the application to determine whether the issue(s) raised in the complaint met the grounds for investigation; that is, whether the complaint raised potential for a breach of process fairness. A written screening decision was then provided by the FTA to the complainant and the CRD, for posting on the FTA webpage.

If through screening of the complaint it was determined that the issue would proceed to investigation, the following steps were followed: the FTA provided notice of the commencement of an investigation to the complainant and the CRD within 3 working days of the screening decision; the FTA examined evidence provided by the complainant and/or the public record; and the FTA sought clarification from CRD staff and/or consultants with respect to the issue(s) raised.

A decision was then released presenting the findings of the investigation and any recommendation(s). The decision was provided to the complainant and the CRD, and subsequently posted to the CRD webpage.

Complaints statistics

Of the 30 complaints received, the FTA screened out 2 requests (these did not proceed to investigation. Specifically, these were complaints number 10 and 16). Additionally, not all the issues raised in each complaint proceeded to review. In all cases where issues were screened out of the complaint process and did not proceed to investigation, written reasons were provided. These reasons fell under three main categories: i) the issue(s) raised did not meet the grounds for investigation as the issues in the complaint did not relate to fairness or transparency; ii) the issue(s) raised were substantive (e.g., technical) or otherwise pertained to an issue on which the FTA could not provide comment; or iii) the complainant had not taken other steps to resolve their issue prior to bringing it forward to the FTA.

The scope of each complaint – that is, the number of issues raised and their complexity and time required to reach a decision – varied. In particular, the FTA received several complaints of a complex nature that required

extensive research and review of evidence from the public record. The more complex issues tended to involve multiple records; technically complex issues; and lengthy documents requiring several hours to review and absorb. However, the majority of the FTA’s decisions were issued within a week of a submitted request for review.

Summary of Concerns Raised

Of the thirty complaints received, it is possible to categorize them into three general areas:

1. Participation Rights
2. Exercise of Discretionary Powers
3. Procedural Aspects of Certain Actions/Decision Making Processes

Some complaints raised issues that crossed more than one category. However, the categorization of concerns below reflects the primary issue of fairness each complaint raised. Each of the three categories is discussed below.

1. Participation Rights

REQUEST NUMBER	DETAILS OF REQUEST
Request 3	TOP engaging with the public
Request 5	Availability of minutes
Request 7	Sufficiency of the provision of information about gasification
Request 9	Adequacy of information on options costs in the on-line survey
Request 11	Procedural concerns with an on-line survey question
Request 12	Adequacy of information on water reuse costs in on-line survey

In terms of general procedural concerns raised, a common issue related the public’s participation in the process. Participation rights generally consider the following aspects:

- i. Whether the processes allow sufficient or reasonable time for the public and interested parties, to review and understand the information;
- ii. Whether the processes ensure that all relevant information was made available;
- iii. Whether the processes offer an opportunity for discussion on the information & whether the public was given a meaningful opportunity to state or present their case & to challenge information;
- iv. Whether the decision maker was impartial (unbiased and without a personal interest in the outcome of the decision)

- i. Whether the processes allow sufficient or reasonable time for the public and interested parties, to review and understand the information

It was a well understood fact that the timelines associated with this project were aggressive and externally driven with the CRD having very little control over the outer contours of the timelines (they had flexibility only to manage within the margins of the timelines imposed). For the most part, the FTA found that the notice periods; the length of time between public sessions, etc., were reasonable. However with respect to the Eastside consultation process, the FTA was not able to confirm what the specific lead times were with respect to all of the public notice given for various consultation events and therefore could not comment on the sufficiency of the notice provided.

ii. Whether the processes ensure that all relevant information was made available

Central features of procedural fairness include timely access to relevant information as well as sufficient time to review and digest it. Overall, I am comfortable stating that with respect to the information made available to the public, there were signposts of significant efforts to keep the public informed and to attempt to provide succinct information on issues which were at times, technically complex and part of a web of factors.

As it relates to the specific concerns raised related to access to information, the FTA did find that with respect to some documents, the information was not easily found and/or written in such a way as to ensure fulsome coverage within a single document. There were examples of certain documents being incomplete in so far that they did not repeat certain information on costing which had been available in other documents; making the review of the costing information in a single document more cumbersome. In particular, two complaints dealt with the issue of inadequate information provided with regards to options costing. Complaints number 9 and 12 related to a lack of clear and accessible information on transportation and water recovery costs, including the metrics for determining these costs. An earlier complaint (number 4) raised issue with the lack of information provided on the effects of a potential plant breakdown. The FTA recommended the CRD provide such information to the public.

iii. Whether the processes offered an opportunity for discussion on the information; the opportunity for public to state or present their case & dispute any information;

The FTA found that in general, the processes used to inform the public enabled those opposed to challenge the accuracy of any facts and/or the validity of arguments being put forward. In addition, those adversely affected by the decisions were given an opportunity of stating their reasons for objecting to it.

While some issues were raised with certain public sessions and processes, in further investigation, the FTA was unable to find evidence of a breach of procedural fairness.

iv. Whether the decision maker was impartial (unbiased and without a personal interest in the outcome of the decision)

There was a concern raised with respect to potential bias of a committee member in engaging in public undertakings as the process unfolded. It was determined that public officials had a role to play in such activities and no bias was found.

2. Exercise of Discretionary Powers

REQUEST NUMBER	DETAILS OF REQUEST
Requests 17-29	Processes for adding additional sites

There were several complaints related to the exercise of discretionary powers by various bodies. The single most disputed issue in the end related to the exercise of discretion to consider options which had not been raised within the context of the established process.

Discretion must “...be exercised within a manner that is within a reasonable interpretation of the margin of manoeuvre contemplated by the legislature, in accordance with the principles of the rule of law...in line with general principles of administrative law governing the exercise of discretion...”¹

Decision makers are expected to exercise the discretion available to them, in good faith and with the objective of attaining the aims being sought. They should consider all relevant information and not dwell on

¹ *Baker v. Canada* (Minister of Citizenship & Immigration), [1999] 2 S.C.R. 817 at para. 53 (internal citations omitted)

irrelevant information. In addition, they should not exercise their discretion as a result of coercion and should ensure that in the exercise of discretion that they consider the full merits of the issues before them.

While the CALWMC’s process in the end related to site selection was somewhat flexible and they did exercise their discretion – they did entertain site options which were not raised as part of the community/municipal consultation process – it is my view that in prioritizing substance over process, they demonstrated a genuine consideration of submissions. Strict adherence to process, in this instance, would have been of dubious utility.

As I have previously stated, fairness is contextual and eminently variable and its content is to be decided in the specific context of each case. In this instance, the fiscal importance of the decision; the number of property owners impacted by the decision; and the tight timelines all combine to create a difficult decision-making environment. I believe that in the end, decision-makers made fair procedural choices which coincided with the objectives of the project.

3. Procedural Aspects of Certain Actions/Decision Making Processes

REQUEST NUMBER	DETAILS OF REQUEST
Request 1	Selection criteria for engineering consultants
Request 2	Accuracy of costing methods and metrics
Request 4	Site selection criteria and the Eastside consultation process
Request 6	TOP deliberative processes
Request 8	Costing methodology processes
Request 13	Consideration of alternatives in the option selection process
Request 14	Eastside committee consultation processes
Request 15	Bias in the selection process and Eastside consultation materials and methods
Request 30	TOP vetting of feasibility and costing studies

Nine complaints raised issue with procedural aspects of various decisions. In each case it was found that the processes used, as a general rule, did not give rise to diminished procedural fairness.

As it relates to the processes established by the CALWMC related to costing I found that they were discussed at the committee level in a deliberative manner; a decision was made collectively on a given process; this decision was made known to the public and for the most part, followed.

While in some instances it was found that there was room to improve specific processes, this did not amount to a diminishment of fairness.

Nothing found in the various guiding documents related to the procedural aspects of the project could be construed as to impose any mandatory processes or steps; as such, the process, while generally consistent and known to the public, did at times adjust and modify as needed.

As it relates to the most contentious issue (the additional sites added to the options selection process at the end) it would appear the committee turned its mind to the procedural issues associated with adding these sites but in the end, made a determination that the potential fiscal issues with the final decision outweighed the benefit of procedural safeguards to protect the interests of the public.



**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, APRIL 13, 2016**

SUBJECT **Update on Municipal Referral Process – Core Area Wastewater and Resource Recovery System**

ISSUE

To provide the Core Area Liquid Waste Management Committee (CALWMC) with an update on referrals made to the Township of Esquimalt and the City of Victoria regarding Core Area wastewater treatment facility siting engagement process.

BACKGROUND

On March 23, 2016, the Core Area Liquid Waste Management Committee considered a staff report regarding a process to engage with communities surrounding Clover Point in the City of Victoria and McLoughlin Point/Macaulay Point within the Township of Esquimalt. The Committee passed the following resolution:

That City of Victoria be requested to co-operate with the CRD on the community engagement process for the proposed facility at Clover Point, and that the process be funded from the Core Area Liquid Waste Management Program Phase 2 Planning Process.

And that the City of Victoria be invited to provide comment to the Core Area Liquid Waste Management Committee on this approach by April 13, 2016.

That the matter be referred to Esquimalt to determine how they would like to deal with the lead of the community engagement process in their community, that the process be funded from the Core Area Liquid Waste Management Program Phase 2 Planning budget and that Esquimalt report back to the Core Area Liquid Waste Management Committee on April 13, 2016.

The City of Victoria dealt with the matter on March 24, 2016 at its Council meeting, and the following motion was passed:

- 1. That Council consent to participate cooperatively with the Capital Regional District on the community engagement process for the proposed sewage facility at Clover Point.*
- 2. That staff be directed to engage consultants necessary to carry out this engagement process and advise the Capital Regional District on the funding required to undertake the community engagement for the proposed facility at Clover Point. This funding is to be provided from the Core Area Liquid Waste Management Phase 2 planning process budget.*

Core Area Liquid Waste Management Committee – April 13, 2016
Update on Municipal Referral Process – Core Area Wastewater and Resource Recovery 2

3. *That the Mayor, on behalf of Council, write a letter to the CRD confirming Council's willingness to cooperate in the engagement process and indicate that the City will provide budget details for the engagement at the earliest convenience.*
4. *Council acknowledges that this cooperation doesn't equal consent or support for this proposed sewage treatment location and that this step is only a means for engaging Victoria residents meaningfully and effectively regarding the proposal.*
5. *That all of the above is subject to land use approval by City Council.*
6. *That staff be directed to report back to Council with a public engagement plan.*

The Township of Esquimalt received a CRD staff presentation on the process to date and the CALWMC referral on April 4, 2016 at its Council meeting.

Upon consideration of the matter, the Township of Esquimalt requested that Lisa Helps, Chair of the CALWMC, Robert Lapham, CRD Chief Administrative Officer, and Larisa Hutcheson, CRD General Manager Parks & Environmental Services, attend a subsequent Council meeting to further discuss the matter, which has been scheduled on April 13, 2016.

FINANCIAL IMPLICATIONS

Funding for the process has been identified from the Core Area Liquid Waste Management Program Options Development - Phase 2 Budget, which had a balance of \$498,820 as of February 29, 2016. The CRD will hold the contracts for the engagement specialists retained to conduct the engagement processes in the respective communities and are working collaboratively with staff at both the City of Victoria and Township of Esquimalt to coordinate the work. The budget for the respective processes is likely to be in the order of \$150,000 for each community.

RECOMMENDATION

That the Core Area Liquid Waste Management Committee receive this report for information.

Submitted by:	Dan Telford, P.Eng., Project Manager, Core Area Wastewater and Resource Recovery Project
Concurrence:	Mike Walton, Acting General Manager, Parks & Environmental Services
Concurrence:	Kevin Lorette, P.Eng., MBA, Acting Chief Administrative Officer

LH: cl



April 5, 2016

Dear members of the Capital Regional District Core Area Liquid Waste Management Committee,

On behalf of Council, I am writing to confirm the City of Victoria's commitment to working with the Capital Regional District on an engagement process for the proposed sewage facility at Clover Point. We recognize that this is an important step to facilitate meaningful engagement for a project that will impact Victoria residents.

Please understand that, at this stage in the process, this cooperation does not equal consent or support for this proposed sewage treatment location. Rather, we recognize that this is an important step to help inform Council's understanding of the concerns and interests of Victoria citizens related to the proposal for sewage treatment at Clover Point and to help inform Council's decision related to land use approval for this project.

The City of Victoria will provide the Capital Regional District with budget details for the engagement at our earliest convenience.

Please find below Council's motion from the March 24, 2016 Committee of the Whole meeting for your information:

Motion:

1. That Council consent to participate cooperatively with the Capital Regional District on the community engagement process for the proposed sewage facility at Clover Point.
2. That staff be directed to engage consultants necessary to carry out this engagement process and advise the Capital Regional District on the funding required to undertake the community engagement for the proposed facility at Clover Point. This funding is to be provided from the Core Area Liquid Waste Management Phase 2 planning process budget.
3. That the Mayor, on behalf of Council, write a letter to the CRD confirming Council's willingness to cooperate in the engagement process and indicate that the City will provide budget details for the engagement at the earliest convenience.
4. Council acknowledges that this cooperation doesn't equal consent or support for this proposed sewage treatment location and that this step is only a means for engaging Victoria residents meaningfully and effectively regarding the proposal.

THE CITY OF VICTORIA



OFFICE OF THE MAYOR

5. That all of the above is subject to land use approval by City Council.
6. That staff be directed to report back to Council with a public engagement plan.

Sincerely,

A handwritten signature in black ink, appearing to read "L. Helps".

Lisa Helps
Victoria Mayor



Committee
of the Whole

APR 06 2016

Late Item# 9

Committee of the Whole
For the Meeting of April 7, 2016

To: Committee of the Whole **Date:** April 5, 2016
From: Jonathan Tinney, Director, Sustainable Planning and Community Development
Subject: Guiding Policy for Wastewater Treatment Facilities

RECOMMENDATION

That Council direct staff to:

1. Undertake a comprehensive public engagement process to support development of guiding policy for Council consideration and adoption related to wastewater treatment facilities as a precursor to a future land use application for such a facility within the City of Victoria. This policy should address:
 - a. land use suitability;
 - b. siting options and considerations;
 - c. designer requirements;
 - d. construction and operational considerations, and;
 - e. amenity priorities and opportunities.
2. Hold an open house on Monday April 25, 2016 and distribute a letter to provide background information to the public as well as generate feedback in support of the development of an Engagement Plan for development of the guiding policy framework;
3. Report back to Council on the outcomes of the open house and the draft Engagement Plan.

EXECUTIVE SUMMARY

The Capital Regional District (CRD) has recently identified lands at Clover Point in the City of Victoria as a preferred site for an eastside wastewater treatment facility as part of a two plant wastewater solution for the region. To support future land use approval processes, the CRD board has requested that the City of Victoria develop and lead a community engagement process to discuss considerations related to the siting of wastewater treatment facilities within the city.

The CRD Board also approved a separate process to engage the private sector in identifying any additional options that met key requirements that could include the Clover Point site or other sites in Victoria in Rock Bay.

The City currently has no specific policies to provide planning guidance on land use, integration and design considerations for a wastewater treatment facility. At the same time, public interest related to the siting and management of wastewater treatment is very strong.

As such, there exists an opportunity for the City to undertake a comprehensive, inclusive engagement process resulting in a planning policy framework to support Council decision-making on a wastewater treatment facility at Clover Point or potentially elsewhere within the City pending the outcome of a market sounding process currently underway. Once this policy framework was in place it would support the CRD in the development of its proposal and provide guidance to Council in consideration of a future land use application for a wastewater treatment facility.

The goal of this process would be to engage the public in the development of guiding policy for Council which would:

- identify application requirements, specific to this type of development application;
- create planning policy and design guidelines used to evaluate the appropriateness of land use for consideration at rezoning and development permit. This policy would also include site specific criteria and policy in relation to Clover Point and/or other sites identified previously for siting of a wastewater treatment facility;
- clearly lay out the process by which development applications would follow and where opportunities for public input would be sought, specific to this type of development (acknowledging existing requirements in the (Land Use Procedure Bylaw);
- define operational considerations to support community integration;
- provide guidelines-related to preferred amenity opportunities.

Ultimately, the policy will assist in providing improved clarity, certainty on the process and desired outcomes for all those involved in the process from the applicant, City staff, local communities and Council in reaching decisions on the suitability of a site for a wastewater treatment facility in the City of Victoria.

The policy development process will also begin a longer engagement process founded on the principles and core values of IAP2, including the core value that those affected by the decision have a right to be involved in the decision-making and that public participation promotes sustainable decisions. Engagement will be inclusive and transparent and provide multiple ways for the community to influence this important decision.

This engagement process will also represent only the first phase of feedback. Additional opportunities will also be provided as part of any subsequent land use approval process.

PURPOSE

The purpose of this report is to recommend that Committee and Council endorse the process outlined in this report for developing a guiding policy related to wastewater treatment facilities, which can be used to assist in the determination of any subsequent development applications for a wastewater treatment facility in the City of Victoria.

BACKGROUND

On March 9, 2016, the Capital Regional District (CRD) Board approved that a conditional amendment to the Core Area Liquid Waste Management Plan be submitted to the Province.

Under this amendment, two wastewater treatment facility locations were identified as a base case: Clover Point and McLoughlin Point/Macaulay Plain. The Board directed staff to refer these sites to both the City of Victoria and the Township of Esquimalt for endorsement in principle.

The Board also approved a separate process to engage the private sector in identifying any additional options that met key requirements that could include the Clover Point site or other sites in Victoria in Rock Bay.

On March 10, 2016, City of Victoria passed the following motion:

That Council:

1. *Request that the CRD meet with the Fairfield Gonzales CALUC and present a concept drawing of an underground plant at Clover Point and engage the Community with regard to their concerns and desires specific to this concept.*
2. *THEN the CRD report back to Council and also present a concept plan for an underground plant to Council.*
3. *That Council's consideration of any approval in principle of expansion of existing wastewater facilities at Clover Point would be based on conditions including, but not limited to:*
 - a. *That staff work through the Local Area Planning process to engage residents of Fairfield, Gonzales and other Victoria neighbourhoods to identify neighbourhood amenities and community amenities that would be provided to ensure the most effective integration of this project into the neighbourhood and city;*
 - b. *The surface of the entire footprint of the proposed site being restored upon completion as publicly accessible parkland, with the final elevation of the parkland not to exceed the current elevation of the roadway at Dallas Road;*
 - c. *The provision of a neighbourhood amenity and community amenity package to the satisfaction of the City of Victoria; and,*
 - d. *Mitigation of construction impacts, including: provision for potential continuous waterfront public access around the perimeter of Clover Point from Dallas Road Park in the west to Ross Bay in the east; aesthetic features including artistically adorned hoarding; negotiation of permissible working hours; and provision around access, egress and transport to the site.*
 - e. *Request the Capital Regional District to make best efforts to pursue the most cost effective option for the proposed facility.*
4. *All of the above is subject to land use approval by Council.*

The March 9, 2016, report from the CRD states that "To be successful, the process required to achieve community support and the approvals necessary from Victoria and Esquimalt Councils must be municipally led" and goes on to state that "to help facilitate the process, it is essential that the host municipalities endorse a process that will identify community expectations and requirements. The CRD is not able to determine the ultimate siting of wastewater treatment facilities without municipal support and collaboration."

To support the host municipalities, the necessary capacity and resources are needed to allow a team of engagement specialists to work with municipal constituents to identify a meaningful consultation process and obtain community input. The process will need to identify design guidelines, mitigation features and opportunities to address integrating a wastewater treatment plant into the community and resolve the municipal expectations and requirements for approval of the projects.

On March 23, 2016, the CRD board approved the following:

That the host municipalities lead the community engagement process in their respective communities, that the processes be funded from the Core Area Liquid Waste Management

Program Phase 2 Planning budget and that the approach be referred to both Esquimalt and Victoria Councils.

ISSUES & ANALYSIS

The CRD Board has requested that the relevant host municipalities develop and lead the community engagement process in the respective communities and engage the residents of Fairfield, Gonzales and other Victoria neighbourhoods to identify neighbourhood amenities and community amenities that would be provided to ensure the most effective integration of this project into the neighbourhood and City.

Public interest and concern in the siting and management of wastewater treatment is very high. The City needs to build public confidence in the engagement and decision-making processes. In order to do so, a comprehensive, inclusive engagement process resulting in a policy framework for decision-making about wastewater treatment is required.

While Clover Point has been identified by the CRD as a potential location, this site along with other potential locations would require a rezoning application and potential OCP Bylaw Amendment application to be approved by Council in order to proceed.

There is currently no planning policy to determine the suitability and appropriateness of a rezoning for this type of use, other than general policies contained within the *Official Community Plan (OCP)*.

Regardless of the site specific issues associated with a wastewater treatment facility, there are a number of considerations associated with these types of infrastructure projects which could be addressed via a guiding planning policy protocol. These potential considerations include the following:

- water quality and resources
- odour
- flood risk, seismic and sea level rise adaptation
- site selection background
- biodiversity and geological
- archaeology and cultural significance
- landscape and visual impacts
- open space and green infrastructure
- noise and vibration
- cultural significance
- traffic and transportation
- air quality and emissions
- dust, light, smoke, artificial light
- waste management
- socio-economic issues.
- architecture and urban design

Identifying these considerations and addressing how they will be dealt with in any subsequent application would greatly assist in setting a clear path for the development application process and ensure that a better application is submitted at the outset which should result in a quicker review of the application and overall determination period for the application.

In addition, there are no clear expectations on what is required to be submitted by the applicant, e.g. technical studies, supporting information and engagement plan. Including these requirements, along with community involvement expectations and clearly setting out these requirements in the guiding policy, will assist in any subsequent development application process whether that be the applicant, City staff, local communities and Council in their review and consideration of the application.

As such, City staff are recommending that a guiding policy, including design guidelines, be drafted

to better assist staff, Council and local communities in making informed decisions on wastewater treatment facilities and which can also assist in setting out the process which any development application submitted to the City would follow.

Development of the policy will also provide an opportunity to augment the usual community engagement that typically accompanies development applications. The policy will be drafted based on the outcomes of an engagement process founded on the principles and core values of IAP2, including the idea that those affected by the decision have a right to be involved in the decision-making and that public participation promotes sustainable decisions. Engagement will be inclusive and transparent and provide multiple ways for the community to influence this important decision.

The outcomes of this process will be brought back as a policy document for consideration and adoptions by Council, following referrals to stakeholders including Community Association Land Use Committees (CALUCs).

Local Area Planning Program

Connected to the issue of wastewater treatment facilities is Local Area Planning. This has been ongoing in the Burnside Gorge Neighbourhood Plan process which started in early 2015 and where the community has had some discussions on the planning issues which would need to be addressed should Rock Bay be identified for a wastewater treatment facility.

On October 15, 2015, Council directed staff to initiate a Neighbourhood Plan in Fairfield-Gonzales and finalise the Neighbourhood Plan for Burnside Gorge. The two proposed wastewater treatment sites fall in these neighbourhoods.

Staff have recently begun work on the pre-planning for the Fairfield-Gonzales Neighbourhood Plan and a kick-off meeting with the community is scheduled for Saturday April 9, 2016. This Plan is envisaged to take 12 months to complete.

Some of the key issues associated with locating a wastewater treatment facility at Clover Point are likely to raise related key issues associated with waterfront planning along Dallas Road, e.g. sea level rise considerations, heritage and parks planning, which can then feed into the neighbourhood planning process and be addressed in this Plan.

This local area planning process, has the potential to align with the CRD's timescales, therefore, staff are recommending at this stage to run two parallel processes to deal with these issues. Should the two parallel processes eventually align, discussion at that time can take place on the inclusion of policies and processes into the Neighbourhood Plan, where relevant and appropriate.

Proposed Process

Staff are recommending the following process for developing the proposed City-wide planning policy protocol.

Stage	Timing	Output/Deliverable/Outcome
Develop Engagement Strategy and Identify Key Issues	April-May 2016	<ul style="list-style-type: none"> Distribute letter informing residents of process to date and highlighting opportunities for engagement going forward (Week of April 9th) Hold initial meeting with Fairfield-Gonzales Community Association to discuss issues and opportunities for engagement (April 9th) Identify and appoint consulting support, as necessary Hold Community Open House (April 25th) to provide information on process to date and opportunities for engagement going forward Engagement Strategy Update Report to Council to confirm Engagement Strategy and define next steps
Initial Engagement	May 2016	<ul style="list-style-type: none"> Initial consultation (TBD based on outcomes of Engagement Strategy) Engagement Summary Report
Draft Guiding Policy	June 2016	<ul style="list-style-type: none"> City staff to draft Guiding policy
Consultation on Guiding policy	July 2016	<ul style="list-style-type: none"> Consultation on draft policy (TBD based on outcomes of Engagement Strategy) Referral to key stakeholder groups including CALUCs Engagement Summary report prepared
Revisions to Policy and Presentation to Council	August-September, 2016	<ul style="list-style-type: none"> Proposed policy Guiding policy protocol prepared by staff for Council Review Public Hearing

RESOURCE IMPACTS

Staff have reviewed the impact of this project on the 2016 Operational Plan. There will be resource implications for Sustainable Development, Engineering and Public Works, Citizen Engagement and Strategic Planning Departments as well as the City Manager's Office as a result of this project. The Operational Plan will be delayed until direction of Council on this significant work item has been addressed.

In addition, the Fairfield-Gonzales Neighbourhood Plan will likely need to be extended beyond the 12-month period previously identified as the focus of the consultation for this policy will be within the Fairfield - Gonzales Neighbourhood and therefore additional time may be needed at the front end of this process to support engagement activities and so as not to overburden local stakeholders.

At this time, it is felt that the delivery of the Vic West Neighbourhood Plan project also planned for this year will not be affected by this project; but that additional resources may need to be sought to ensure delivery.

Staff recommend retaining planning and community relations consulting support given the scale of the engagement activities required. Additional engineering support will also be required to support technical inputs into the process.

Impacts to 2015 – 2018 Financial Plan

On March 23, 2016, the CRD board agreed to initial funding of \$150,000 to assist with a community engagement process. It is felt that this would be sufficient to procure the additional consulting support required to undertake the work plan laid out herein.

Respectfully submitted,



Brian Green
Senior Planner
Community Planning Division



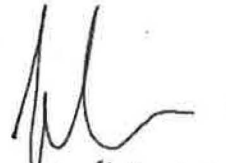
Jonathan Tinhey, Director
Sustainable Planning and Community
Development Department



Katie Hamilton, Director
Citizen Engagement & Strategic Planning

Report accepted and recommended by the City Manager:

Date:


April 6, 2016

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Guiding Policy and Engagement for Wastewater Treatment Facilities

Purpose

Develop a guiding policy related to wastewater treatment facilities, which can be used to assist in the determination of any subsequent development applications for a wastewater treatment facility.

Background

- On March 9, 2016 CRD Board approved an amendment to CALWMP be submitted to the Province
- Two locations identified Clover Point and McLoughlin Point/Macaulay Plain.
- Board also approved a process to engage the private sector in identifying any additional options
- CRD Board requested host municipality develop and lead engagement process in advance of land use approval process
- Council dealt with this motion on March 10, 2016 to engage the community on:
 - Design and community integration
 - Amenity considerations



Issues & Analysis

- Public interest in the siting of a WWTF is high
- No OCP or other planning policy to guide consideration or determine process requirements for this type of facility
- Opportunity to integrate with Local Area Planning
- Will require open, inclusive and transparent engagement process founded on the principles and core values of IAP2
- Further engagement opportunities to occur as part of any subsequent development application
- Opportunity to create City wide planning policy to address issues and considerations of any site which may come forward



Issues & Analysis

- New guiding policy would address impacts and considerations including design guidelines and performance specifications
- Outcome of the process will be a City wide policy document for consideration and adoption by Council, which would:
 - Identify application requirements
 - Create planning policy and design guidelines to address key considerations
 - Clearly lay out the process
 - Define operational considerations
 - Provide guidelines related to preferred amenity opportunities



Timeline



Proposed Initial Process

Stage	Timing
Develop Engagement Strategy and Identify Key Issues	April – May 2016 Open House April 25
Initial Engagement	May 2016
Draft Guiding Policy	June 2016
Consultation on Guiding Policy	July 2016
Revisions and Presentation to Council	August – September 2016



Resource Impacts

- Resource implications for Departments as not currently identified in Operational Plan
- Delay to finalizing Operational Plan until implications of Council direction are known
- Fairfield-Gonzales Neighbourhood Plan likely to be extended beyond the 12 month period
- Additional consulting resources relating to engagement, engineering support will be required to support this process



Recommendation

That Council direct staff to:

1. Undertake a comprehensive public engagement process to support development of guiding policy for Council consideration and adoption related to wastewater treatment facilities as a precursor to a future land use application for such a facility within the City of Victoria. This policy should address:
 - a. land use suitability;
 - b. siting options and considerations;
 - c. designer requirements;
 - d. construction and operational considerations, and;
 - e. amenity priorities and opportunities.

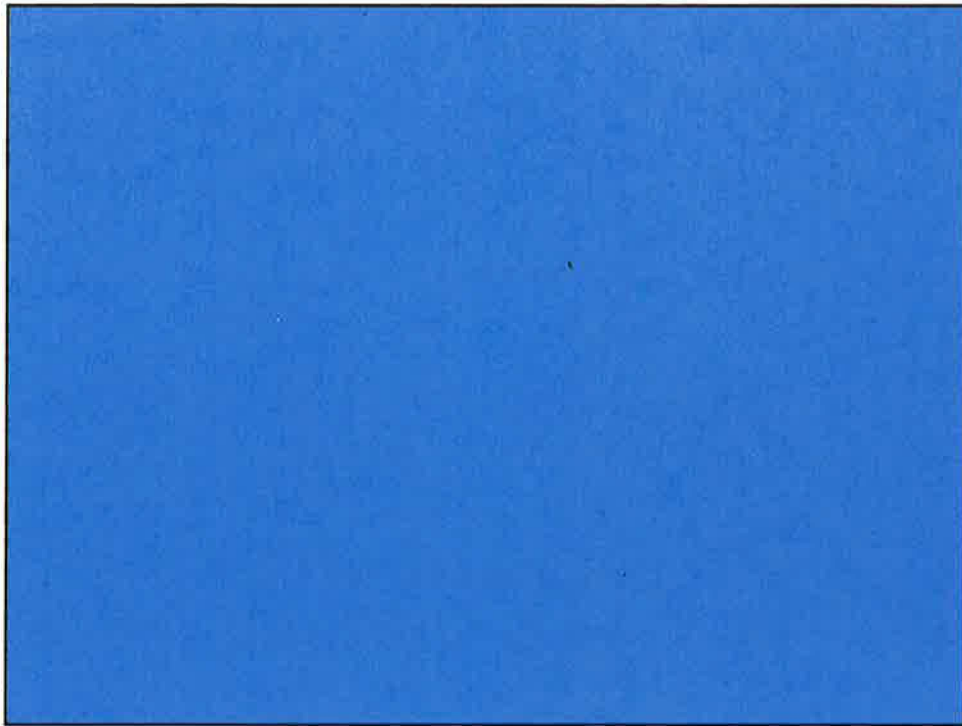


Recommendation

and that Council direct staff to:

2. Hold an open house on Monday April 25, 2016 and distribute a letter to provide background information to the public as well as generate feedback in support of the development of an Engagement Plan for development of the guiding policy framework;
3. Report back to Council on the outcomes of the open house and the draft Engagement Plan.





Background

On March 10, 2016, City of Victoria passed the following motion:

That Council:

- 1. Request that the CRD meet with the Fairfield Gonzales CALUC and present a concept drawing of an underground plant at Clover Point and engage the Community with regard to their concerns and desires specific to this concept.*
- 2. THEN the CRD report back to Council and also present a concept plan for an underground plant to Council.*
- 3. That Council's consideration of any approval in principle of expansion of existing waste-water facilities at Clover Point would be based on conditions including, but not limited to:*

Background

- a) *That staff work through the Local Area Planning process to engage residents of Fairfield, Gonzales and other Victoria neighbourhoods to identify neighbourhood amenities and community amenities that would be provided to ensure the most effective integration of this project into the neighbourhood and city;*
- b) *The surface of the entire footprint of the proposed site being restored upon completion as publicly accessible parkland, with the final elevation of the parkland not to exceed the current elevation of the roadway at Dallas Road;*
- c) *The provision of a neighbourhood amenity and community amenity package to the satisfaction of the City of Victoria; and,*



Background

- d) *Mitigation of construction impacts, including: provision for potential continuous waterfront public access around the perimeter of Clover Point from Dallas Road Park in the west to Ross Bay in the east; aesthetic features including artistically adorned hoarding; negotiation of permissible working hours; and provision around access, egress and transport to the site.*
 - e) *Request the Capital Regional District to make best efforts to pursue the most cost effective option for the proposed facility.*
4. *All of the above is subject to land use approval by Council.*



Cathy Leahy

Subject: FW: As Discussed: City of Victoria COW Staff Report - Guiding Policy for Wastewater Treatment Facilities

Importance: High

-----Original Message-----

From: Christine Havelka

Sent: Friday, Apr 8, 2016 10:51 AM

To: Colleen Mycroft; Alicia Ferguson; Chris Coates

Cc: Noraye Fjeldstad; Jonathan Tinney

Subject: RE: Action: City of Victoria COW Staff Report - Guiding Policy for Wastewater Treatment Facilities

Here is the motion from April 7 COTW:

Guiding Policy for Wastewater Treatment Facilities

That Council direct staff to:

1. Undertake a comprehensive public engagement process to support development of guiding policy for Council consideration and adoption related to wastewater treatment facilities as a precursor to a future land use application for such a facility within the City of Victoria. This policy should address:
 - a. land use suitability;
 - b. siting options and considerations;
 - c. designer requirements;
 - d. construction and operational considerations, and;
 - e. amenity priorities and opportunities.
 - f. technical feasibility
 - g. cost effectiveness to City of Victoria taxpayers
2. Hold an open house on Monday, April 25, 2016, and distribute a letter to provide background information to the public as well as generate feedback in support of the development of an Engagement Plan for development of the guiding policy framework;
3. Report back to Council on the outcomes of the open house and the draft Engagement Plan.



**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, APRIL 13, 2016**

SUBJECT **Core Area Sewage and Resource Recovery System 2.0 – Budget Update No. 5**

ISSUE

To provide the Core Area Liquid Waste Management Committee (CALWMC) with a monthly budget update.

BACKGROUND

The CALWMC requested that a detailed operating budget for the Core Area Sewage and Resource Recovery System 2.0 (including securing final treatment sites, rezoning, public consultation, LWMP Amendment No. 10 and final submission to 3P Canada by March 31, 2016 deadline), with actual expenses and commitments, be provided to the CALWMC on a monthly basis. At its March 23, 2016 meeting, the CALWMC received Budget Update No. 4.

Phase 2 Budget Update No. 5 provides actual expenses and outstanding commitments to March 31, 2016, as summarized in Appendix A.

FINANCIAL IMPLICATIONS

Funding for the project is being drawn from the Core Area Liquid Waste Management Plan (LWMP) operating account.

CONCLUSION

A budget is presented for the Core Area LWMP Options Development Phase 2 of the project to the end of March 2016. Due to the accelerated pace of work on the project, invoicing received from some of the suppliers and consultants has lagged. Any invoices received after the cut-off date for reporting will be brought up to date with the next budget report.

The Committee will continue to receive monthly budget updates through the course of the project.

RECOMMENDATION

That the Core Area Liquid Waste Management Committee receive this budget update for information.

Submitted by:	Dan Telford, P.Eng., Project Manager, Core Area Wastewater and Resource Recovery Project
Concurrence:	Larisa Hutcheson, P.Eng., General Manager, Parks & Environmental Services
Concurrence:	Rajat Sharma, B.Eng., MBA, CPA, CMA, A/Chief Financial Officer
Concurrence:	Kevin Lorette, P.Eng., MBA, Acting Chief Administrative Officer

DT:mer

Attachment: Appendix A – Core Area Sewage and Resource Recovery System 2.0 – Budget Update No. 5

CORE AREA LIQUID WASTE MANAGEMENT PROGRAM

Options Development - Phase 2 Budget Update No. 5
March 31, 2016

	BUDGET (est. Oct 14, 2015)	ACTUAL	COMMITTED	TOTAL	REMAINING
Project Oversight (FTA & ToP)	280,000	376,278	-	376,278	(96,278)
Public Consultation	240,000	133,277	75,032	208,309	31,691
Feasibility and Costing Analysis	450,000	412,911	37,089	450,000	-
Property and Rezoning	75,000	-	-	-	75,000
LWMP Amendment No. 10	75,000	-	-	-	75,000
Project Management (Staff & Wages)	300,000	51,390	-	51,390	248,610
Miscellaneous and Legal	30,000	9,969	-	9,969	20,031
CALWMP Total	\$ 1,450,000	\$ 983,826	\$ 112,121	\$ 1,095,947	\$ 354,053



Making a difference...together

Westside Wastewater Treatment & Resource Recovery Select Committee's Report

Victoria, BC, March 8, 2016

To the Chair and Directors of the Core Area Liquid Waste Management Committee:

The Westside Wastewater Treatment & Resource Recovery Select Committee reports and recommends as follows:

1. Revival of Work on Westside Solution

That, pending the outcome of discussions at the Core Area Liquid Waste Management Committee, Esquimalt and Victoria City Councils, and to ensure that the Westside Select Committee participant communities continue to work towards a solution that meets the objectives of the Committee, staff be directed to revive the work done in part last fall on a Westside Solution--specifically focusing on a one or two plant option and the opportunity to include treatment of solids at a facility on the Westside.

(Background information can be found in the attached documents.)



Westside Wastewater Treatment Plant Siting Analysis – Phase 2 Report

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Appendix E	Pump Station Cost Curves
Appendix F	Updated Site Prioritization

1.0 Report Summary and Study Overview

The Westside Select Committee terms of reference guided recent analysis for potential distributed and sub-regional treatment systems. Led by Westside Technical Staff, recent analysis builds from sites and option set development in 2015 to provide advanced feasibility reporting for three options: 1-plant, 2-plant and 4-plant solutions. Phase II objectives include:

- Conduct technical analysis using current public input and wastewater data
- Study wastewater treatment technologies including liquids and solids treatment
- Explore resource recovery pathways including water reclamation and solids-energy recovery
- Assess the regulations and identify varying levels of service for further consideration by the Committee
- Include conceptual costing as well as preliminary revenue projections for resource recovery
- Reprioritize the Westside sites for further consideration by Westside Technical Staff and the Select Committee

Interim findings were presented to the Westside Select Committee on September 29, 2015 for further discussion and direction on each of the study objectives. The interim presentation provided for a progressive discussion regarding flow conditions, resource recovery methodologies, solids recovery strategies, regulatory considerations and treatment technologies. Key takeaways from September 29 included direction to conduct analysis on the integrated flow scenario, whereby Westside option sets incorporate flows from west Saanich and west Victoria, and, direction by the Committee to study and report on highest-potential solids recovery approaches, given factors such as distributed, centralized and integration with municipal yard and kitchen waste.

This report includes six technical chapters which cover design criteria, resource recovery, solids management and review of each option set (1-plant, 2-plant and 4-plant). Section 1.1 isolates key findings for further discussion and direction and provides a strong basis for subsequent technical and life-cycle analysis. Opportunities to achieve similar or higher levels of service at lower costs may be possible following Core Area feasibility analysis by way of finding resource recovery synergies, reducing infrastructure needs and or minimizing redundant facilities.

1.1 Key Findings from Phase 2

1.1.1 Representative Design Approach

- Representative design includes provisional selection of technologies to develop order of magnitude costs. Technologies are selected to suit the project criteria but should not be considered the solution as private sector responses are critical to confirming the actual facilities built.

1.1.2 Solids Management and Recovery

- Wastewater solids are comprised of many materials and provide for a diverse range of recovery possibilities, such as nutrients, energy, bioplastics, biofuels and carbon dioxide (among others). Converting wastewater solids into valued resources requires customers, risk, investments and often, tenured financial partnerships. There are myriad ways to recover resources from wastewater solids which extends the resources required for broad studies. Instead, wastewater utilities often canvass the private sector for financially-backed solutions to meet a list of explicit objectives as stated by the Owner. Proponents detail how their solution addresses the Owner's requirements and responses include confirmation of end-uses, customers, risk management, costs and revenues. While Core Area analysis will further explore solids management and recovery, recent Westside analysis explored the potential for integration of solids recovery with municipal solid waste such as kitchen scraps and yard/garden waste.
- Gasification of municipal sludge (e.g. cake) with municipal yard and kitchen waste appears to provide a similar long-term cost and value proposition as anaerobic digestion of wastewater solids (only). However, gasification of sludge without yard waste does struggles to achieve energy neutrality. At the time of this report, technical analysis continues regarding the storage, handling, trucking, revenue potential and residual solids management methods (e.g. creating new markets for biochar, among others). Carrying the cost for either gasification or anaerobic digestion in representative design cost estimates does not appear to significantly affect the overall cost estimating at this time. As noted above, results from Core Area analysis may further suggest that that approaching the private sector with a Request for Statements of Interest (RFSI) for either technology would maximize the efficiency of the market.
- Five conditions encourage a centralized approach to energy-solids recovery:
 - Multiple small plants are overall less efficient than one larger facility (important in order to optimize recovery and revenues)
 - Multiple small plants do not negate the need for a larger solids processing facility at one location (to account for the 0-4xADWF flows), meaning that additional plants may be redundant and costly
 - Multiple small plants will require redundant heat/energy delivery infrastructure or gas-upgrading systems which have capital and operating costs;

- Trucking patterns for one facility would be relatively simple compared to the ins-outs of multiple smaller facilities
- Most sites throughout the Westside are not large enough to host both liquids and solids treatment, in particular when three or four times the feedstocks are temporarily stored for gasification
- Resource recovery activities at Hartland Landfill should be explored further to define the benefits of integration with municipal yard and kitchen waste as well as to uncover the synergies of linking technologies with resource recovery efforts (e.g. methane gas capture) already underway at the Landfill. A key issue in future phases will be to identify the future market for all residual solids downstream of the preferred recovery technology to avoid the cost of landfilling byproducts until suitable markets are confirmed.

1.1.3 Water Reuse and Recovery Systems

- Core Area water customers receive service from CRD Water with adequate supply from Sooke Reservoir. Treated effluent reuse could help to mitigate future potable water supply issues caused by climate change or population growth (among other drivers).
- Target markets for water reclamation typically include clusters of high-water use demands such as parks, green spaces, aquifer recharge and future growth centers (based on treated effluent used for toilet flushing). Next steps in water reuse should look to identify new customers (i.e. new markets) for water reuse to grow water revenues to offset capital + operating costs.
- Growth and development as well as lands in and around the North Colwood site node present the highest water reuse possibilities, including, the potential for aquifer recharge throughout the year. Further feasibility analysis is being conducted by Colwood to determine the reliable potential for aquifer recharge and those effects on infrastructure systems. Two reuse systems in Colwood-Langford and Esquimalt (with some coverage of View Royal lands) provides for relatively efficient strategy to provide for water reuse via clustered infrastructure systems.
- Phasing-in water reclamation systems (e.g. purple pipe) over time helps to align infrastructure investments with the timing of actual water needs. With a potential system built in Colwood, Westside communities could consider expanding water reclamation systems to suit potable water supply challenges over time in addition to aquifer recharge.
- Treatment plants are designed to renovate wastewater for re-entry to the environment. Recent Westside analysis suggests that a sustainable water recovery strategy can include:
 - reclamation for irrigation of up to 400 hectares,
 - aquifer recharge for most flows in Colwood and perhaps more from treated flows Langford over time,

- indirect potable reuse for toilet flushing in growth centers (in addition to any other grey-water reuse strategies that may also be considered), and
 - the potential to treat almost all flows in excess of the regulations by way of tertiary treatment via membranes (part) and disinfection (all).
- Recent information points to increased aquifer recharge which should also be explored further in Phase 2: Core Area. Life cycle costing can inform the desired level of service for water recovery.

1.1.4 Life Cycle Costing Considerations

- Costing models are based on a construction schedule that begins in 2018 with commissioning in 2023. Preliminary cash flow analysis is based on system capacities to suit the 2030 flow scenario over a 7-year analysis period. Longer-term analysis is needed for decision making but cannot be completed until 2045 capital projects have been considered and more accurate revenue projections been developed. Preliminary analysis still provides important insights into option set financial feasibility.
- Multiple, smaller-scale facilities reduce beneficial economies of scale for construction, reduce efficiencies, increase the number of pumps and length of pipes, and increase overall site improvement costs which create higher life-cycle costs for the 4-plant option. The 1-plant option provides greater efficiencies, increases economies of scale, reduces the extent of new infrastructure and demonstrates the lowest costs.
- Revenues for water reuse are set to be phased in as customers confirm partnerships with CRD or the municipality for service. Revenues from water re-use will be challenged to cover the operating and capital financing costs of their delivery systems.
- Revenues for heat recovery are largely confined to offsetting the costs of processing heating and energy needs at the plant(s). Finding a reliable market for biochar or biosolids will significantly affect the preliminary life-cycle feasibility of either technology. Preliminary analysis assumes that a market for a biochar must be developed at or less than the cost of landfilling. Revenues from carbon offsets for either anaerobic or gasification are still under development and therefore have not yet been accounted for in costing analysis.
- While the 1-plant option provides for the lowest life cycle costs up to 2030, the 2-plant option is appreciably less costly than the 4-plant option. The qualitative benefits of any option help to balance the financial weighting of the analysis with respect to other environmental, social and economic factors.

Option Sets Summary: Criteria Differentiators

A fulsome characterization of option sets against the Charter and technical criteria will be completed as Part of Phase 2 for the Core Area. Consider this preliminary table a snapshot into the characterization of the three option sets.

Criteria	
<i>Leverage infrastructure and minimize operating costs</i>	<ul style="list-style-type: none"> The 1-plant option requires least new infrastructure and offers lowest operating costs; the 2-plant option is notably less expensive than the 4-plant option
<i>Long-term revenues and resource demands</i>	<ul style="list-style-type: none"> The 2-plant option best meets the supply-demand, and achieves high efficiencies for water and solids recovery
<i>Include other waste streams</i>	<ul style="list-style-type: none"> All options consider integration with municipal-garden waste at the Esquimalt Nation site
<i>Includes capacity phasing</i>	<ul style="list-style-type: none"> The 1-plant option allows for the most efficient capacity phasing however 2-plant and 4-plant options allow for capacity increases adjacent where growth is to occur
<i>Carbon, energy and footprint (physical area)</i>	<ul style="list-style-type: none"> The 1-plant option demonstrates the greatest energy and carbon footprint; the 4-plant option involves smaller facilities throughout
<i>Positive and safe public interaction</i>	<ul style="list-style-type: none"> Smaller facilities of the 2-plant and 4-plant options provide a higher level of service and allow for enhanced massing for neighborhood fit; all facilities should be designed for safe interaction and to suit the local context
<i>Extent of water quality in excess of regulations</i>	<ul style="list-style-type: none"> Each option set provides for enhanced tertiary treatment to varying levels: 4-plant includes ~40% to tertiary levels; 2-plant includes ~15% to tertiary levels; 1-plant to ~5% of tertiary levels

1.1.5 Site Findings

- Langford Site 2a at Meaford, Colwood Site 11 'Park and Ride', Colwood Site 14 'Juan de Fuca Recreation Centre', Esquimalt Nation Site 15, Bullen Park Site 17 and View Royal Site 16 'Burnside' are preferred technical sites because they present advantages over other sites due to infrastructure and sizing considerations. Site 17 demonstrates low overall feasibility against the other five sites due to its size however synergies with Eastside facilities may reduce the footprint of any plant in Esquimalt. Further analysis in Phase 2 will explore this possibility in greater detail.
- Esquimalt Nation site poses the greatest feasibility for both liquids and solids treatment for the Westside (if sub-regional solids treatment is preferred).
- Gravel Storage Site 4 was not considered for 2030 design scenarios but can offer benefits to future sanitary system expansions as Westside communities continue to grow. Further consideration should be given to sites near Royal Bay for the 2045 scenario and beyond.

2.0 Design Criteria

2.1 Flows

All flows generated from Westside communities are currently discharged through the Macaulay Point Outfall. Partial flows from west Saanich and west Victoria also flow to Macaulay Point Outfall which triggers the need for Westside Solutions to consider treatment capacities for six of the seven municipalities in the Core Area.

Two recent milestones affect the design flows for this assignment:

- Direction from the Westside Select Committee to include the flows from west Saanich and west Victoria in the analysis
- Adoption by the Core Area Committee for 2030 flows for each municipality, which differ in the case of west Saanich and west Victoria from the flows initially provided at the start of this project

The inconsistency in flow estimates can be reconciled as part of Phase 2 feasibility and life-cycle analysis for the Core Area. For example, the cumulative flow estimates for the Core Area are relatively unchanged from previous estimates, however their distribution across west Saanich and west Victoria is what appears to have changed. Each of these flow scenarios in terms of average dry weather flows (ADWF) is summarized below in Table 2.1 Flow estimates to 2045 are provided as a provisional scenario for developing long-term site size requirements.

Table 2.1: 2030 and 2045 Design Flows

Location	Current	2030			2045 ⁽²⁾		
	ADWF (MLD)	ADWF (MLD)	2 x ADWF (MLD)	4 x ADWF (MLD)	ADWF (MLD)	2 x ADWF (MLD)	4 x ADWF (MLD)
Langford	5.2	14.1	28.2	56.4	23.1	46.2	92.4
Colwood	2.2	4.7	9.4	18.8	13.1	26.2	52.4
View Royal	1.5	3.5	7.0	14.0	7.9	15.8	31.6
Esquimalt First Nation	0.1	0.7	1.4	2.8	0.4 ⁽¹⁾	0.8	1.6
Songhees First Nation	0.5	0.7	1.4	2.8	0.5 ⁽¹⁾	1.0	2.0
Esquimalt	4.9	6.2	12.4	24.8	7.9	15.8	31.6
West Victoria	5.4 ⁽³⁾	1.0	2.0	4.0	6.8	13.6	27.2
West Saanich	16.4 ⁽³⁾	16.5	33.0	66.0	32.9	65.8	131.6
Total	36.2	47.4	94.8	189.6	92.6	185.2	370.4

- (1) Flows are not actually expected to decrease. This discrepancy is due to different sources of data which is not significant enough to affect analysis at this time.
- (2) For derivation refer to Appendix A.
- (3) Flows are not expected to decrease, this discrepancy is due to different sources of data.

Wastewater flows fluctuate throughout the day and throughout the year. As such, the Ministry of Environment and the LWMP have established certain treatment levels for different flows. The regulations, at minimum, require treatment facilities to treat 0 to 2 x ADWF to a secondary level. Flows from 2 to 4 x ADWF must be treated to a primary level and then can be combined with the secondary effluent for release through the Macaulay outfall. Flows greater than 4 x ADWF must be screened and then can be combined with the rest of the flows for discharge out the outfall. Table 2.2 summarizes the primary and secondary flows for the various option sets that were determined in the Phase 1 Report.

Table 2.2: Westside Design Treatment Flows

Option		2030 (MLD)		2045 (MLD)	
		Primary *	Secondary 2 x ADWF	Primary *	Secondary 2 x ADWF
1A	Esquimalt Village	189.6	94.8	370.4	185.2
1B	Esquimalt Nation	189.6	94.8	370.4	185.2
2A	Esquimalt Village	146.0	51.2	282.2	97.0
	View Royal	43.6	43.6	88.2	88.2
2B	Esquimalt Nation	47.4	47.4	90.0	90.0
	Esquimalt Village	142.2	47.4	280.4	95.2
2C	Colwood North	37.6	37.6	72.4	72.4
	Esquimalt Village	152.0	57.2	298.0	112.8
2D	Langford/Colwood	28.2	28.2	46.2	46.2
	Esquimalt Village	161.4	66.6	324.2	139.0
2E	Colwood South	37.6	37.6	72.4	72.4
	Esquimalt Village	152.0	57.2	298.0	112.8
4A	Langford/Colwood	28.2	28.2	46.2	46.2
	Colwood North	9.4	9.4	26.2	26.2
	View Royal	7.0	7.0	15.8	15.8
	Esquimalt Village	145.0	50.2	282.2	97.0
4B	Langford/Colwood	28.2	28.2	46.2	46.2
	Colwood North	9.4	9.4	26.2	26.2
	Esquimalt Nation	9.8	9.8	17.6	17.6
	Esquimalt Village	142.2	47.4	280.4	95.2

- * Since the Macaulay outfall has no room for primary treatment facilities it is assumed the flows resulting from I/I (i.e., 2 to 4 x ADWF) will be treated as close to the Macaulay outfall as possible including any of the sites identified in the option sets.

2.2 Influent Wastewater Quality

The CRD collects 24 hour composite samples and tests the influent effluent for numerous parameters, as summarized in Appendix B. For convenience, Table 2.3 provides the most relevant influent sewage concentration data from 2014. This data is consistent with historical reports prepared for the Core Area LWMP, the latest being the January 23, 2013 Technical Memo “Indicative/Detailed Design/Wastewater Characterization and Design Loads”. Table 2.3 also includes a summary of the 2030 maximum month loads, which are used to size the biological components of the plants. To account for flow and load variability, design factors account for the maximum load that the facility will experience in any 30 consecutive days which typically represents the 92 percentile of the data set analyzed for 2014. The proposed flow-load variability factor is set at 1.25 times the average loading.

Table 2.3 – Average Influent Quality Concentrations and Maximum Month Loads for 2030 Flows ⁽¹⁾

Parameter	Macaulay	
	Average (mg/L)	Max Month (kg/d)
Carbonaceous BOD ₅	226	17,010
Total BOD ₅	275	20,700
Total Suspended Solids	270	20,320
Chemical Oxygen Demand (COD)	632	47,560
Ammonia	42	3,160
Alkalinity	217	16,330
Total Kjeldal Nitrogen	54	4,060

⁽¹⁾ Note influent pH typically ranges from 7.3 to 7.7

2.3 Liquid Effluent Criteria

2.3.1 Introduction

Two regulations currently govern effluent discharges in BC – The Federal Wastewater Systems Effluent Regulation (WSER) and the BC Municipal Wastewater Regulation (MWR). The WSER deals only with discharges to surface waters and has marginally different criteria than the MWR. The MWR also defines indirect potable reuse applications which we understand to be an acceptable level of treatment for aquifer

recharge based on work currently being undertaken by City of Colwood. Both provincial and federal governments intend to harmonize the regulations which will affect the effluent criteria.

There is a strong sentiment within Westside to reuse reclaimed water where feasible. To facilitate this sentiment, it is proposed that effluent destined for reuse meet the *Indirect Potable Reuse Category* for reclaimed water as defined in the BC Municipal Wastewater Regulation. This level of quality is more stringent than the requirements of the *Canadian Guidelines for Domestic Reclaimed Water for Use in Toilet and Urinal Flushing* and the *California Title 22 Regulation* and would permit all reclaimed uses except Direct Potable Reuse. Alternatively if reuse was limited to irrigation on restricted public access sites only, then the standard of effluent quality could be reduced to *Moderate Exposure Potential Category* which is basically equivalent to secondary treatment as defined in Section 2.3.4. Also, secondary treatment is suitable for discharge to most marine environments but the outfall depth must be positioned at 30 m depth or more which effectively rules out any discharge to the inner harbour.

Stream augmentation is cited in the regulations whereby treatment must be greater than secondary (i.e. must be tertiary) with effluent criteria to suit the receiving environment. However, MWR requires an alternate disposal or storage for reclaimed water (stream augmentation or reuse) as follows:

“Alternate Disposal or Storage

- 114** (1) A person must not provide or use reclaimed water unless all of the following requirements are met:
- (a) There is an alternate method of disposing of the reclaimed water that meets the requirements of this regulation or is authorized by a director.
 - (b) Treatment processes are built with the minimum number of components specified in the applicable reliability category for the alternate method of disposal, as described in section 35 [*general component and reliability requirements*];
 - (c) If there is no immediate means of conveyance of the municipal effluent or reclaimed water to the alternate disposal method, the wastewater facility has 48 hours’ emergency storage outside the treatment system.
- (2) Despite subsection (1) (a), a director may waive the requirement for an alternate method of disposal for reclaimed water that is not generated from residential development or institutional settings if an alternate method is not required to protect public health or the receiving environment and the wastewater facility has
- (a) 48 hours’ emergency storage outside the treatment system and the ability to shut down generation of municipal wastewater within 24 hours, or
 - (b) A dedicated storage system that is designed to accommodate:
 - i. At least 20 days of design average daily municipal effluent flow at any time,

- ii. The maximum anticipated volume of surplus reclaimed water, and
 - iii. Storm or snowmelt events with a less than 5-year return period.
- (3) Despite subsections (1) (a) and (2), if reclaimed water is discharged from a wastewater facility directly into a wetland, a director may waive the requirement for an alternate method of disposal if an alternate method of disposal is not required to protect public health or the receiving environment.

Failure to meet municipal effluent quality requirements

- 115** (1) If municipal effluent does not meet municipal effluent quality requirements, a provider of reclaimed water must ensure that the municipal effluent is diverted immediately to
- (a) An alternate method of disposal, as provided for in section 114 (1) (a) [*alternate disposal or storage*], or
 - (b) Emergency storage or a dedicated storage system, as described in section 115 (1) (c) or (2),
- Until municipal effluent quality requirements are met and reclaimed water uses may continue.”

These regulatory requirements strongly suggest that access to an alternate ocean outfall is required if stream augmentation is pursued.

A discharge to a wetland may be possible without requiring an alternate method of disposal, but this would require a specific environmental impact study and a waiver from the Director of the Ministry of Environment. A discharge to a wetland has not been considered in our analyses at this time however may be considered at the direction of the Committee.

The MWR and previous liquid waste management plan amendments further regulate the quality of effluent with respect to wet weather flows, as tabulated below:

Effluent Criteria	Macaulay Outfall
Secondary	0 to 2 x ADWF
Primary	2 to 4 x ADWF
Screening (6 mm Ø)	> 4 x ADWF

ADWF = Average Dry Weather Flow

2.3.2 Ammonia and Toxicity

Ammonia and toxicity in wastewater effluent is a complicated topic which is discussed in detail in Appendix C. In summary, the Federal and BC governments have criteria that regulate the amount of ammonia in the effluent, in particular to the un-ionized ammonia concentrations. Our research and analysis concludes (Appendix C) that it is not necessary to reduce ammonia in the wastewater treatment plants to comply with both the federal and provincial regulations before discharging out the Clover and Macaulay outfalls. Enhanced treatment would be required however for any option that contemplates stream augmentation and/or wetland discharges.

2.3.3 Primary Liquid Effluent

The MWR requires primary effluent to meet:

CBOD₅ ≤ 130 mg/L

TSS ≤ 130 mg/L

2.3.4 Secondary Liquid Effluent plus Disinfection

Ocean outfall effluent criteria should best address both the federal and provincial regulations, as proposed in the table below, and based on the requirement of outfall diffusers at a minimum depth of 30 m below the surface.

Parameter	Units	Average Concentration	Maximum Concentration
CBOD ₅	mg/L	≤ 25	≤ 45
TSS	mg/L	≤ 25	≤ 45
Un-ionized Ammonia in Effluent	mg/L	NA	≤ 1.25 ⁽¹⁾
Un-Ionized Ammonia at End of Dilution Zone	mg/L	NA	≤ 0.016 ⁽¹⁾
Total Residual Chlorine	mg/L	NA	≤ 0.02
Faecal Coliforms	cfu/100 mL	NA	≤ 200 ⁽²⁾

⁽¹⁾ Only one of these parameters need to be met.

⁽²⁾ It is our understanding that disinfection will be required. This is the standard concentration for discharge to recreational waters.

The frequency of testing and averaging period is dependent on flow rates as shown below for continuous flow systems.

Flow Range	Testing Frequency	Averaging Period
≤ 2,500 m ³ /d	Monthly	Quarterly
> 2,500 but ≤ 17,500 m ³ /d	Every 2 Weeks	Quarterly
> 17,500 but ≤ 50,000 m ³ /d	Weekly	Monthly
> 50,000 m ³ /d	3 Days/Week	Monthly

2.3.5 Enhanced Tertiary Liquid Effluent

Secondary liquid effluent treatment with added disinfection is considered the base case level of service. However, in order to provide the ability for reuse we have identified enhanced tertiary treatment targets to satisfy most reclaimed water applications in the *Indirect Potable Water Reuse* category. This approach allows for aquifer recharge which is being contemplated in Colwood, and would require the following effluent criteria as defined in the Municipal Wastewater Regulation, as noted below:

Parameter	Indirect Potable Reuse	Monitoring Requirements
pH	6.5 to 9	Site Specific
CBOD ₅	≤ 5 mg/L	Weekly
TSS	≤ 5 mg/L	Weekly
Turbidity	Maximum 1 NTU	Continuous Monitoring
Faecal Coliform ⁽¹⁾	Median <1 cfu/100 mL	Daily

(1) Median is based on the last 5 results.

2.3.6 Emerging Contaminants

There are in the order of 1,700 pharmaceuticals and personal care products (PPCPs) in wastewater, with some contaminants posing greater concern than others. At the present time, there are no published standards in Canada for the discharge of emerging contaminants to marine waters. Data has been collected by the CRD to estimate removal efficiencies of key contaminants at their Ganges membrane bioreactor (MBR) plant and Saanich Peninsula secondary plant (conventional activated sludge). Preliminary results show that approximately 80% of the contaminants (211 of 266) had removal efficiencies > 90% for the MBR plant. Approximately 45% of the monitored contaminants (145 of 324) had removal efficiencies > 90% for the activated sludge plant.

Increasing treatment levels beyond the regulations can be seen as an enhanced level of service. In order to allow for ongoing discussion and debate amongst the Committee(s) and the public, it is important that option sets provide for a range of treated effluent quality levels. Whether secondary and disinfection, or MBR, many emerging contaminants will be reduced during treatment significantly. While we have not

included specific technologies to further reduce emerging contaminants, explicit criteria can be added as a required outcome for any proposals by the private sector.

Also note that treatment processes and technologies can be assessed further when the Ministry of Environment considers enhanced regulations for emerging contaminants. The CRD may also elect to expand their existing emerging contaminants monitoring program to research any new facilities in the Core Area in the early years of operation and to assess the level of reduction of emerging contaminants already occurring in the effluent. Space could be left in the plant(s) if it was desired for emerging contaminant treatment in the future once the specific effluent criteria are known.

2.3.7 Liquid Treatment Summary

While water reuse markets will be explored, any excess treated effluent has been designed to meet secondary treatment plus disinfection standards for all ocean discharges up to 2 x ADWF. Flows greater than 2xADWF but less than 4xADWF will undergo primary treatment at the plant closest to the Macaulay Outfall. Water for reclaimed purposes will be treated to Indirect Potable Reuse Tertiary Standards given the water quality requirements for anticipated uses.

3.0 Options for Management of Residual Solids

The options available to manage residual solids along with the advantages and disadvantages of all legal methods of reusing or disposing of biosolids acceptable to the BC Ministry of Environment are fully detailed in a memorandum included in Appendix D. Section 3.0 provides for a summary of the memorandum.

Westside communities are currently assessing options for the management of local sanitary sewage. Research to date summarizes the management approaches available for the residual solids as well as an inventory of acceptable methods of reuse and disposal including their regulatory considerations and treatment approaches. There are a variety of different words which can be used for the residual solids which are produced during municipal wastewater treatment. For the purpose of this memorandum, the use of the word “sludge” will relate to the untreated residual solids which are produced during wastewater treatment and the use of the word “biosolids” will relate to sludge which has undergone treatment and meets the regulatory standards outlined in the BC Organic Matter Recycling Regulation (OMRR).

The CRD does not want biosolids or sludge going into the Hartland Landfill. It is our understanding that the Saainch Peninsula plant is discharging their solids into the landfill only until this process implements a solids treatment plant that they can utilize. Markets for solids byproducts must be developed as part of any Core Area solution.

Application to land is long-practiced and well documented, but often receives significant opposition, despite well-known benefits to plant growth and soil conditions. Treatment requirements can be costly, with little to no return on the capital and operational costs through sales opportunities. No authorisation is needed from the BC Ministry of Environment, but there is the need to register biosolids activities under the OMRR, e.g. a compost operation or a Land Application Plan. A policy statement was passed by the CRD Board indicating the desire not to apply biosolids to land.

Incineration and gasification are two available options to convert organics into energy. Globally, the common approach to using sludge as an energy source is an incineration-type process. However, incineration results in high capital and operational costs, which could include the need to dry the sludge before combustion in order to increase process efficiency. There are risks associated with the gasification process as well, as this approach is relatively new for sludge/biosolids management and, as such, there is little information on the long-term operation. Moisture content and calorific value are both important when considering process efficiency. There is a risk with respect to the authorisation requirements, until incineration and gasification of sludge/biosolids becomes established in BC. From the information available, it is expected that no authorisation is needed from the BC Ministry of Environment for the development of a combustion process for sludge/biosolids. Depending on the management approach for the waste solids and any wastewater which may be produced as a result of combustion, it is possible that

no further authorisations are needed from the BC Ministry of Environment, with the only authorisation being a permit for air emissions. There is also a risk with respect to the requirement of a BC environmental assessment, although this may be avoided, depending on interpretations regarding the material for combustion and wording in the approved CRD Liquid Waste Management Plan. Clarification on these interpretations would be required from the BC Environmental Assessment Office.

In terms of the criteria to use for treatment technologies and management of solids, the following aspects have been used:

- The CRD has a policy that does not allow the land application of biosolids within its boundaries.
- The CRD strongly discourages solids being discharged to their landfill.
- Where it is economical, implement resource recovery.
- Consider the potential to integrate other waste streams.

4.0 Resource Recovery Opportunities Characterization Methodology

4.1 Introduction

Recovery of resources available in both the liquids and solids is highly dependent on the market conditions, energy prices, carbon and renewable credit markets and the overall cost for the projects. The following list identifies the resources present in the sewage and the sewage solids that will be considered as resources for recovery. Water recycling through purple pipe, recharge, indirect potable reuse, direct potable reuse and other reclamation alternatives are discussed later in this section.

Liquid

1. Thermal: Thermal energy recovery from sensible heat contained in the sewage in the form of hotter temperature (than ambient/winter condition) and cooler temperature (than ambient/summer condition).
2. Mechanical: Mechanical energy recovery from the transformation of potential energy into kinetic energy. This type of energy recovery is possible when water has a natural drop in elevation that can be harnessed and converted into energy.

Solids

1. Nutrients: Ammonia and Phosphorus recovery from the sewage solids.
2. Energy: The thermal conversion of the carbon contained in the sewage solids.
3. Bio plastics: The conversion or refinement of bioplastics from the sewage solids.
4. Organic Soil Amendment: The use of treated sewage solids to offset the use of commercial fertilizers
5. BioMethane: The biological conversion of carbon in the sewage solids to a usable gas through anaerobic digestion
6. Biofuels: The conversion of the sewage solids into usable vehicle fuels.
7. Carbon Dioxide: The capture, purification and compression of combustion and digestion by products to produce a commercial pure gas.

In addition to the ones identified, there are research level efforts to try and recover heavy and precious metals, and other high value organics. Since these are at a research level only at this time, they are not being considered for the evaluation.

As the resource recovery must compete with the products they are offsetting, it is extremely hard for this effort to adequately evaluate the revenue source that could be derived from implementing any of these approaches. In other words, market commodity prices are dynamic and cash flow analysis is subject to multiple caveats and risks. As such we propose the CRD work with the private sector to distribute risk appropriately in an effort to identify and fund the recovery of the resources available in the sewage. A common and well-regarded approach is to issue a Request for Statements of Interest (RFSI). This document would be issued to the general private market to propose on resource recovery opportunities with their technologies and provide the CRD with an all-in cost to install the technology, receive (solids or liquid) the product, process it and provide a higher value material as well as the recovered materials extracted from the product.

The CRD can then evaluate these proposals and rank them based on their:

1. Alignment with CRD Goals and Objectives
2. Environmental Benefit
3. Cost
4. Risk to CRD and member Cities.

Through this process, the CRD will make sure that the market is driving the recovery of resources and how much investment the CRD is willing to introduce to promote the recovery of resources that with today's utility costs may require longer term investments.

4.2 Water Reuse

4.2.1 Water Reuse Target Market Summary

When treated to a high enough standard, treated effluent can be reused instead of potable water. A target market framework helps to navigate the multiple possibilities for reuse to select applications that have greatest potential. Water recovery target markets should deliver on the following key themes:

- Demonstrate long-term demands and revenues
- Support community amenities
- Reduce the scope of infrastructure needs
- Demonstrate synergy with conventional public utility services

For Westside Solutions, supply-demands studies centered on water applications that require less than potable-quality water in addition to water demands situated in clusters which helps to reduce the cost of additional pipes to convey flows. Ideally, treated effluent on the Westside should include:

- large tracts of irrigable land such as parks and green spaces;
- significant industrial water reuse such as greenhouses or manufacturing operations;
- growth centers where new developments can be encouraged to include additional plumbing systems for toilet flushing or outdoor irrigation; and
- environmental augmentation.

These types of customers typically present the lowest capital cost for system set up (so long as they are located near treatment facilities), provide long-term demands and revenues, support community amenities such as parks and growth and generally conforms to the type of water services provided today.

Spatial analysis based on land use uncovers target markets and illustrate clusters of high demand. Each land parcel is coded based on its land use through the BC Assessment Authority which provides a proxy for water use potential i.e. parks, institutional-vacant, dairy farm, etc. At a conceptual level, these land use codes provide a basis for the potential for land application in Westside communities. Further, local Official Community Plans, land use plans and regional growth centers illustrate where focused, dense development may occur over the next 20+ years. The cost of retrofitting (re-plumbing) existing buildings to allow for treated effluent reuse is prohibitive; it is more feasible to include non-potable water lines in new construction and to phase in non-potable sources over time. Combined, land application and regional growth centers provide for lower-barrier methods for reuse.

Environmental augmentation includes directing treated effluent to natural water courses for beneficial reuse. While these methods don't typically provide revenues, they represent an opportunity to close the wastewater loop and restore water supplies locally, in urban areas; particularly where/when there is demonstrated need. Typical forms of environmental augmentation include:

- Direct augmentation to streams, rivers or other surface water bodies,
- Indirect augmentation to surface water bodies which includes infiltration to adjacent soils allowing flows to meander into the substrate groundwater or into actual surface flows,
- Aquifer recharge, and
- Wetland enhancement.

Each of these methods requires adequate environmental study to determine the feasibility including risks associated with any option. Water bodies which demonstrate supply issues are typically studied for

stream augmentation because there is a clearer link to beneficial reuse, instead of simply becoming a vector for disposal. Wetlands throughout the Westside have not been studied to date.

Colwood has studied the potential for indirect augmentation via aquifer recharge for the highly permeable soils near royal Roads University and further west toward Langford. Local infiltration rates are relatively high and may provide for aquifer recharge for 10 to 30 MLD, based on recent reports. If approved by the Director (of the Ministry), this approach could negate the need for an alternate disposal method such as local outfall to the ocean, however we have assumed any effluent that does not meet the specifications would be discharged into the CRD trunk to be treated by a downstream plant. Westside Technical Staff are awaiting formal feedback from the Ministry regarding the potential for aquifer recharge including any waiving of outfall infrastructure. Option sets which include a treatment facility in Colwood take into account the preliminary feasibility results for aquifer recharge.

4.2.2 Summary of Water Reuse across the Westside

Table 4.1 summarizes the land application; toilet flushing and aquifer recharge possibilities on the Westside based on the applied target-market framework and analysis methodology. It is important to note that while estimates can be developed per municipality, it became clear during analysis and mapping that demands were clustered near growth centers of Colwood-Langford and separately, in Esquimalt (with some overlap to View Royal). Establishing two reuse systems provides for 3/4 coverage of the treated effluent target possibilities and also reduces the need for redundant infrastructure.

Table 4.1 – Reuse Target Market Scan

Node	Colwood-Langford	Esquimalt
Area (ha) w/ Irrigation Potential	275	115
Demand (low) (cm/year)	45	30
Demand (high) (cm/year)	60	45
Volume (low) (ML/year)	1,240	340
Volume (high) (ML/year)	1,650	520
Aquifer Recharge (ML/year)	3,430	n/a
Toilet (2030; ML/year)	1,780	435

Additional lands in the View Royal-Highlands interface could provide greater irrigation potential however these lands would require significantly larger reuse systems. Further, Colwood continues to undertake more detailed water reuse analysis. Table 4.1 should be updated for future analysis as the results of Colwood’s analysis are available.

Overall, if the Ministry accepts Colwood's aquifer strategy then the Colwood plant could demonstrate near 100% reuse of flows in that area: during the winter when there is less need for irrigation, reuse can be focused toward aquifer recharge and toilet flushing, whereas during irrigation seasons, aquifer recharge could be reduced significantly while flows are redirected to land application. It is also feasible to phase-in greater effluent reuse capacity at the Colwood facility as population growth occurs in Colwood-Langford.

Future phases of analysis should confirm with the Ministry whether redundant capacity is needed at alternate plants on the Westside to account for any potential treatment upsets at the Colwood facility. This would provide greater assurance of environmental protection through planned and unplanned treatment disruptions.

4.2.3 Water Reuse Infrastructure Systems

Treated effluent systems require their own, separate infrastructure for distribution. Each proposed wastewater treatment facility would include a pumping station to cover the range of elevations and flows as well as distribution pipes based on conceptual routes. In order to avoid the costs and footprint of equalization storage, reuse of treated effluent would be limited to the daily capacity of the plant. This strategy does not significantly limit the supplies available for irrigation or toilet flushing.

For Colwood-Langford, the conceptual reuse system includes approximately 19,500 meters of reuse pipe and a pumping system equivalent to the average daily capacity of the plant. The Esquimalt system includes almost 17,000 meters of reuse pipe and pumping system that can deliver the peak irrigation and toilet flushing demands in 2045. While the reuse systems are similar in scope, the Colwood-Langford plant provides 5x (or greater) the amount of reuse potential because of the land irrigation demand and aquifer recharge, providing a significantly greater return on investment. In effect, while the 4-plant option set would provide higher level of service and boost enhanced tertiary water quality, it may not provide greater reuse opportunities for a long time.

5.0 Technology Needs and Considerations

5.1 Representative Sites and Characteristics

Representative design is a helpful approach to assessing the relative merits of multiple option sets, each with their own feasible sites. For Westside analysis, representative design was customized to suit myriad possible configurations by identifying four types of treatment plants to suit the flow design scenarios across the municipalities. Table 5.1 summarizes the four types of plants that would be situated across the Westside as they relate to each option set.

Table 5.1 - Site Characterization Summary

Site Characterization	Neighbouring Land Use	Flow Range (Average Dry Weather Flow)	Anticipated Plant Purpose – Liquid Train
Small Distributed	Residential	< 5 ML/day	Tertiary treatment for local reuse
Medium Distributed	Residential	6-15 ML/day	Tertiary treatment for local reuse
Large Distributed	Residential	16 – 25 ML/day	Tertiary treatment for local reuse
Extra Large Distributed or Central	Non-Residential	26 + ML/day	Primary & Secondary treatment for outfall and tertiary treatment for local reuse

5.2 Liquid Treatment Options and Representative Designs

The small, medium and large plants are part of distributed option sets whereby plants may be located in residential areas. It is our understanding, based on the public process to date, that the primary reason to have a distributed system is to put plants near target markets for resource recovery thereby signalling the need for tertiary level treatment. The driver for smaller footprint and consideration to ‘neighborhood fit’, treatment technologies should be selected that occupy a relatively smaller physical space.

Representative design includes technology selections on a provisional basis: at this stage, design choices provide key insights into the possibilities at each plant without eliminating the innovation from the private sector to propose the ultimate solutions. Indeed, the selection of specific technologies and manufacturers is a complicated process and ought to consider, more detailed evaluations such as:

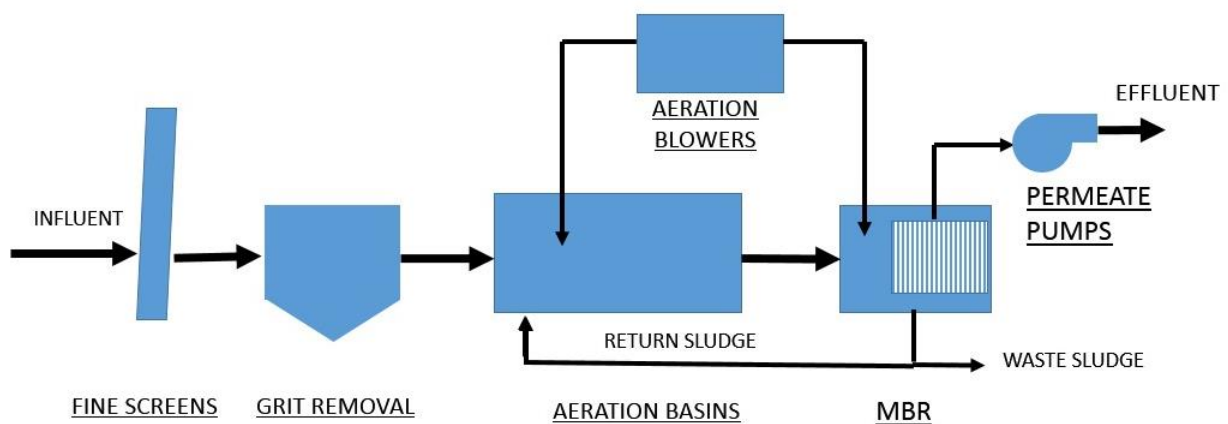
1. Method of procurement
2. Competition amongst a reasonable number of manufacturers

3. Financial security of manufacturer
4. Proven in the market place
5. Life cycle costing (capital and operating)
6. Flexibility
7. Ability to phase construction
8. Carbon footprint
9. Operational complexity
10. Physical area requirements
11. Amount of commonality with equipment desired within the entire CRD

Examples of tertiary technologies that demonstrate potential for the Westside include: membrane bioreactors, sequencing batch reactors with ultrafiltration membranes, moving bed bioreactors with ultrafiltration membranes and continuous flow intermittent cleaning with ceramic membranes. Representative designs for the small, medium and large plants include membrane bioreactor (MBR) processes because it is well-known to tertiary quality requirements, because there is competition among the manufacturers of the technology, and also, because it occupies a small physical footprint. .

A typical generic MBR plant would include grit removal, fine screens, anoxic and aerated bioreactors, membranes, a waste sludge wasting system and ultraviolet light for primary disinfection with sodium hypochlorite for secondary disinfection (chlorine residual). Odour control facilities would also be provided. A typical process schematic for an MBR process is shown in Figure 5.1 below.

Figure 5.1 – Membrane Bioreactor (MBR)



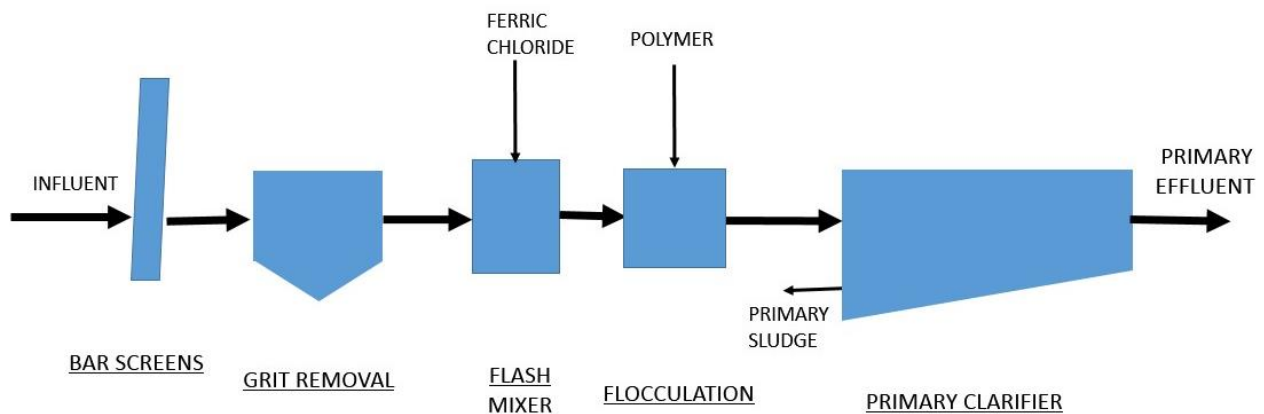
Each of these plants would extract 2 x ADWF from the CRD trunk sewers. Any wet weather flows above this amount will be left in the trunk sewer to be treated at the extra-large distributed or central plants.

The extra-large distributed or central plants located in non-residential areas are primarily targeting to meet the federal and provincial regulations. This means meeting the secondary level of treatment and processing the 2 to 4 x ADWF to a primary treatment level. The intent with these plants is to ensure there is sufficient site area to allow for a side stream of flow to be treated to a tertiary level to satisfy the target resource recovery markets in the reuse areas identified nearby the plant. However, it is recognized that because the demand for reuse in the vicinity may be a small fraction of the treatments plants capacity, these facilities will operate at reduced capacities much of the time. Private sector responses allow for other technologies that meet or exceed the level of treatment identified above.

Primary treatment technologies are diverse as well and technologies considered for this project include traditional primary clarification (PC), ballasted flocculation (BF) and chemically enhanced primary treatment (CEPT). The mechanical fine mesh screen systems were reviewed, but were eliminated for further consideration since they do not consistently achieve the $CBOD_5 < 130 \text{ mg/L}$ requirement.

Representative design analysis includes the CEPT process because it is established in the market, occupies a relatively small physical footprint and provides a high level of reliability. The CEPT process includes chemical addition, mechanical mixing and primary clarifiers with sludge removal pumps. The primary clarifiers would be covered and include odour removal equipment. Figure 5.2 provides a schematic of a CEPT system with a headworks that includes screens and grit removal.

Figure 5.2 – Chemically Enhanced Primary Treatment (CEPT)



Representative design for extra-large treatment facilities included review of processes that were suited for providing secondary treatment to larger flow ranges. Suitable technologies include conventional activated

sludge (CAS), moving bed bioreactors (MBBR) and integrated fixed-film activated sludge (IFAS). Process schematics of CAS, MBBR and IFAS are provided in Figures 5.3, 5.4 and 5.5 below.

Figure 5.3 – Conventional Activated Sludge (CAS)

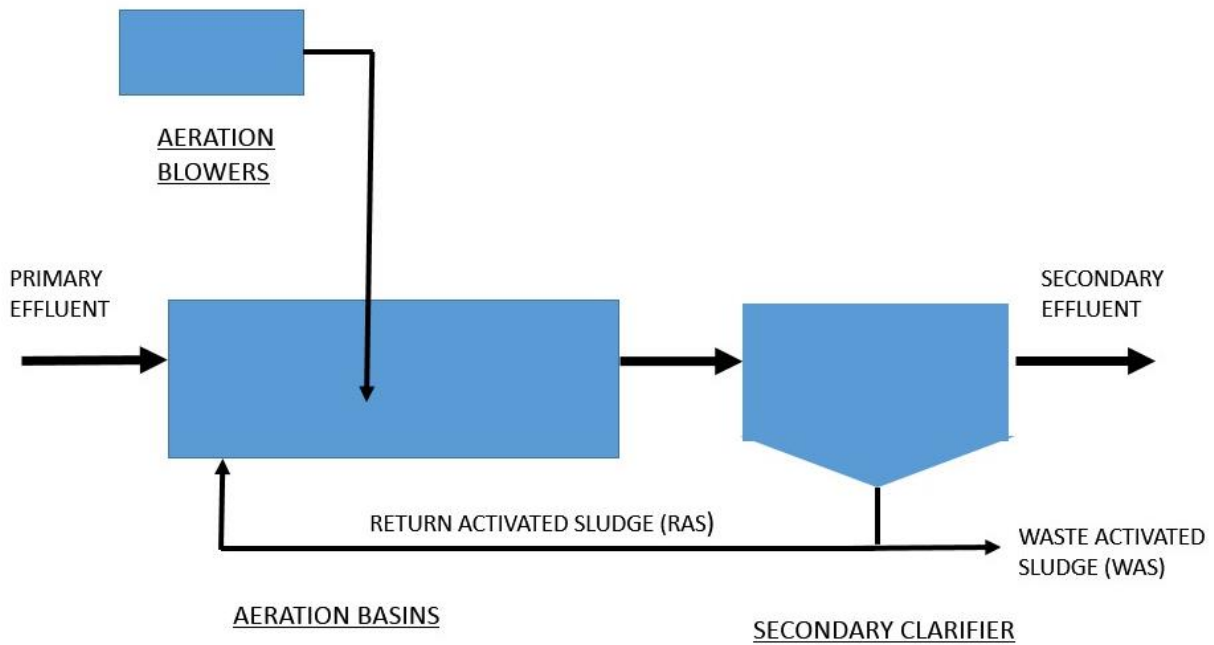


Figure 5.4 – Moving Bed Biological Reactors (MBBR)

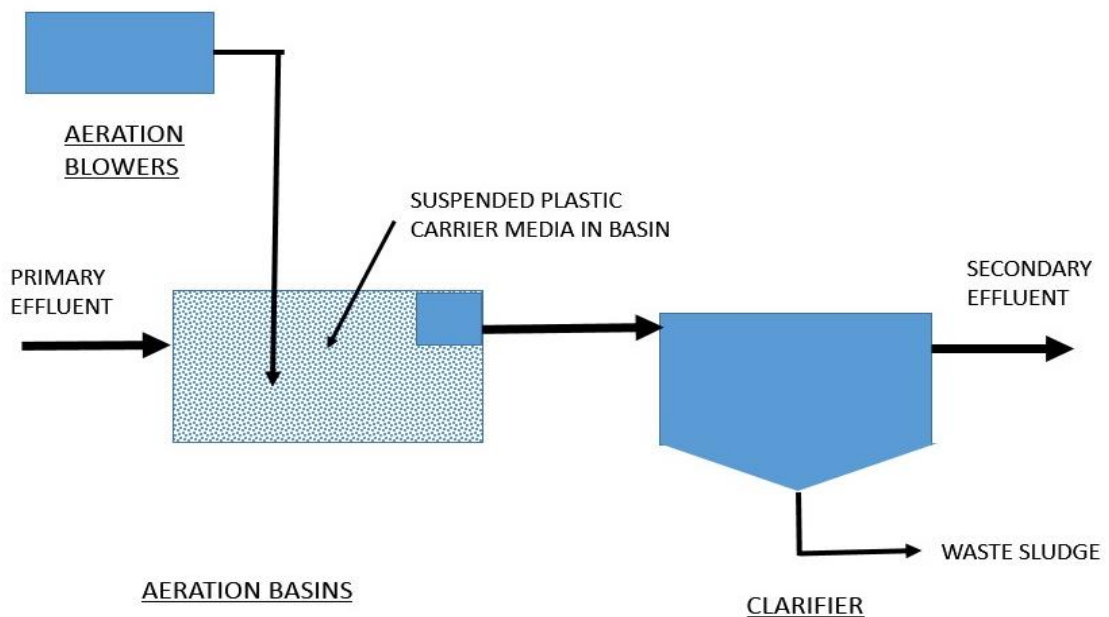
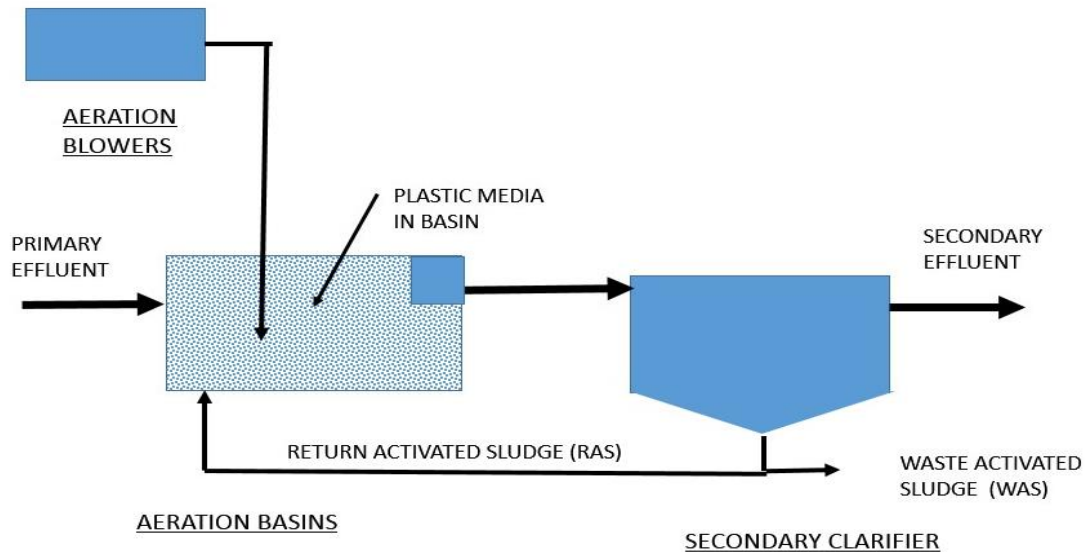


Figure 5.5 – Integrated Fixed-Film Activated Sludge (IFAS)


The MBBR and IFAS systems processes are similar to CAS, in that they both typically use aeration and clarification tanks for treatment. One advantage of these processes is that they reduce the size of aeration tanks needed for biological treatment. This is accomplished by adding media (plastic pieces, ropes, or sponges) to the aeration tanks. Bacteria grow on the surface of the media in a “fixed film,” and effectively increase the amount of bacteria that can be held within a given tank size. Both the IFAS and MBBR processes provide a fixed media with an aeration basin. IFAS differs from MBBR in that it is more like the activated sludge process, since it provides for a return of activated sludge from the clarifier back to the aeration basin. These systems are sometimes used to upgrade an existing aeration basin in a treatment plant, by retrofitting existing aeration basins with the media to be able to provide increased capacity for the existing basin footprint.

The secondary treatment process for extra-large facilities includes primary treatment via CEPT followed by secondary treatment. The initial technology selected was CAS due to lower operating costs than the MBBR or IFAS systems. Based on the available land area for the selected sites, it became apparent that a secondary treatment process requiring a smaller footprint than a CAS system would provide advantages. An MBBR or IFAS system would require a reduced footprint, but annual operating costs would be greater than CAS because of less efficient aeration. These systems would provide an effluent quality that would meet or exceed the proposed discharge limits. Overall, the MBBR and IFAS processes were reviewed in order to meet the treatment limits but also reduce the footprint. Also note that the process would typically include grit removal, screens, primary treatment, and an aerated tank with a floating or fixed film media. Any floated media systems require screens to contain the media in the tank, in addition to a clarification system, a waste sludge system, and ultraviolet light for primary disinfection. The aeration basins would be covered and include odour control equipment.

5.3 Solids Treatment Options and Representative Designs

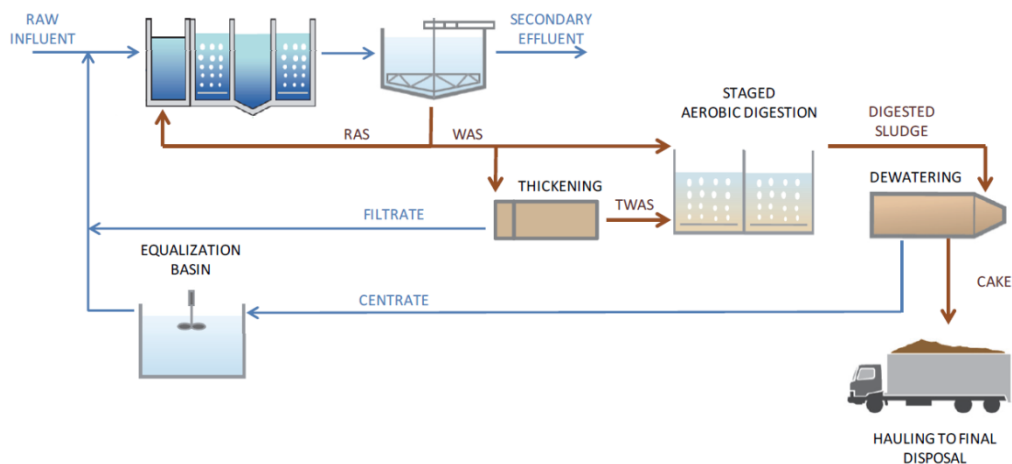
Solids treatment alternatives are narrowed based largely on these local boundary conditions:

1. The land application of any sewage solids is not allowed. This includes highly processed forms like pelletized solids, biochar or solids converted through thermochemical methods. New markets must be developed through partnerships to reflect the value of the byproduct in an effort to offset the treatment and development costs.
2. The landfilling of sewage solids is strongly discouraged by the CRD. Under extraordinary circumstances, the landfill may accept sewage solids at a cost of \$121 dollars per wet tonne.
3. The CRD is considering an integrated waste resource plant that may include sewage solids in addition to select yard, garden and kitchen waste managed in an integrated manner with solid waste management services.

In addition to these boundary conditions, Phase 2 analysis for Westside includes review of three key technologies for the stabilization and treatment of the sewage solids generated at the liquid treatment plants: aerobic digestion, anaerobic digestion and gasification.

Aerobic Digestion: Through this process, the collected sewage solids are kept under aeration for a period of no less than 28 days (using reactors in series) at a concentration of less than 2% solids (to maintain adequate air transfer and avoid odors and anaerobic conditions). The resulting is a wet-soil like material with high potential for odors, bacterial regrowth and additional degradation. This process is energy intensive and can be capital intensive in larger applications. Figure 5.6 shows a generic flow schematic for the aerobic digestion alternative.

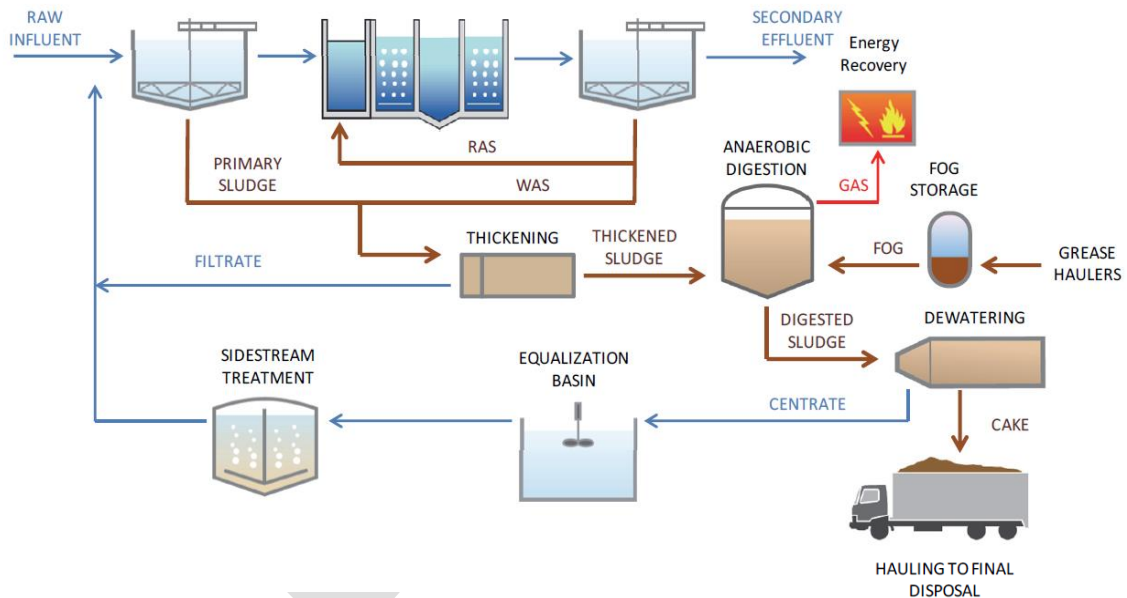
Figure 5.6 – Aerobic Digestion



1. Anaerobic digestion: Through this process, the collected sewage solids are kept under anaerobic (no oxygen) conditions for a period of 15-25 days at a concentration of at least 4% solids to allow the microorganisms to consume the organic matter efficiently and produce a valuable resource in the form of methane gas that can be recovered and reused. These systems produce a wet-soil like material with moderate potential for odors, bacterial regrowth and additional degradation. This process generates energy and is cost effective, compared to aerobic digestion, in facilities larger than 20 ML/d. Anaerobic digestion is particularly suited for facilities that have primary clarification as the performance of the system is far superior to the anaerobic digestion of biological sludge (Waste Activated Sludge).

Figure 5.7 shows the generic process flow diagram for the anaerobic digestion alternative including energy recovery and fats oils and grease digestion to supplement gas production.

Figure 5.7 – Anaerobic Digestion



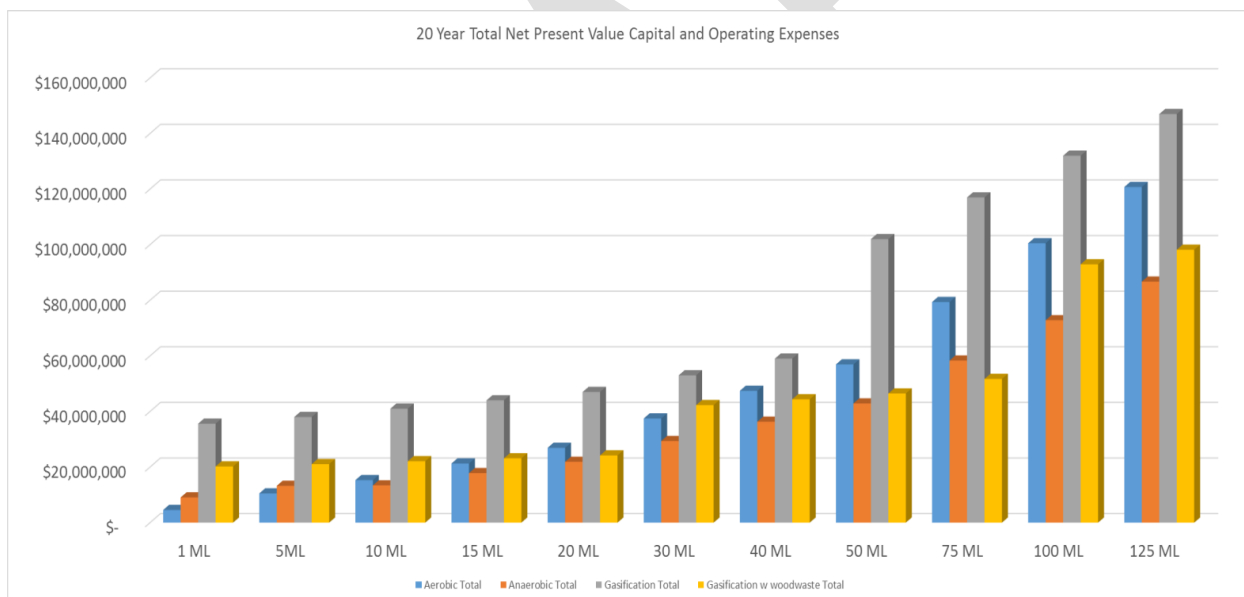
2. Gasification: This process is a thermal process that converts part of the organic carbon in the sewage solids into a syngas through non-biological processes. Unlike the previous approaches, this approach will require the participation of a technology manufacturer as the gasification systems require proprietary technology. The end product of the gasification technology is a biochar that does not look like a soil material. It has the composition and physical properties of activated carbon but is irregular and may produce dust. This technology struggles to achieve energy neutrality using only sewage solids; it requires a solids concentration of approximately 80% to become energy positive; manufacturers of gasification technology claim that the use of other feedstocks, like wood waste or yard, garden and kitchen scraps make the process energy positive.

While liquids and solids treatment processes overlap and link together, it's typical to assess solids recovery methods in an isolated manner to illustrate the cost and revenue conditions for each approach. Solids recovery scenarios for Westside analysis include:

1. Provide full level of solids treatment at each site.
2. Reintroduce the solids into the sewer system for treatment at the peak weather facility
3. Provide solids dewatering and transport at the smaller facilities and full treatment at the peak weather facility.

Figure 5.8 shows the 20 year total net present value (NPV) for the solids alternatives as a function of the plant size.

Figure 5.8 – 20 Year Total Net Present Value Capital and Operating Expenses



Takeaways and detailed insights from Table 5.2 and Figure 5.8 include:

1. Gasification of sewage solids without additional feedstocks is not cost effective in a 20 year life cycle. Based on the cost estimating, the reduction in mass obtained by drying and gasifying the sewage solids is significant and reduces the cost of disposal. This offset however does not pay back for the cost of the initial installation and the cost of the natural gas to drive the drying process.
2. Gasification with feedstock is cost effective in a 20 year life cycle. The overall costs are similar to anaerobic digestion (assuming a market can be created at a cost less than \$121/tonne).

3. Based on the size of the distributed system facilities, all of the smaller facilities would incorporate aerobic digestion, as the minimum facility size that provides a NPV benefit utilizing anaerobic digestion is around 20 ML average daily flows. Because the option sets still provide for the peak flows (>2X ADWF) to be routed to a peak flow "large facility", the system will have all of the costs of the smaller plants plus a large fraction of the costs of the single facility. Therefore the cost of providing full solids treatment at each of the satellite facilities is approximately \$25,000,000. These costs do not appreciably offset any costs for the larger facility. Based on this analysis, it is recommended that the CRD consider only solids dewatering at the satellite facilities. This approach will provide for a reduction in the cost of almost \$20,000,000 as the solids dewatering systems would remain at each of the satellite plants and a solids receiving station would be required at the large plant.
4. Based on preliminary net-present value analysis, the use of anaerobic digestion at the large plant with trucking of the solids from the satellite plants and gasification using a yard waste feedstock are comparable. A Request for Statements of Interest and Request for Proposals will assist the CRD in confirming reliable, financially-backed solutions for solids recovery management.



5.4 Energy Recovery Options and Representative Designs

Until further research can be conducted on the full life-cycle costing of gasification including integration of waste streams, anaerobic digestion was included for life-cycle costing due to its energy positive balance and more reliable cost estimates (because there are more installations for comparison).

The industry standard for Energy recovery from anaerobic digesters is to provide the ability to use a combined heat and power (CHP) system for the facility. CHP units utilize either an internal combustion engine or turbine to generate power; the waste heat from these units is captured and used to provide heat for the digesters.

Newer approaches include the refinement of the biogas to Biomethane by processing the gas to higher standards and removing the carbon dioxide present in the gas. This biomethane can be compressed and used to fuel CNG vehicles if there is sufficient production and the demand (buses or trash trucks) are located in close proximity where the gas is being produced. As this approach requires additional treatment and the marketing of the gas, this recovery alternative is a candidate for a public-private-partnership. We recommend that the CRD issue a RFSI similar to the resource recovery RFSI for the inclusion of private market capital to promote and produce biomethane.

Therefore, the Energy Recovery Option will be limited to the sites that can support anaerobic digestion and will focus on the use of a CHP system (micro-turbine or internal combustion generator) to match the expected average gas production.

Technology	Electricity Produced	Heat Recovered
 MICROTURBINE	30%	30%
 INTERNAL COMBUSTION GENERATOR	35%	35%

Based on the size of the facility it is recommended that an internal combustion engine be evaluated as the CHP driver. The table below shows the estimated cost of the combined heat and power system for the central facility.

Type of CHP	Size of Installation	Cost of Installation	Power Generated	Heat Rejected to Recovery
Internal Combustion Engine	1.5 MW	\$7,750,000	1,285 kW	4 MMBTU/hr. 16,000 Kcal/hr.

6.0 Costing Factors

6.1 Introduction

Costs will be presented in 2015 Canadian dollars. It is important to recognize that since 2010, and from 2015 until the systems are constructed, prices of all cost elements can be significantly affected by time and other cost escalations. For example, the Engineering News Record (ENR) is an industry guide to the construction industry. The ENR states that the construction cost index for Toronto (BC is currently not represented in the ENR) has increased from 9,434 (2010) to 10,515 (2015). This is equivalent to a construction cost increase of 11.5% over the 5 year period. A review of data available from Stats Canada for the Victoria area indicates that their construction price index has risen from 111.5 (2010) to 122.8 (2014; no 2015 data yet available), using a base index of 100 (2007). This is equivalent to a 10.1 % increase over this 4 year period. This would appear to correlate fairly closely with the 11.5 % increase over 5 years for the ENR index. We have used the Stats Canada index for the purposes of calculating all cost escalations.

The impact of the exchange rate between the Euro, the US and Canadian dollars is also relevant, since a portion of the equipment may be manufactured in the USA or Europe.

Some costing considerations are difficult to predict, like the supply and demand and productivity of skilled labour in the Greater Victoria area, especially if other large scale projects in the province were to occur, such as liquefied natural gas and the Metro Vancouver Lion's Gate WWTP. It is also widely known that construction on Vancouver Island carries a premium compared to the mainland.

Cost estimates will also stem from recent engineering and costing experiences for construction projects supported by Urban Systems and Carollo, both locally and abroad. Cost estimates conducted by other consultants for CRD have been reviewed and informed the updated unit rates.

6.2 Capital Cost Breakdown

Capital cost estimates include multiple factors and contingencies. For Class D cost estimates we have included *general requirements, contractor profit and overhead, construction and project contingencies, engineering, administration, interim financing and escalation*. Table 6.1 illustrates these cost factors for an example project with a base construction cost estimate of \$1,000,000. For comparative purposes the percentages used in this study are the same as those used in previous studies. We have assumed the mid-point of construction is four years or 2019.

Table 6.1 - Capital Cost Breakdown

Description	Total
Construction Cost	\$ 1,000,000
General Requirements (Mobilization, Demobilization, Bonds, Insurance, etc.) – 10%	\$ 100,000
Contractor Profit/Overhead – 10%	\$ 100,000
Construction/Project Contingency – 35%	\$ 350,000
Subtotal of Direct Costs	\$ 1,550,000
Engineering – 15%	\$ 233,000
CRD Administration and Project Management and Miscellaneous – 8%	\$ 124,000
Interim Financing and Inflation During Project – 4%	\$ 62,000
Escalation to Mid-Point of Construction – 2%/year (compounded over 4 years)	\$ 124,000
Total Capital Project Cost	\$ 2,093,000

6.3 Pump Stations

The pump stations that will be used to pump effluent from the existing CRD collection system to the proposed treatment plants are typically designed to be low-lift, high-volume facilities. Because of the unique nature of each pump station (siting, access, pump capacity, proximity to major utilities and sensitive areas, geotechnical considerations, etc.), costs for such facilities can vary widely.

Class D cost estimates (-15%/+25%) are commonly derived from cost curves which are based on extensive cost data gathered from the combination of a wide range of pump stations throughout the industry. These curves typically plot station costs against the size of the stations in L/s. Typical curves are shown in Appendix E and were developed by an extensive study undertaken 11 years ago for the Ministry of Public Infrastructure Renewal in Ontario. In conducting our estimates we assessed the application of estimates from Ontario against our experience in the BC market. The unit rates have been multiplied by 1.6 with consideration of the following:

- a. 20% - for temporary and permanent site work.
- b. 20% - for standby power and SCADA
- c. 20% - inflation from 2004 to 2015.

Where possible, the unit rates have been compared to cost data available from recently designed and constructed projects, to confirm general data conformance. These facilities typically comprise a concrete below grade wet well, in which the sewage is collected and from which the sewage is pumped using submersible pumps. An at-grade superstructure (usually concrete block or similar durable material) is located on top of the wet well (typically poured in place concrete), to house mechanical and electrical equipment, including MCCs, PLCs and standby power.

Where pump stations will be included in the design and construction of a wastewater treatment plant, i.e., are not stand alone facilities, experience informs that a 30% cost deduct should be applied to the unit costs rates to account for common infrastructure and other facility synergies.

Below is a summary of a few examples of anticipated pump station costs, based upon the curves in Appendix E and including the 1.6 multiplier. All rates are in 2015 dollars and pertain only to the Construction Cost portion as outlined in Section 6.2, which would be factored up as per Table 6.1.

Pump Station Size	Construction Cost (CDN\$)
350 L/s	\$ 3,400,000
750 L/s	\$ 6,400,000
925 L/s	\$ 8,000,000

The Craigflower Pump Station upgrade tendered price not including GST was \$11,000,000 and the capacity is approximately 1,000 L/s. This value aligns quite well with the Ontario curves given that this number includes contractor profit/overhead and general requirements and was constructed in the last two years.

6.4 Piping

The piping systems that will be used to service the Core Area option sets will comprise PVC pipe installed in existing rights-of-ways, typically existing road allowances. As such, the unit cost rates allow for pavement and any existing surface improvement restoration. In addition, an allowance has been included for temporary site works, traffic control and associated above ground work.

In general, these pipes will provide the connectivity between the existing CRD sewer trunk mains, proposed pump stations, proposed wastewater treatment plants and proposed outfalls. Typically sanitary collection systems are designed for minimum flow velocities of 0.8 m/sec to ensure that material does not build up within the piping systems. From a capital cost and energy perspective, ideally flows should be near 2.5 m/sec. Given the wide range in flows within the CRD system (0 to 4 x ADWF), detailed analysis is required for any pumped and piped system to ensure that the optimum life cycle range of costs are achieved.

For the purposes of this costing exercise, we have sized our pipes such that the resultant velocities are in the 1.5 to 2.5 m/sec range, based upon 2 x ADFW.

The unit cost rates developed are based upon meeting or exceeding accepted industry design standards, such as those detailed by AWWA.

The following is a summary of the unit cost rates developed by Urban Systems as part of the ongoing work with the CRD. All rates are in 2015 CDN dollars and pertain only to the Construction Cost portion outlined in Section 6.2.

Pipe Diameter (mm)	Construction Unit Cost \$/m
300	\$ 700
350	\$ 740
400	\$ 780
450	\$ 820
500	\$ 870
600	\$ 950
750	\$ 1,130
900	\$ 1,350
1050	\$ 1,620
1200	\$ 1,850
1350	\$ 2,100
1575	\$ 2,450

6.5 Outfalls

Developing unit cost rates for outfalls into a marine environment proved to be the most challenging task, given the wide range of unknowns and variabilities. Not too dissimilar from pump stations and their unique features, the unit cost rates for outfalls also vary widely. In particular, geotechnical considerations and seabed profiles will have significant impacts on these costs. However, unlike, pump stations, there is not a large data base on which to draw upon and develop cost curves.

Outfalls are anticipated using steel pipes, installed with concrete collars and anchors. Based upon the data available, 2015 costs for these two sizes were developed as summarized below and pertain only to the Construction Cost portion outlined in Section 6.2.

Pipe Diameter (mm)	Construction Unit Cost \$/m
600	\$ 6,150
750	\$ 7,000
900	\$ 7,800
1050	\$ 8,600
1200	\$ 9,600
1350	\$ 10,800

6.6 Methodology to Provide WWTP Cost Estimates

For Wastewater Treatment Plants the costing methodology is more complicated since each plant includes both liquids and solids treatment processes and costs are largely dependent on the indicative technology selected. For this project we will use the experience database developed by Carollo and Urban Systems in order to determine appropriate costs for the indicative facilities. Only the representative technology will be costed in order to arrive at comparative cost estimates between the option sets.

6.7 Revenue Sources

Revenue sources will cover the range of incomes based on exchange of goods or services and also monies that offset costs including potential development contributions or potential partnerships which minimize the extent and impact of new works. Phase II analysis for Westside does not include detailed life-cycle costing analysis including each of the following revenue examples, however these will be assessed further as part of Phase 2 for the Core Area:

- Utility billings, requisitions, transfers and interest gains
- Retail rates for resource recovery systems including water rates, gas/fuel rates (solids recovery) and incomes collected for any sales related to solids residuals
- Development cost charges and other potential private sector development contributions available to local governments
- Municipal cost-shares for example where infrastructure upgrades are needed for both local and regional benefit
- Grants in terms of secured monies available to Westside
- Other offsetting costs for example, homeowner cost savings that may arise through waste diversion as part of integrated solids recovery

Three important notes about revenues at this time include:

- Water revenues increase over time as irrigation customers are phased-in and as growth and development potentially incorporate recycled water for toilet flushing
- Energy recovery revenues are currently offset by costs associated with disposal of byproducts eliminating any addition revenues from wastewater solids; further analysis is required as part of Phase 2 analyses
- Carbon offsets are being studied so that they can be included, where appropriate

6.8 Operating and Life Cycle Cost Assumptions

Life-cycle costs will be prepared for each of the option sets. Life cycle costing includes capital, as well as operating costs and later, consideration to revenues as part of the aggregate financial scenarios. Operating costs will consider typical cost elements as well as revenue (outlined in Section 6.7) which can reasonably be assumed to accrue given the resource recovery opportunities available.

Below is a summary of the inputs into our life cycle costing model. As this is a constant dollar analysis, all costs will be in \$2015. The only escalation that will be included will be 2% per year for initial capital projects for the time from today until midway through construction which is assumed to be 2019.

We propose to conduct sensitivity analysis on the discount rate, escalation factors and revenue projections to monetize the risks inherent in long-term capital financing and service delivery. As a base case, our life cycle analysis will be guided by previous analysis and in particular, will suit treasury board guidelines to suit the funding partners.

We will assume that chemical and energy costs will be linearly proportional to flow. For example, the current Langford flow is 5.2 MLD and 2030 design is 14.2 MLD. Electricity cost in year one will be:

$$\frac{5.2}{14.2} \times 100\% \text{ of the 2030 design year.}$$

Life Cycle:	15 years (2015-2030)
Interest Rate:	to be confirmed with funding partners (as needed) e.g. 4%
Inflation Rate:	to be confirmed with funding partners (as needed) e.g. 2%
Discount Rate:	to be confirmed with funding partners (as needed) e.g. 3%
Water Cost:	Distribution cost from distribution supplier (e.g., CRD for Westshore & Sooke) is \$1.81/m ³
Electricity Cost:	Average rate \$0.08/kwh

Chemical Costs;

Current market prices

Labour Rates:

Labour Type	2015 Annual Salary ⁽¹⁾
Plant Manager	\$ 158,000
Chief Plant Operators	\$ 135,000
Chief Area Operator	\$ 113,000
Plant Operator	\$ 90,000
Labourer	\$ 56,000

⁽¹⁾ Including benefits and administration

Vehicle Rates:

\$40,000/yr./vehicle

Trucking Rates:

Current market prices

Disposal Rates:

Current tipping charges to CRD Landfill
(i.e., \$157 per tonne for screenings and pumpings from Sewage Treatment Plants and \$121/tonne for waste sludge < 80% moisture)

Maintenance/Repairs Pump Stations: 1% of Capital/yr.

Equipment Replacement Reserve: 1% of Capital/yr.

Operation & Maintenance Contingency: 10% (includes testing, insurance, miscellaneous)

7.0 Description of Option Sets

7.1 Introduction

After discussions with the Westside Technical Committee it was agreed that the three option sets to be examined in more detail are:

Option 4A (Revised)	Langford/North Colwood/View Royal/Esquimalt First Nation
Option 1B	Esquimalt First Nation
Option 2C (Revised)	North Colwood/Esquimalt First Nation

The rationale for selecting these three option sets is as follows:

Four Plant Option

- Distributed model with each community contributing to a sub-regional solution.
- Increasing the opportunities for reuse of treated effluent and heat recovery since there are multiple plants.
- Increased potential for revenue from reuse/recovery options.

One Plant Option

- Single plant may be the most cost effective since it involves the least amount of new pipe and pump stations.
- Operations are consolidated in one location.

Two Plant Option

- This specific option takes advantage of all the reuse work that has been undertaken by Colwood.
- Does not require solids dewatering of treatment in Colwood, which simplifies that plant.
- The large plant becomes the “alternative method of disposal” required by the Ministry of Environment in the event of plant failure. As such a second ocean outfall is not required.

Note that all plants will have ultraviolet disinfection to achieve the required concentration of faecal coliforms, whether for secondary or tertiary plants. Since the demand for effluent reuse is not likely to be 100% of the capacity of any of the plants it is proposed that chlorination not be included in the plants. Rather, it is suggested that wherever the takeoff points are from the treated effluent line that chlorine be

added there. This will ensure that any discharge to the ocean will not have a chlorine residual > 0.02 mg/L.

7.2 Site Prioritization

Site prioritization was conducted simultaneous to option set design and costing. Insights from sizing, infrastructure and resource recovery potential signal a pared-down list of sites, as detailed in Appendix F, and summarized here as:

- Site 2a Langford VMP and Meaford Avenue
- Site 11 Colwood Park and Ride
- Site 14 Colwood West Shore Parks and Recreation
- Site 15 Esquimalt First Nation
- Site 16 View Royal Burnside and Watkiss
- Site 17 Esquimalt Bullet Park Site 17

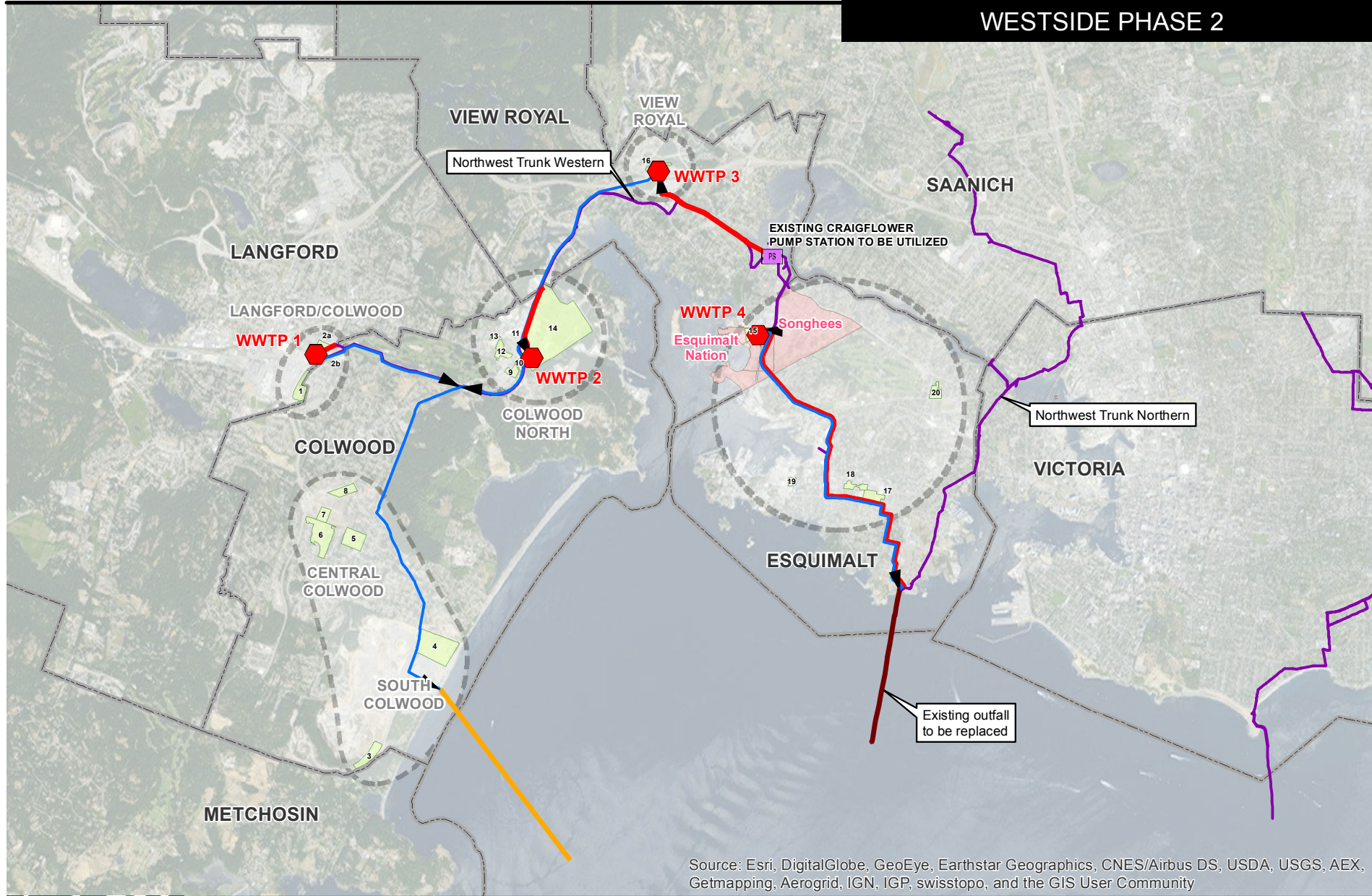
Esquimalt Village Site 17 was originally part of Option 4A and 2C and can be considered further however it is a relatively small site and will require flow synergies with plants located on the Eastside. Further feasibility analysis in Phase 2 can confirm the potential for Site 17. Additional costs related to maintaining its use as a park will increase site improvement costs. Also, Site 4 in South Colwood was not considered for 2030 design scenarios however it demonstrates some potential for phasing new sites over time to accommodate population growth and increased flows.

7.3 Option 4A (Revised) – Four Plants

7.3.1 Description

Figure 7.1 illustrates four treatment plants across the Westside with one facility in each community. Plant technologies and processes for small, medium and large plants meet the representative design considerations laid out earlier in the memo. In particular, the larger plant would be constructed to treat the full 4 x ADWF to a primary level as well as the balance of 2 x ADWF to a secondary level, recognizing that the largest portion of the effluent will be discharged to the ocean. Option 4A is revised in this analysis because the only site that has enough area is the Esquimalt First Nation, so it replaces the Esquimalt Village site (#17).

WESTSIDE PHASE 2



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Legend

- Municipal Boundary
- First Nation Reserve
- Site Nodes
- Existing Sanitary Trunkmain
- Existing Pump Station
- Raw Sewage Forcemain
- Treated Effluent Forcemain
- New Outfall
- Potential WWTP



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WESTSIDE OPTION SETS
FOUR PLANT OPTION

Table 7.1 summarizes usable areas for each of the four sites, as well as a footprint requirement for 2030 and a conceptual estimate of area required for 2045.

Table 7.1 – Site Locations Area and Ownership

Community	WWTP Site	Estimated Usable Area	Estimated Required Area (ha)		Ownership
			2030	2045	
Langford	2a	1.89 ha	1.1	1.6	Private
Colwood	11	0.74 ha	0.6	1.1	Municipal
View Royal	16	1.13 ha	0.4	0.8	Provincial
Esquimalt First Nation	15	3.72 ha	2.4	3.7	First Nation

The estimated site area requirements in Table 7.1 illustrate that there is sufficient area at all four plant sites to accommodate the 2045 design flows.

7.3.2 Option Set Components

Plant 1 – Langford

1. Tie-in to CRD trunk main.
2. Sewage pump station adjacent to CRD trunk at east boundary of Langford (to pump 2 x ADWF from Langford). Note the 2 to 4 x ADWF is left in the trunk for treatment at EFN.
3. Short sewage forcemain to plant on Site 2a.
4. Plant on Site 2a with headworks (grit and screens), tertiary treatment with UV disinfection. Residual solids would be dewatered and trucked to the EFN treatment site.
5. Effluent pump station (part of the plant).
6. Effluent forcemain to connect to the other forcemains.

Plant 2 – Colwood North

1. Tie-in to CRD trunkmain at east boundary of Colwood.
2. Sewage pump station at east boundary of Colwood and CRD trunk (2 x ADWF from Colwood) to pump to new plant on Site 11. Note 2 to 4 x ADWF is left in the trunk to be treated at EFN.
3. Sewage forcemain to plant.
4. Plant on Site 11 with headworks (grit and screening), tertiary treatment with UV disinfection. Residual solids will be dewatered and trucked to EFN.
5. Effluent pump station (part of plant).

6. Effluent forcemain to connect to other forcemains and new outfall.
7. Outfall to handle Langford/Colwood/View Royal flows.

Plant 3 – View Royal

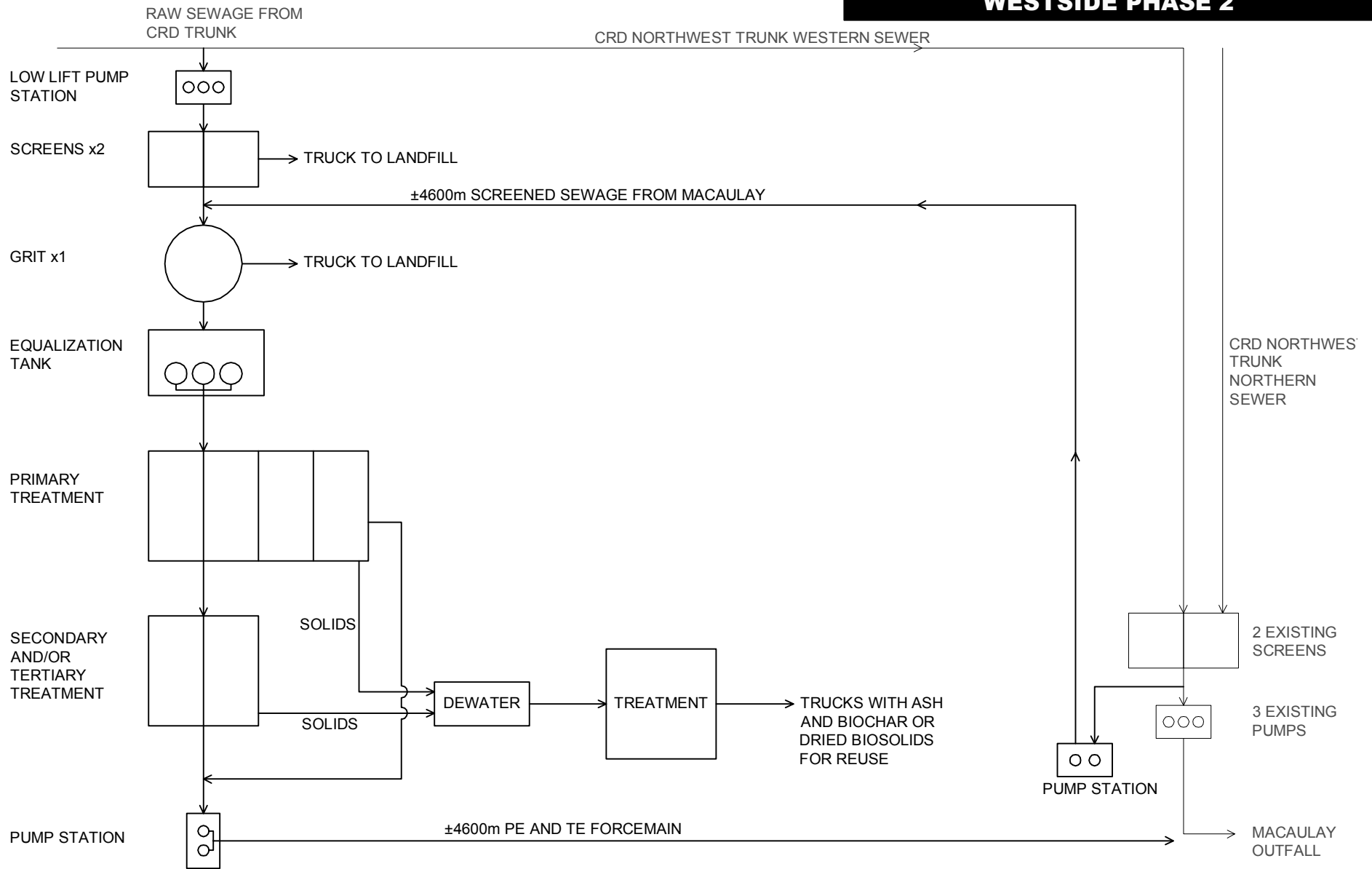
1. Reorient part of Craigflower Lift Station to pump 2 x ADWF (from most of View Royal) to the new plant on Site 16. The other portion of the Craigflower LS will continue to pump the 2 to 4 x ADWF from Langford/Colwood and View Royal on to EFN.
2. Sewage forcemain to plant.
3. Plant on Site 16 to provide headworks (grit and screens), and tertiary treatment with UV disinfection. Note residuals solids can be discharged back into the raw sewage pipe network for treatment at EFN.
4. Effluent pump station (part of plant).
5. Effluent forcemain to connect to other effluent forcemains.

Plant 4 – Esquimalt First Nation

Refer to Figure 7.2 for a process schematic of this plant and the various pump stations required.

1. Tie-in to CRD trunkmain.
2. Pump station beside trunkmain to lift into plant.
3. Short forcemain into new plant.
4. Tie-in to pipe just downstream of the Macaulay Point screens.
5. Pump station at Macaulay Point to pump all flows (0 to 4 x ADWF) to new plant at EFN.
6. Screened sewage forcemain to plant (tie-in after screens at new plant).
7. Primary and secondary plant to include headworks (grit, screens), equalization, primary clarifiers with chemical addition, moving bed bioreactors, clarifiers and ultraviolet light disinfection.
8. Residual solids treatment facility (anaerobic digestion).
9. Effluent pump station.
10. Primary and secondary effluent forcemain with tie-in downstream of Macaulay screens.
11. Outfall to replace existing corroded one.

WESTSIDE PHASE 2



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ESQUIMALT FIRST NATION PLANT

7.3.3 Cost Estimates

7.3.3.1 Capital Cost

The capital cost estimates are comprised of four main components – pump stations, piping, treatment plants and outfalls. It is noted that the pump stations and WWTPs have costs to the 2030 design flows, but the pipes have been costed to the 2045 design flows. Table 7.2 summarizes the capital costs for the four plant option.

Table 7.2 Capital Cost Estimate for Four Plants

Item	Estimated Cost
1. Langford WWTP (28 MLD) Tertiary and Centrifuge	\$ 50,600,000
2. Colwood WWTP (10 MLD) Tertiary and Centrifuge	\$ 31,300,000
3. View Royal WWTP (7 MLD) Tertiary	\$ 21,600,000
4. Esquimalt First Nation WWTP (145/50 MLD Primary/Secondary) plus Solids Treatment	\$ 81,770,000
5. CRD Trunk Tie-Ins (4)	\$ 3,300,000
6. Piping 23,350 m, not including reuse networks	\$ 27,397,000
7. Esquimalt Effluent Reuse Network	\$ 5,950,000
8. Colwood Effluent Reuse network	\$ 7,000,000
9. Ten Pump Stations, Including Esquimalt Reuse Pump Station	\$ 34,200,000
10. New Outfall 2,550 m @ 0.75 m Ø	\$ 17,850,000
11. Replace Macaulay Outfall 1,700 m @ 1.2 m Ø	\$ 16,320,000
Subtotal	\$ 297,287,000
General Requirements (Bonding, Mobilization/Demobilization, etc.) - 10%	\$ 29,728,700
Contractor Profit/Overhead - 10%	\$ 29,728,700
Construction Contingency - 35%	\$ 104,050,450
Total Direct Costs	\$ 460,794,850
Engineering - 15%	\$ 69,119,228
CRD Administration - 8%	\$ 36,863,588
Interim Financing - 4%	\$ 18,431,794
Escalation to Mid-Point of Construction – 2%/year (4 years)	\$ 37,984,315
TOTAL PROJECT COSTS	\$ 623,194,000

7.3.3.2 Operating Costs

The annual operating costs assuming 2030 design flows and 2015 dollars are summarized in Table 7.3.

Table 7.3 – Operating Cost Estimate for Four Plants

Item		Estimated Annual Cost
1. Langford WWTP	(28 MLD) - Liquid	\$ 2,877,000
	(28 MLD) – Solids - Centrifuge	\$ 175,000
2. Colwood WWTP	(10 MLD) - Liquid	\$ 1,514,500
	(10 MLD) - Solids	\$ 93,000
3. View Royal WWTP	(7 MLD) - Liquid	\$ 1,139,500
	(7 MLD) - Solids	\$ 0
4. Esquimalt First Nation WWTP	(145/50) - Liquid	\$ 3,968,500
	(145/50) - Solids	\$ 2,128,000
5. Pump Stations and Piping and Effluent Reuse Systems (2)		\$ 1,324,000
Subtotal		\$ 13,219,500
Contingency (10%)		\$ 1,321,950
TOTAL ANNUAL ESTIMATED OPERATING COST		\$ 14,541,450

7.3.3.3 Anticipated Revenue

- Revenues from solids-energy recovery can be utilized to offset the costs of treatment and solids processing and market development but are unlikely to present incomes beyond the expenditures of the system.
- Water revenues phase in over-time with the potential of approximately \$3,000,000 in 2045. This amount may cover the operating costs of one of the distributed plants (e.g. Colwood) that is if capital financing is not included. This means that based on projected demand for treated effluent reuse, that there will be much less revenue than there will be added cost for three MBR plants. Further life-cycle analysis and risk considerations, including any reductions to potable water revenues (other CRD service) are needed as part of Phase 2.
- Carbon offsets typically range in the order of \$10 - \$20 per tonne of CO2 equivalent. Carbon offsets for solids recovery will be analysed in Phase 2 for the Core Area.

7.3.3.4 Life Cycle Costs

Preliminary results strongly suggest that higher levels of treatment including MBR technologies provide for opportunities for reuse but notably increase capital as well as operating and maintenance costs. Water revenues alone are unlikely to recover these costs over time although there are may be opportunities to reduce the need for outfalls (the case of Colwood) which may create notable cost-offsets from reuse.

7.3.4 Relevant Considerations

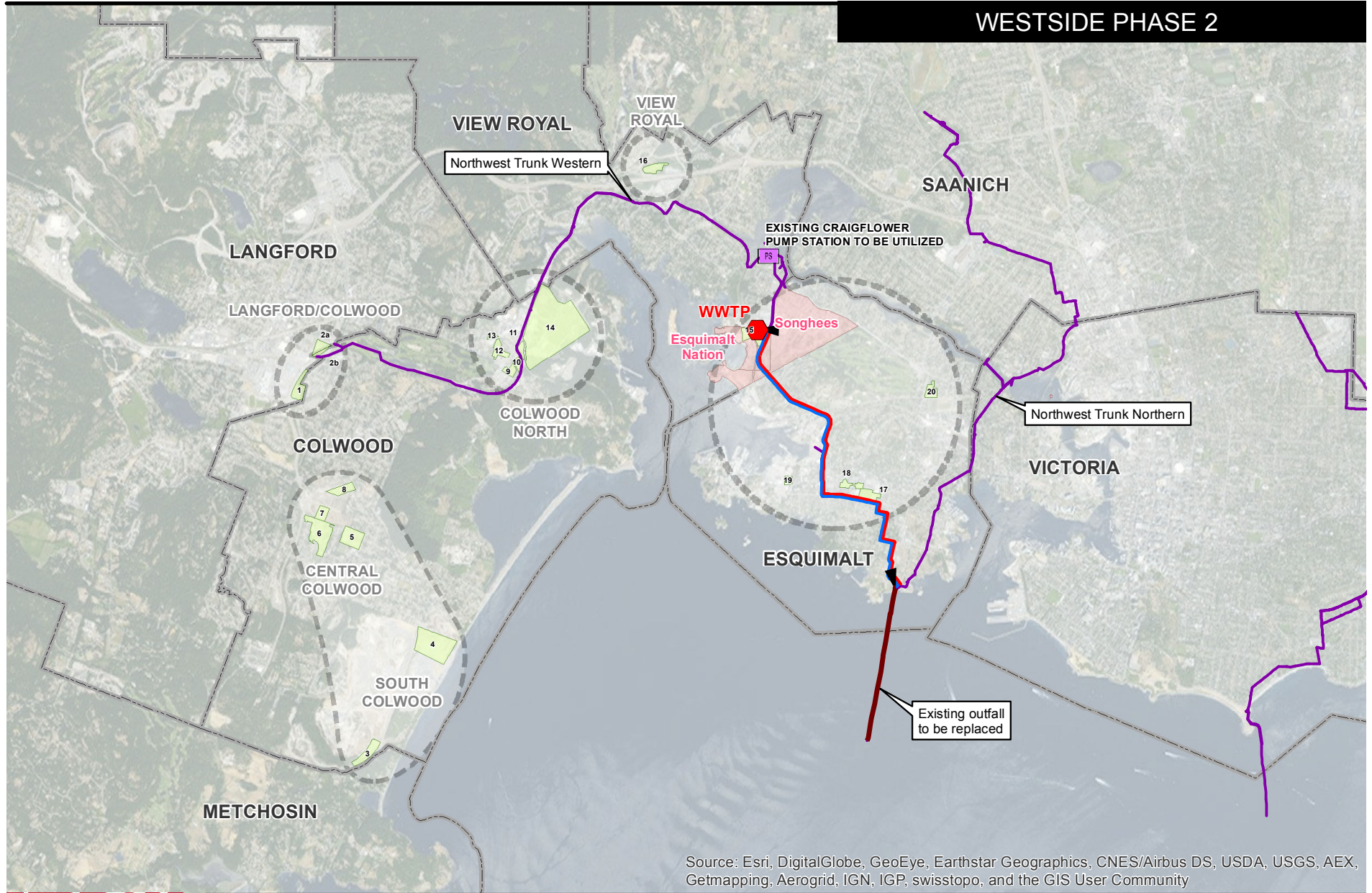
1. No new environmental impact study (EIS) is expected for the Macaulay outfall.
2. The flow from all Westside, West Saanich and Vic West are included in this option.
3. Aesthetically pleasing structures could enhance the neighbourhoods.
4. Reclaimed water could be extracted from the treated effluent line for reuse around each plant and between EFN and Macaulay Point and between Sites 16, 10, 2a and the new outfall.
5. Heat recovery is possible at the treatment plants and along all trunk lines.
6. Can intercept 0 to 4 x ADWF from trunk line beside EFN to avoid repumping it from Macaulay.
7. Colwood would have to relocate the Park n' Ride on Site 11.
8. A new EIS would be required for the new outfall.
9. There will likely be some constraints on Site 16 imposed by a BC Hydro easement for the high voltage power lines.
10. Maximum reuse opportunities with four plants, including effluent reuse networks in Colwood and Esquimalt.
11. Purchase of land from private landowners is required.
12. Agreements with EFN need to be made for use of their land.
13. This the highest life cycle cost of the three options.

7.4 Option 1B

7.4.1 Description

This 1-plant option is located on the Esquimalt First Nation as illustrated in Figure 7.3. Recent site area analysis requirements indicate that there is sufficient area for the 2030 liquid and solids treatment processes, but may be too small to accommodate flows well beyond 2030. Space constraints at the Esquimalt Nation site should be considered in future phases as 2045 flows become available. The primary intent of this option is to meet the federal and provincial regulations with discharge through the Macaulay outfall. The plant is located close to the CRD trunk sewer on Admirals Road. Consequently, it will be possible to capture and pump all of the upstream flows from Langford, Colwood and View Royal.

WESTSIDE PHASE 2



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Legend

- Municipal Boundary
- First Nation Reserve
- Site Nodes
- Existing Sanitary Trunkmain
- Existing Pump Station
- Raw Sewage Forcemain
- Treated Effluent Forcemain
- New Outfall
- Potential WWTP



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WESTSIDE OPTION SETS
ONE PLANT OPTION

The balance of the flows from the two First Nations, Esquimalt, west Saanich and west Victoria will be pumped to the plant from the Macaulay Point outfall. After treatment all of the flow will be pumped back to the Macaulay outfall.

The plant will be able to treat the full 4 x ADWF to a primary level, as well as the first 2 x ADWF to a secondary level.

7.4.2 Option Set Components

Figure 7.2 also illustrates the various components required for this option. The following components are noted:

1. Tie-in to CRD trunkmain.
2. Pump station beside trunkmain to lift into plant.
3. Short forcemain into new plant.
4. Tie-in to pipe just downstream of Macaulay screens.
5. Short pipe into pump station.
6. Pump station at Macaulay Point to pump all flows (0 to 4 x ADWF) to new WWTP at Esquimalt First Nation.
7. Screened sewage forcemain to new WWTP (tie-in after screens at new plant).
8. Primary and Secondary plant to include headworks (grit, screens), equalization, primary clarifiers with chemical addition, moving bed bioreactors, clarifiers, and ultraviolet light disinfection.
9. Residual solids treatment including anaerobic digestion and dewatering.
10. Effluent pump station (part of plant).
11. Primary and secondary effluent forcemain back to Macaulay Point outfall, tie-in downstream of the screens.
12. Outfall to replace existing corroded one.

7.4.3 Cost Estimates

7.4.3.1 Capital Cost

The capital cost estimates are comprised of four main components – pump stations, piping, treatment plants and outfalls. It is noted that the pump stations and WWTPs have costs to the 2030 design flows, but the pipes have been costed to the 2045 design flows. Table 7.4 summarizes the capital costs for the one plant option.

Table 7.4 Capital Cost Estimate for One Plant

Item	Estimated Cost
1. Esquimalt First Nation WWTP (190/95 MLD Primary/Secondary) Plus Solids Treatment	\$ 139,000,000
2. CRD Trunk Tie-Ins (two)	\$ 2,400,000
3. Piping 9,500 m, Not Including Effluent Reuse	\$ 20,335,000
4. Esquimalt Effluent Reuse Network	\$ 5,950,000
5. Four Pump Stations, Including Esquimalt Reuse Pump Station	\$ 28,800,000
6. Replace Macaulay Outfall – 1,700 m @ 1.2 m Ø	\$ 18,360,000
Subtotal	\$ 214,845,000
General Requirements (Bonding, Mobilization/Demobilization, etc.) - 10%	\$ 21,484,500
Contractor Profit/Overhead - 10%	\$ 21,484,500
Construction Contingency - 35%	\$ 75,195,750
Total Direct Costs	\$ 333,009,750
Engineering - 15%	\$ 49,951,763
CRD Administration - 8%	\$ 26,640,740
Interim Financing - 4%	\$ 13,320,870
Escalation to Mid-Point of Construction – 2%/year (4 years)	\$ 27,450,824
TOTAL PROJECT COSTS	\$ 450,374,000

7.4.3.2 Operating Costs

The annual operating costs assuming 2030 design flows and 2015 dollars, are summarized in Table 7.5.

Table 7.5 – Operating Cost Estimate for One Plant

Item	Estimated Annual Cost
1. Esquimalt First Nation WWTP	Liquid \$ 7,167,000
	Solids \$ 3,689,000
2. Pump Stations and Piping and Effluent Reuse System	\$ 856,000
Subtotal	\$ 11,712,000
Contingency (10%)	\$ 1,171,200
TOTAL ANNUAL ESTIMATED OPERATING COST	\$ 12,883,200

7.4.3.3 Anticipated Revenue

The anticipated revenues are listed below.

- Revenues from solids-energy recovery can be utilized to offset the costs of treatment and solids processing and market development but are unlikely to present incomes beyond the expenditures of the system.
- Water revenues phase in over-time with the potential of approximately \$1,000,000 in 2045. This amount is unlikely to cover the operating costs of a small MBR ('slipstream' type installation) even when capital financing is not included. Further life-cycle analysis and risk considerations, including any reductions to potable water revenues (other CRD service) are needed as part of Phase 2.
- Carbon offsets typically range in the order of \$10 - \$20 per tonne of CO₂ equivalent. Carbon offsets for solids recovery will be analysed in Phase 2 for the Core Area.

7.4.3.4 Life Cycle Costs

Preliminary costing analysis suggests that the 1-plant option provides for the lowest capital and operating option for the Westside. Further cost savings may be realized by looking for further efficiencies and synergies through Core Area analysis.

7.4.4 Relevant Considerations

1. The usable area of the EFN site (3.72 ha) is inadequate to handle the full 2045 flows.
2. No new environmental impact study (EIS) is expected for the Macaulay outfall.
3. The flow from all Westside, West Saanich and Vic West are included in this option.
4. Aesthetically pleasing structures could enhance the neighbourhoods.
5. Heat recovery is possible at the treatment plants and along all trunk lines.
6. Can intercept 0 to 4 x ADWF from trunk line beside EFN to avoid repumping it from Macaulay.
7. Reclaimed water could be extracted from the 4,600 m long effluent forcemain for reuse between the plant and Macaulay outfall.
8. Agreements need to be made with the Esquimalt First Nation for their land.
9. This option incorporates an effluent reuse network in Esquimalt.
10. This is the option with the lowest life cycle cost.

7.5 Option 2C Revised – Two Plants

7.5.1 Description

Option 2C is illustrated in Figure 7.4 and includes two important improvements from the original version (June 2015). First is that the plant in Colwood North does not discharge to its own outfall. Instead all of the effluent is reused for irrigation and aquifer recharge – which is estimated to have a maximum capacity of 10 MLD to 30 MLD. If the plant were not able to meet the effluent criteria, for whatever reason, it would be discharged into the CRD trunkmain for treatment at the large plant at Esquimalt Nation.

The second revision to Option 2C is that the extra-large plant is located at the Esquimalt First Nation, not on the Esquimalt Village site (#17). This is because site 17 does not appear able to accommodate the large facility as it increases in size and capacity to meet growth. Phase 2 analysis as part of the Core Area should consider synergies between sites on both Eastside and Westside for longer-term upsizing potential.

7.5.2 Components

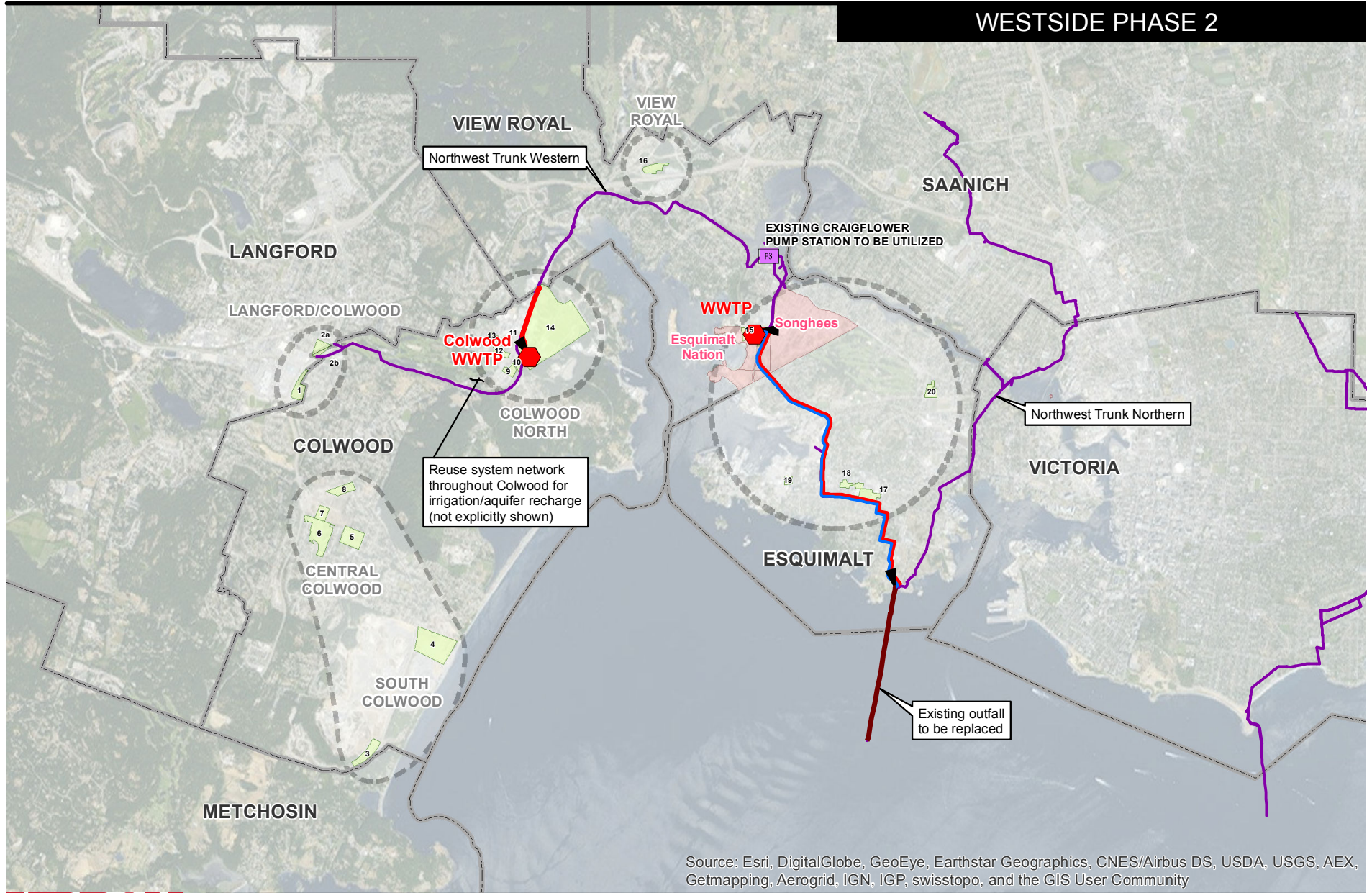
Colwood Plant (10 MLD)

1. CRD tie-in to trunk at east boundary of Colwood.
2. Sewage pump station at east boundary of Colwood and CRD trunk (2 x ADWF from Colwood) to pump to new plant on Site 11. Note that 2 to 4 ADWF remains in trunk to be treated by plant at EFN.
3. Sewage forcemain to plant.
4. Plant on Site 11 with headworks (grit, screens), tertiary treatment with UV disinfection. Residual solids will be directed back into the CRD trunk for treatment at the new plant at EFN.
5. Effluent pump station (part of plant).
6. Network of pipes, valves, controls to distribute around Colwood for irrigation/aquifer recharge.
7. Failsafe valving and piping for effluent back to the CRD trunk in the event effluent quality does not meet the criteria for reuse.

Esquimalt First Nation Plant

1. Tie-in to CRD trunkmain.
2. Pump station beside trunkmain to lift into plant.
3. Short forcemain into new plant.
4. Tie-in to pipe just downstream of Macaulay screens.

WESTSIDE PHASE 2



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Legend

- Municipal Boundary
- First Nation Reserve
- Site Nodes
- Existing Sanitary Trunkmain
- Existing Pump Station
- Raw Sewage Forcemain
- Treated Effluent Forcemain
- New Outfall
- Potential WWTP



Client/Project		
CAPITAL REGIONAL DISTRICT WESTSIDE PHASE 2		
Scale	Date (y/m/d)	Figure
nts	2015-10-07	7.4
1692.0034.08		Title

WESTSIDE OPTION SETS
TWO PLANT OPTION

5. Short pipe into pump station.
6. Pump station at Macaulay Point to pump all flows (0 to 4 x ADWF) to new WWTP at Esquimalt First Nation.
7. Screened sewage forcemain to new WWTP (tie-in after screens at new plant).
8. Primary and Secondary plant to include headworks (grit, screens), equalization, primary clarifiers with chemical addition, moving bed bioreactors, clarifiers, and ultraviolet light disinfection.
9. Residual solids treatment including dewatering anaerobic digestion and dewatering.
10. Effluent pump station (part of plant).
11. Primary and secondary effluent forcemain back to Macaulay Point outfall, tie-in downstream of the screens.
12. Outfall to replace existing corroded one.

7.5.3 Cost Estimates

7.5.3.1 Capital Cost

The capital cost estimates are comprised of four main components – pump stations, piping, treatment plants and outfalls. It is noted that the pump stations and WWTPs have costs to the 2030 design flows, but the pipes have been costed to the 2045 design flows. Table 7.6 summarizes the capital costs for the two plant option.

Table 7.6 Capital Cost Estimate for Two Plants

Item	Estimated Cost
1. Esquimalt First Nation WWTP (190/95 MLD Primary/Secondary) Plus Solids Treatment	\$ 139,000,000
2. Colwood WWTP (10 MLD) – No Solids Dewatering	\$ 29,800,000
3. CRD Trunk Tie-Ins (3)	\$ 2,850,000
4. Piping 10,650 m, Not Including Reuse Piping in Colwood & Esquimalt	\$ 21,071,000
5. Colwood Reuse Network	\$ 7,000,000
6. Esquimalt Reuse Network	\$ 5,950,000
7. Six Pump Stations, Including Esquimalt Reuse Pump Station	\$ 31,700,000
8. Replace Macaulay Outfall – 1700 m @ 1.2 m Ø	\$ 18,360,000
Subtotal	\$ 255,731,000
General Requirements (Bonding, Mobilization/Demobilization, etc.) - 10%	\$ 25,573,100
Contractor Profit/Overhead - 10%	\$ 25,573,100
Construction Contingency - 35%	\$ 89,505,850
Total Direct Costs	\$ 396,383,050

Item	Estimated Cost
Engineering - 15%	\$ 59,457,458
CRD Administration - 8%	\$ 31,710,644
Interim Financing - 4%	\$ 15,855,322
Escalation to Mid-Point of Construction – 2%/year (4 years)	\$ 32,674,711
TOTAL PROJECT COSTS	\$ 536,081,000

7.5.3.2 Operating Costs

The annual operating costs assuming 2030 design flows and 2015 dollars, are summarized in Table 7.7.

Table 7.7 – Operating Cost Estimate for Two Plants

Item	Estimated Annual Cost	
1. Esquimalt First Nation WWTP	Liquid	\$ 7,167,000
	Solids	\$ 3,689,000
2. Colwood WWTP	Liquid Only	\$ 1,514,500
3. Pump Stations and Piping and Effluent Reuse Systems (2)		\$ 1,052,100
Subtotal	\$ 13,422,600	
Contingency (10%)	\$ 1,342,260	
TOTAL ANNUAL ESTIMATED OPERATING COST	\$ 14,764,860	

7.5.3.3 Anticipated Revenue

The anticipated revenues are listed below.

- Revenues from solids-energy recovery can be utilized to offset the costs of treatment and solids processing and market development but are unlikely to present incomes beyond the expenditures of the system.
- Water revenues phase in over-time with the potential of approximately \$3,000,000 in 2045. This amount may cover the operating costs of the Colwood plant when capital financing is not included. Further life-cycle analysis and risk considerations, including any reductions to potable water revenues (other CRD service) are needed as part of Phase 2. If 'slipstream' MBR is added to the main plant at Esquimalt, it will likely add additional capital and operating costs that will not be recovered through water reuse revenues.

- Carbon offsets typically range in the order of \$10 - \$20 per tonne of CO₂ equivalent. Carbon offsets for solids recovery will be analysed in Phase 2 for the Core Area.

7.5.3.4 Life Cycle Costs

Preliminary results strongly suggest that higher levels of treatment including MBR technologies provide for opportunities for reuse but notably increase capital as well as operating and maintenance costs. Water revenues alone are unlikely to recover these costs over time although there are may be opportunities to reduce the need for outfalls (the case of Colwood) which may create notable cost-offsets from reuse. The two-plant option provides for greater water reuse, is appreciably less cost than the four-plant option yet is notably greater cost than the 1-plant option.

7.5.4 Relevant Considerations

1. The area of the EFN site (3.72 ha) is inadequate to handle the full 2045 flows.
2. No new environmental impact study (EIS) is expected for the Macaulay outfall.
3. The flow from all Westside, West Saanich and Vic West are included in this option.
4. Aesthetically pleasing structures could enhance the neighbourhoods.
5. Heat recovery is possible at the treatment plants and along all trunk lines.
6. Colwood would have to relocate the Park n' Ride on Site 11.
7. Reclaimed water could be extracted from the 4,600 m long effluent forcemain for reuse between the plant and Macaulay outfall.
8. Agreements with EFN need to be made for use of their land.
9. Can intercept 0 to 4 x ADWF from trunk line beside EFN to avoid repumping it from Macaulay.
10. This option maximizes the known (or at least well studied) reuse opportunities of irrigation/aquifer recharge in the Colwood area.
11. This option includes an effluent reuse network in Esquimalt as well.
12. The alternative method of disposal for the Colwood plant is discharge back into the CRD trunk for treatment of the extra-large EFN plant.
13. Residual solids do not need to be dewatered and trucked away from the Colwood plant, since the waste solids can be put into the CRD sewer for treatment at EFN.
14. This option has higher life cycle costs than the one plant option.

Appendix A

Derivation of 2045 Flows

DRAFT

2045 ADWF Calculation

Area	2015 - 2045	2045	2045	2045	2045
	Residential Growth Rates (%) ⁽¹⁾	Residential & ICI Total Population Equivalents ⁽¹⁾	Residential & ICI Flows (MLD) ⁽²⁾	Base Groundwater Infiltration (MLD) ⁽⁵⁾	ADWF (MLD)
Saanich	0.5	184,424	36.0	9.7	45.7
Victoria	0.5	151,589	(3)	(3)	40.8 ⁽³⁾
Esquimalt	0.5	30,140	(4)	(4)	7.9 ⁽⁴⁾
Langford	2.9	93,189	18.2	4.9	23.1
Colwood	1.5	52,697	10.3	2.8	13.1
View Royal	1.5	31,867	6.2	1.7	7.9
Oak Bay	0.1	26,670	5.2	1.4	6.6
Subtotal		570,576			145.1
Esquimalt First Nation	-	-	-	-	0.4 ⁽⁶⁾
Songhees First Nation	-	-	-	-	0.5 ⁽⁶⁾
Total					146

West = 32.9 / East = 12.8

West = 6.8 / East = 34.0

⁽¹⁾ 033-DP-1

⁽²⁾ Assume 195 Lcd, from CALWMP Amendment #8

⁽³⁾ Equilavent Population increase estimate from 2030 is 10,000 people - increase 2030 flow by 10,000 x 195 Lcd x 1.27 = 2.5 MLD or 38.3 + 2.5 = 40.8

⁽⁴⁾ Population increase estimate from 2030 is 3274 - increase 2030 flow by 3274 x 195 Lcd x 1.27 = 0.8 MLD or 7.1 + 0.8 = 7.9

⁽⁵⁾ LWMP Amendment 8 - 2030 ADWF = 108 MLD for Core Area

$$\text{Equivalent Population in 2030 is } 436,032 \times 195 \frac{\text{L}}{\text{person}\cdot\text{day}} = 85 \text{ MLD}$$

$$\text{Base GWI} = 108 - 85 = 23$$

$$\text{BGWI is } \frac{23}{85} = 27\% \text{ of the Residential + ICI Flows}$$

⁽⁶⁾ Increase 2030 EFN and SFN flows by 145.1/108 = 1.33

Appendix B

2014 Influent Quality Data

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Macaulay Screened Raw Sewage 2014

Parameter	State	Unit	Frequency of Detection	Average Concentration	n	Max Concentration	Min concentration	1:175 Dilution	BC WQG	CCME WQG
alkalinity - total - pH 4.5	TOT	mg/L	75%	217.7	9	273.0	188.0	1.1		
biochemical oxygen demand	TOT	mg/L	100%	275.8	12	376.7	180.0	1.5		
chemical oxygen demand	TOT	mg/L	100%	632.5	12	816.0	433.3	3.3		
carbonaceous biochemical ox	TOT	mg/L	100%	226.4	12	291.0	162.0	1.2		
cyanide-SAD	TOT	mg/L	100%	0.00256	9	0.00334	0.00173	0.00001		
cyanide-WAD	TOT	mg/L	100%	0.00148	10	0.00263	0.00083	0.00001	0.001b	
hardness (as CaCO3)	DISS	mg/L	100%	76.8	12	112.7	55.1	0.5		
hardness (as CaCO3)	TOT	mg/L	100%	88.6	12	127.7	63.6	0.5		
oil & grease, total	TOT	mg/L	100%	8.8	10	17.3	4.9	0.1		
oil & grease, mineral	TOT	mg/L	25%	ND	3	3.30	2.00	0.01		
pH	TOT	pH	100%	7.34	12	7.71	7.10	0.03		
pH @ 15° C	TOT	pH	100%	6.99	12	7.19	6.77	0.03		
specific conductivity - 25°C.	TOT	µS/cm	100%	794.4	12	971.0	649.3	4.0		
sulphate	TOT	mg/L	100%	29.3	2	39.6	18.9	0.2		
sulfide	TOT	mg/L	100%	0.353	11	0.632	0.125	0.003	0.002cf	
temperature	TOT	°C	100%	17.2	12	20.5	13.3	0.1		
enterococci	TOT	CFU/100 mL	100%	2,584,848	12	4,266,667	1,633,333	17,000	20j	35/70n
fecal coliforms	TOT	CFU/100 mL	100%	8,563,636	12	29,000,000	4,200,000	118,000	200j	
N - TKN (as N)	TOT	mg/L	100%	54.4	12	70.3	40.5	0.3		
N - NH3 (as N)	TOT	mg/L	100%	42.4	8	49.0	35.3	0.2		
N - NH3 (as N)- unionized	TOT	mg/L	100%	0.115	12	0.190	0.058	0.001	19.7e	
N - NO2 (as N)	TOT	mg/L	75%	0.041	9	0.253	0.005	0.001		
N - NO3 (as N)	TOT	mg/L	25%	ND	3	0.020	0.005	---		
N - NO3 + NO2 (as N)	TOT	mg/L	0%	ND	0	0.0200	0.0200	---		
P - PO4 - total (as P)	DISS	mg/L	100%	4.3	10	5.75	2.63	0.02		
P - PO4 - total (as P)	TOT	mg/L	100%	5.5	12	6.81	3.89	0.03		
P - PO4 - ortho (as P)	TOT	mg/L	100%	3.8	12	4.96	2.02	0.02		
total organic carbon	TOT	mg/L	100%	82	11	144.0	42.6	0.6		
total suspended solids	TOT	mg/L	100%	270	12	332	168	1.4		
aluminum	TOT	mg/L	100%	0.3	12	0.365	0.203	0.001		
antimony	TOT	mg/L	100%	0.0003	12	0.000399	0.000243	0.000002		
arsenic	TOT	mg/L	100%	0.0006	12	0.00084	0.00044	0.000003	0.0125cg	0.0125
barium	TOT	mg/L	100%	0.02	12	0.0387	0.0137	0.0002	0.5ac	
beryllium	TOT	mg/L	0%	ND	0	0.0000100	0.0000100	---		
cadmium	TOT	mg/L	100%	0.0002	12	0.000275	0.000139	0.000001	0.00012c	0.000120
calcium	TOT	mg/L	100%	21.7	12	29.3	16.8	0.1		
chloride	TOT	mg/L	100%	89.1	8	140.3	75.0	0.6		
chromium	TOT	mg/L	100%	0.002	12	0.00298	0.00116	0.00001		
chromium VI	TOT	mg/L	25%	ND	3	0.00120	0.00100	---		
cobalt	TOT	mg/L	100%	0.0009	12	0.001310	0.000504	0.000005	0.000004	
copper	TOT	mg/L	100%	0.12	12	0.169	0.081	0.001	0.001	0.003bh

Clover Screened Raw Sewage 2014

Parameter	State	Unit	Frequency of Detection	Average Concentration	n	Max Concentration	Min concentration	1:175 Dilution	BC WQG	CCME WQG
alkalinity - total - pH 4.5	TOT	mg/L	75%	168	9	179.3	154.3	1.0		
biochemical oxygen demand	TOT	mg/L	100%	238	12	305.0	184.0	1.7		
chemical oxygen demand	TOT	mg/L	100%	530	12	686.0	301.3	3.9		
carbonaceous biochemical oxygen	TOT	mg/L	100%	192	12	248.3	118.3	1.4		
cyanide-SAD	TOT	mg/L	100%	0.002	9	0.00257	0.00158	0.00001		
cyanide-WAD	TOT	mg/L	100%	0.0013	10	0.00216	0.00071	0.00001	0.001b	
hardness (as CaCO3)	DISS	mg/L	100%	63.9	12	90.4	49.0	0.5		
hardness (as CaCO3)	TOT	mg/L	100%	73.2	12	97.9	60.1	0.6		
oil & grease, total	TOT	mg/L	100%	9.7	10	24.3	3.5	0.1		
oil & grease, mineral	TOT	mg/L	42%	ND	5	4.00	2.00	0.02		
pH	TOT	pH	100%	7.33	12	7.71	7.10	0.04		
pH @ 15° C	TOT	pH	100%	6.89	12	7.15	6.24	0.04		
specific conductivity - 25°C.	TOT	µS/cm	100%	528.1	12	568.0	481.0	3.2		
sulphate	TOT	mg/L	100%	20.6	2	24.1	17.0	0.1		
sulfide	TOT	mg/L	100%	0.246	11	0.424	0.092	0.002	0.002cf	
temperature	TOT	°C	100%	18.4	12	21.2	14.9	0.1		
enterococci	TOT	CFU/100 mL	100%	2,255,556	12	4,500,000	766,667	25,714	20j	35/70n
fecal coliforms	TOT	CFU/100 mL	100%	6,433,333	12	14,333,333	3,033,333	81,886	200j	
N - TKN (as N)	TOT	mg/L	100%	40.8	12	51.7	28.9	0.3		
N - NH3 (as N)	TOT	mg/L	100%	27.1	8	34.0	13.3	0.2		
N - NH3 (as N)- unionized	TOT	mg/L	100%	0.058	12	0.120	0.012	0.001	19.7e	
N - NO2 (as N)	TOT	mg/L	92%	0.063	11	0.187	0.005	0.001		
N - NO3 (as N)	TOT	mg/L	50%	ND	6	0.489	0.006	0.003		
N - NO3 + NO2 (as N)	TOT	mg/L	0%	ND	0	0.0200	0.0200	0.0001		
N - Total (as N)	TOT	mg/L	100%	40.3	1	40.3	40.3	0.2		
P - PO4 - total (as P)	DISS	mg/L	100%	3.40	10	4.30	1.88	0.02		
P - PO4 - total (as P)	TOT	mg/L	100%	4.36	12	5.74	2.76	0.03		
P - PO4 - ortho (as P)	TOT	mg/L	100%	2.91	12	4.04	1.75	0.02		
total organic carbon	TOT	mg/L	100%	61.9	11	118.0	30.8	0.7		
total suspended solids	TOT	mg/L	100%	238.4	12	292.0	166.0	1.7		
aluminum	TOT	mg/L	100%	0.310	12	0.435	0.217	0.002		
antimony	TOT	mg/L	100%	0.000258	12	0.000380	0.000186	0.000002		
arsenic	TOT	mg/L	100%	0.00066	12	0.00111	0.00050	0.00001	0.0125cg	0.0125
barium	TOT	mg/L	100%	0.0214	12	0.0253	0.0120	0.0001	0.5ac	
beryllium	TOT	mg/L	8%	ND	1	0.0000103	0.0000100	0.0000001		
cadmium	TOT	mg/L	100%	0.000157	12	0.000260	0.000100	0.000001	0.00012c	0.00012
calcium	TOT	mg/L	100%	18.8	12	25.4	16.3	0.1		
chloride	TOT	mg/L	100%	42.8	8	45.7	39.0	0.3		
chromium	TOT	mg/L	100%	0.00100	12	0.00155	0.00069	0.00001		
chromium VI	TOT	mg/L	0%	ND	0	0.00133	0.00100	0.00001		
cobalt	TOT	mg/L	100%	0.000360	12	0.000506	0.000289	0.000003	0.000004	

Appendix C

Ammonia Toxicity Memorandum

DRAFT

MEMORANDUM



Date: September 23, 2015
To: Chris Town, P.Eng.
cc: Ehren Lee, P.Eng., Steve Brubacher, P.Eng.
From: Dr. Joanne Harkness, R.P.Bio.
File: 1692.0037.01
Subject: Requirements for Ammonia Treatment

1. INTRODUCTION

The CRD is currently assessing options for the management of the sanitary sewage which is produced by the area. The purpose of this memorandum is to provide a summary of the assessment which was completed to determine if treatment for ammonia will be required in order to meet Federal and Provincial regulatory requirements.

2. BACKGROUND TO AMMONIA IN MUNICIPAL WASTEWATER

Ammonia is the predominant form of nitrogen in untreated municipal wastewater and in municipal wastewater effluents where there is no nitrification (biological reduction of ammonia). Ammonia is one of the key parameters of concern with respect to sewage effluents and aquatic toxicity. Both acute and chronic toxicity need to be considered.

Acute toxicity refers to a rapid and extreme response to environmental conditions – i.e. death normally occurs within a short period of time. The standard test for determining acute toxicity in an aquatic environment is the LC50 96 hour rainbow trout bioassay. In this test, 10 young rainbow trout are used per test. If 6 fish die within 96 hours, the test solution is determined to be acutely toxic and has failed the toxicity test. Acute toxicity is the focus for effluent prior to release to the environment.

Chronic toxicity is less easy to define than acute toxicity as this type of toxicity refers to effects which may be observed over a long time period and which may be subtle in nature. Chronic toxicity could equate to impacts on off-spring of exposed individuals, metabolic differences or subtle changes in the ability to survive or reproduce. Due to the complexity of chronic toxicity, acute toxicity has historically been the primary focus for legislation and the regulatory government agencies. Chronic toxicity is the focus for environmental conditions, once the effluent has been released.

Ammonia is present in two forms: ionised and un-ionised, the proportion of which is dependent on pH and temperature. It is the un-ionised form of ammonia which is of particular interest, as this is the form which is toxic to fish. The un-ionised form of ammonia becomes the predominant form of ammonia as the pH increases. As a result, under alkaline conditions, it is possible for very low concentrations of ammonia to cause aquatic toxicity. Total ammonia is the sum of the ionised and un-ionised forms of ammonia.

3. REGULATORY BACKGROUND

3.1 Provincial Legislation and Guidelines

The Municipal Wastewater Regulation (MWR) is the regulatory framework for management of sewage in British Columbia. The MWR was published in April 2012, and replaced the Municipal Sewage Regulation,

MEMORANDUM

Date: September 23, 2015
File: 1692.0037.01
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which was promulgated in 1999. The MWR outlines the effluent quality standards and discharge requirements for municipal wastewater treatment plants in British Columbia. For discharge to surface waters, the MWR indicates the expectations for effluent quality, dilution and defines the concept of an initial dilution zone (IDZ). The IDZ is an area immediately around the point of discharge where it is acceptable for degradation in water quality to occur. With respect to ammonia, the MWR focuses on meeting chronic ammonia concentrations at the edge of the IDZ. The concentration of ammonia in the effluent is to be back calculated based on the need to meet site-specific chronic conditions at the edge of the IDZ.

The Capital Regional District (CRD) has an approved Liquid Waste Management Plan (LWMP). A LWMP is a powerful document which is based on the current legislation. The completion of a LWMP results in a document which takes precedence over any existing permit or the MWR. Although a LWMP can provide an avenue for flexibility, the general intent of a LWMP is to develop a plan which will be implemented over time in order to meet the intent and conditions of the MWR.

The BC Water Quality Guidelines provide guidance as to suitable water quality for a range of different uses including drinking water, aquatic life, recreation and agriculture. The guidelines do not have any direct legal standing but are intended to be used as a tool to provide policy direction for decisions relating to water quality. These guidelines can be used to evaluate appropriate effluent criteria for release from a municipal wastewater treatment plant. For ammonia, there are acute and chronic guidelines for the protection of aquatic life for both marine and freshwater surface waters. The guideline value varies, depending on the temperature and pH. For marine waters, the salinity also needs to be taken into consideration. The BC Water Quality Guidelines define chronic as a 30 day average, based on 5 weekly samples taken over a 30 day period. This definition allows for an increased likelihood that a particular condition may both exist and persist in an environment.

3.2 Federal Legislation and Guidelines

The Federal wastewater regulation (the Wastewater Systems Effluent Regulations) was published in July, 2012 and applies to any surface water discharge in Canada where the average annual incoming flow to the sewage treatment plant is $\geq 100 \text{ m}^3/\text{d}$, with the focus being to protect surface waters which are regarded as fisheries resources. The regulation contains National Performance Standards, with the standard for ammonia being a maximum concentration of un-ionised ammonia of 1.25 mg/L, prior to release. The Federal regulation also recognises ammonia conditions after dilution in the receiving environment. In the event that the un-ionised ammonia concentration of 1.25 mg/L cannot be met before effluent release, then there is no need to upgrade for ammonia treatment as long as an un-ionised ammonia concentration of 0.016 mg/L is met in the receiving environment, 100 m away from the point of release. The discharger would need to apply for a temporary authorisation which is valid for 3 years. Re-application for the temporary authorisation would be required every 3 years, if the effluent is still acutely toxic.

3.3 Summary of Legislation

There are three regulatory criteria for ammonia, all of which have direct relevance to each other.

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1. The Federal wastewater regulation stipulates a maximum un-ionised ammonia concentration of 1.25 mg/L, before release. This focuses on acute toxicity to fish.
2. The Federal wastewater regulation stipulates that in the event that the effluent un-ionised ammonia concentration is above 1.25 mg/L, treatment for ammonia is not required as long as the concentration of un-ionised ammonia in the receiving environment is ≤ 0.016 mg/L, at a distance 100 m from the point of effluent release. This focuses on chronic toxicity to fish.
3. The MWR stipulates that the concentration of ammonia at the edge of the IDZ is to meet fisheries chronic concentrations, based on conditions in the receiving environment for temperature and pH. There is no requirement in the MWR for acute ammonia toxicity.

4. EFFLUENT AMMONIA EVALUATIONS

4.1 MWR Evaluations

In order to estimate the chronic total ammonia concentration at the edge of the IDZ, historical data for temperature, pH and salinity were taken from the CRD monitoring program database for locations at the edge of the IDZ. The data indicated little variability in the pH (range pH 7.50 to 7.96). The 90th percentile of the whole dataset (pH 7.83) was used for the evaluation. There was also consistency in the temperature throughout the year, ranging from a low of 7.07 °C in January to a high of 12.44 °C in July. The 90th percentile of the July dataset (11.10 °C) was used for the evaluation. The data indicated that the salinity was in the order of 30 g/kg, which is the highest threshold indicated in the BC Water Quality Guidelines. Based on these data the total ammonia concentration at the edge of the IDZ should be less than or equal to 3.4 mg/L.

The evaluations focused on 90th percentile data rather than the maximum data. Maximum data represent the worst case scenario and the intent was to evaluate the potential for a chronic effect to occur, which requires conditions which have a likelihood of occurring on a regular basis for an extended period of time. Maximum data represent extreme events which occur for short periods of time. This is not the intent of the definitions in the BC Water Quality Guidelines, where chronic conditions are evaluated using 5 data points taken on a weekly basis over 5 consecutive weeks.

Table 4.1 summarises the chronic total ammonia concentration at the edge of the IDZ and the corresponding effluent total ammonia concentration for both the Macauley Point and Clover Point outfalls. The dilution ratio was taken from CRD customized oceanographic/plume modelling of the effluent dilution and dispersion at both outfall locations. The estimations do not take into account the background total ammonia concentration. However, this is a low concern given that the background total ammonia concentration is expected to be close to the analytical detection limit (e.g. in the order of 0.005 mg/L) and the estimated effluent concentrations which would be required to cause chronic ammonia conditions at the edge of the IDZ are significantly higher than what would be expected for untreated municipal wastewater. From this evaluation, since untreated municipal wastewater would have a maximum total ammonia concentration of 45 mg/L, there are no requirements to treat for ammonia to meet chronic ammonia conditions at the edge of the IDZ.

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Table 4.1: Summary of End of IDZ Chronic Ammonia Concentration and the Corresponding Effluent Total Ammonia Concentration

Outfall Location	Edge of IDZ Chronic Total Ammonia Concentration to Meet MWR (mg/L)	Edge of IDZ Dilution Ratio	Corresponding Effluent Total Ammonia Concentration (mg/L)
Macaulay Point	≤ 3.4	245:1	≤ 833
Clover Point	≤ 3.4	175:1	≤ 595

4.2 Federal Wastewater Regulation Evaluations

The Federal wastewater regulation recognises both acute toxicity before effluent release and chronic toxicity at a point 100 m away from the point of release. For the effluent prior to release, the standard is a maximum un-ionised ammonia concentration of 1.25 mg/L. Table 4.2 summarises the pH range expected for a typical municipal wastewater effluent and the corresponding total ammonia concentration which would equate to an un-ionised ammonia concentration of 1.25 mg/L. The standard total ammonia concentration for untreated municipal wastewater is 25 mg/L. However, it is reasonable to expect that there will be periodic increases in the wastewater total ammonia concentration, with the concentration potentially being in the order of 45 mg/L. For a wastewater treatment plant that is not designed to nitrify, it is reasonable to expect that the effluent total ammonia concentration will typically be in the 25 mg/L range, but could periodically be as high as 45 mg/L. From this, although there would be no concerns with the acute un-ionised ammonia threshold of 1.25 mg/L being exceeded if the effluent pH is 7.5 or less, this may not be the case if the pH is in the order of 8.0, as the maximum effluent total ammonia concentration is very close to the acutely toxic threshold under these conditions.

Table 4.2: Effluent Total Ammonia Concentration to be Non-acutely Toxic

Effluent pH	Total Ammonia Concentration (mg/L)
7.0	≤ 455
7.5	≤ 148
8.0	≤ 47

In the event that the effluent is acutely toxic before release, there will be the need to consider the ability to meet chronically toxic concentrations after the release. Table 4.3 summarises the effluent un-ionised and total ammonia concentration required in order to meet an un-ionised ammonia concentration of 0.016 mg/L at the edge of the IDZ, which is approximately 100 m away from the point of effluent release, for both the Macaulay Point and Clover Point outfalls. Using the worst case effluent pH of 8.0, the information presented in Table 4.3 indicates that, in the event it is not possible to meet the pre-discharge un-ionised ammonia concentration of 1.25 mg/L, it will be possible to meet the receiving environment concentration of 0.016 mg/L. The calculated corresponding total ammonia concentration for both the Macaulay Point and Clover Point outfalls is significantly higher than what would be expected for ammonia

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to be present in untreated municipal wastewater. As a point of reference, the effluent pH would need to be in the order of 8.4 before there would be concerns regarding the ability to meet an un-ionised ammonia concentration of 0.016 mg/L in the receiving environment.

Table 4.3: Summary Effluent Total and Un-ionised Ammonia Concentration to Meet Chronic Conditions 100 m Away from the Outfall

Outfall Location	Effluent Un-ionised Ammonia Concentration (mg/L)	Edge of IDZ Dilution Ratio	Effluent Total Ammonia Concentration (mg/L)
Macaulay Point	≤ 3.9	245:1	≤ 146
Clover Point	≤ 2.8	175:1	≤ 104

From the above information, there are no requirements to treat for ammonia to meet the requirements of the Federal wastewater regulation. In the event that the effluent ammonia concentration is deemed to be acutely toxic, the chronic concentrations in the receiving environment can be met and, therefore, this site would be eligible to apply for a temporary authorisation, which is renewable every 3 years, if required.

5. ADDITIONAL INFORMATION – REGULATORY CHANGES

This document considers both the Federal wastewater regulation and the MWR. However, discussion is currently underway to harmonize the BC regulation with the Federal wastewater regulation, which will mean that the Federal wastewater regulation will no longer apply in BC, and the default regulation for an effluent release to a surface water will be the MWR. Preliminary discussions with the BC Ministry of Environment have indicated that, with respect to ammonia, the approach will be to focus on meeting chronic concentrations in the receiving environment, which is consistent with the current conditions in the MWR. However, this approach will need to be confirmed once the harmonization process is complete.

The timing of the harmonization agreement has not been set, but prior to the end of 2015 is considered to be reasonable.

6. SUMMARY

At this point in time, both the Federal and Provincial wastewater regulations need to be considered with respect to effluent ammonia standards. This may not be the case in the future, if the harmonization process is finalised. The default regulation will be the MWR.

The information presented above indicates that there is no requirement to reduce ammonia in order to meet the MWR. Chronic conditions at the edge of the IDZ can be met without ammonia treatment. There is also no requirement to treat for ammonia to meet the Federal wastewater regulation. There could be a slight risk that the effluent could be periodically acutely toxic for ammonia, depending on the operational

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pH. However, there is no risk that the chronic concentration would not be met in the receiving environment. Therefore, in the event that there is an issue with acute effluent toxicity, this site would be eligible to apply for a temporary authorisation, which is renewable every 3 years, if required.

Sincerely,

URBAN SYSTEMS LTD.

A circular professional seal for Dr. Joanne Harkness. The outer ring contains the text "COLLEGE OF APPLIED BIOLOGICAL SCIENCES". The inner circle contains the name "Joanne Harkness" in a stylized font, with "R.P. Bio" and "#1245" below it. A blue ink signature is written over the seal.

Dr. Joanne Harkness, R.P. Bio.
Water and Wastewater Specialist

/jh

Appendix D

Options for Management of Residual Solids Memorandum

DRAFT

MEMORANDUM



Date: September 14, 2015
To: Chris Town, P.Eng.
cc: Ehren Lee, P.Eng., Steve Brubacher, P.Eng.
From: Dr. Joanne Harkness, R.P.Bio.
File: 1692.0037.01
Subject: Options for Management of Residual Solids

EXECUTIVE SUMMARY

Westside is currently assessing options for the management of the sanitary sewage which is produced by the area. The purpose of this memorandum is to provide an outline of the management approaches available for the residual solids which will be produced as part of the wastewater treatment process. This will include an outline of the acceptable methods of reuse and disposal, the regulatory considerations and treatment approaches. There are a variety of different words which can be used for the residual solids which are produced during municipal wastewater treatment. For the purpose of this memorandum, the use of the word “sludge” will relate to the untreated residual solids which are produced during wastewater treatment and the use of the word “biosolids” will relate to sludge which has undergone treatment and meets the regulatory standards outlined in the BC Organic Matter Recycling Regulation (OMRR).

In this memorandum, the focus for the management options was disposal to landfill, use for plant growth and use as an energy source.

With respect to disposal to landfill, it is expected that no authorisation is required from the BC Ministry of Environment as long as the receipt of the sludge/biosolids does not contravene the conditions of the landfill operating permit. The landfill owner needs to be willing to accept the sludge/biosolids. This is becoming more challenging with time, due to the diversion of organic matter away from landfills. Treatment would not be required prior to disposal to landfill, but a tipping fee will be charged.

For application to land, while this approach is long-practiced and well documented, there can be significant opposition, despite the clear benefit to plant growth and soil conditions. Treatment requirements can be costly, with little to no return on the capital and operational costs through sales opportunities. No authorisation is needed from the BC Ministry of Environment, but there is the need to register biosolids activities under the OMRR, e.g. a compost operation or a Land Application Plan. A policy statement was passed by the CRD Board indicating the desire not to apply biosolids to land.

For use as an energy source, the focus was both incineration and gasification. The common approach to using sludge as an energy source is an incineration-type process. However, this results in high capital and operational costs, which could include the need to dry the sludge before combustion in order to increase process efficiency. There are risks associated with the gasification process, as this approach is relatively new for sludge/biosolids management and, as such, there is little information on the long-term operation. Moisture content and calorific value are both important when considering process efficiency. There is a risk with respect to the authorisation requirements, until incineration and gasification of

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sludge/biosolids becomes established in BC. From the information available, it is expected that no authorisation is needed from the BC Ministry of Environment for the development of a combustion process for sludge/biosolids. Depending on the management approach for the waste solids and any wastewater which may be produced as a result of combustion, it is possible that no further authorisations are needed from the BC Ministry of Environment, with the only authorisation being a permit for air emissions. There is also a risk with respect to the requirement of a BC environmental assessment, although this may be avoided, depending on interpretations regarding the material for combustion and wording in the approved CRD Liquid Waste Management Plan. Clarification on these interpretations would be required from the BC Environmental Assessment Office.

1. INTRODUCTION

Westside is currently assessing options for the management of the sanitary sewage which is produced by the area. The purpose of this memorandum is to provide an outline of the management approaches available for the residual solids which will be produced as part of the wastewater treatment process. This will include an outline of the acceptable methods of reuse and disposal, the regulatory considerations and treatment approaches.

2. TERMINOLOGY

There are a variety of different words which can be used for the residual solids which are produced during municipal wastewater treatment. For the purpose of this memorandum, the following terminology and definitions will be used:

Sludge: The excess organic solids which are produced as a result of treating liquid wastes at wastewater treatment plants. These solids consist primarily of the excess micro-organisms which are used to treat wastewater. Sludge has not been treated by any recognised solids treatment process in order to produce biosolids. Therefore, the health and environmental risks associated with sludge can be high. Common concerns with sludge are the production of strong malodours, illness and environmental contamination.

Biosolids: Wastewater sludge which has been treated in order to create a product which has a lower pathogen concentration and is stable organically. The treatment processes to produce biosolids can result in a final product which has low risks to human health and the environment. Concerns relating to the production of strong malodours, illness and environmental contamination are low with biosolids.

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3. OPTIONS FOR DISPOSAL AND REUSE

There are three common options for the management of sludge and biosolids. These options are:

1. Disposal
2. Use for plant growth
3. Use as an energy source

These three options are outlined in greater detail below.

3.1 Disposal

There are two approaches to the disposal of sludge/biosolids: landfill or incineration. With respect to landfill, the intent is that the sludge/biosolids will be incorporated into the landfill as waste material, rather than being used for cover. There are three different types of cover used at a landfill: daily cover, intermediate cover and final cover. However, there is a perception that if sludge/biosolids are used for daily cover, or even in some cases intermediate cover, then this should be classified as disposal, rather than a use. There is general agreement that use of sludge/biosolids for final cover is beneficial and should not be considered as disposal. With respect to incineration, in the event that sludge/biosolids are incinerated without any intent for energy recovery, this should be considered disposal and not use. For the purpose of this discussion, any consideration for disposal will focus solely on landfilling, rather than incineration, as it is assumed that if incineration is selected as a suitable opportunity for Westside, then this would be accompanied by energy recovery.

Generally, the disposal of sludge/biosolids to landfill does not need any direct authorisation or approval from the BC Ministry of Environment. The ability for a landfill to receive sludge/biosolids is typically authorised under general operating conditions through a permit or operational certificate, which is issued by the BC Ministry of Environment. The general operating conditions for landfills typically include restrictions relating to accepting wastes that are liquid in nature. Therefore, only dewatered sludge/biosolids can be received at a landfill. Although no strict number is given with respect to the desired solids content of sludge/biosolids for disposal to landfill, a good rule of thumb is a minimum of 12% for solids content, as this material can be handled as a solid. A solids content of 12% can be easily achieved by more simple dewatering processes, however, the standard dewatering process (i.e. the centrifuge) typically achieves a solids content in the order of 20%. Wording in the operational certificate for the Hartland Landfill does not expressly recognise sludge or biosolids, with the exception of the composting operation, which indicates that digested sewage sludge can be composted at this site.

The receipt of sludge/biosolids at landfill sites will incur trucking costs and tipping fees. Moisture content associated with the sludge/biosolids is an important factor with respect to both of these costs. A wetter sludge/biosolids will result in higher trucking and tipping fees, so there is an advantage to achieving a higher solids content during dewatering.

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It is not necessary to treat the sludge to create biosolids before disposal to landfill. Treatment to create biosolids would help control odours and reduce the presence of potential pathogens. While odours associated with sludge may be a concern, odours are naturally associated with the material which is disposed to landfill and the use of daily cover is implemented as standard practice, regardless of whether sludge is present, to help control nuisance conditions, including odour. There is also a low concern with respect to human contact and the potential pathogens present in the sludge, due to the nature of a landfill operation. Treatment to create biosolids from sludge would incur costs, and the benefits associated with this capital and operational expenditure are questionable for a disposal practice. There could also be issues with perceptions regarding the disposal of biosolids, compared with sludge, as discussed below.

There is an increasing desire to divert organic matter from landfills. For example, the City of Calgary has banned the disposal of organic matter to landfill. The first phase of this policy will come into effect in 2017 with a complete ban to be effective 2019. Diversion of traditional waste into use is not just being encouraged from the local level, but is also being directed by Provincial and Federal policy. In 2012, the development of the Biosolids Management Strategy through the Canadian Council of the Ministers of the Environment (CCME) set policy throughout Canada to encourage the development of beneficial use approaches for sludge and biosolids, rather than disposal. This direction was fully embraced by the BC government. The CCME biosolids strategy highlighted the potential valuable nature of biosolids and the need to conserve landfill space for materials which truly do require disposal. As such, the document provided direction and outlined the desire for sludge to be treated to create biosolids, which could then be available for beneficial use. It is becoming harder to dispose of sludge/biosolids to landfill, and it is possible that this option may be eliminated in the future.

Although it may be possible to dispose of dewatered sludge/biosolids to landfill, it is necessary for the landfill owner to agree to accept the material. For many communities, this can be challenging as the sludge/biosolids provider is often different to the landfill owner. However, in this case, the CRD would bear responsibility for both sludge/biosolids production and landfill operations. Therefore, the ability to co-ordinate these two operations could easily be facilitated.

The advantages and disadvantages of disposing sludge/biosolids to landfill are summarised in Table 3.1.

Table 3.1: Advantages and Disadvantages of Disposal to Landfill

Advantages	Disadvantages
No need to incur costs to treat to create biosolids. Treatment is limited to dewatering only.	Approach is inconsistent with Federal and Provincial policy to encourage reuse not disposal.
Costs are limited to dewatering, trucking and tipping fees.	Potential to be short-term option only, due to desire to divert organic waste from landfills.

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Table 3.1: Advantages and Disadvantages of Disposal to Landfill (continued . . .)

Advantages	Disadvantages
No authorisations needed – only an agreement from the landfill operator.	Using dewatered sludge for daily or intermediate cover may not address odour issues.
High potential to amalgamate sludge/biosolids and landfill operations as the CRD will be responsible for both activities.	There could also be issues with the dewatered sludge/biosolids becoming slippery when wet, due to the use of polymer for dewatering. This could affect the desire to use sludge/biosolids for daily or intermediate cover.

To summarise for the approach of disposal to landfill:

1. The landfill owner needs to be willing to accept the sludge/biosolids. This should be relatively easy to reach an agreement on, given that the CRD will be responsible for both sludge/biosolids and landfill operations.
2. It is expected that no authorisation is needed from the BC Ministry of Environment, but the receipt of sludge/biosolids is not to contravene any requirements in the operating permit or certificate for the landfill. The typical concern relates to liquid content, but this can be overcome through dewatering. Dewatering will be required to an approximate minimum solids content of 12%.
3. No treatment is required to produce a biosolids. This presents a capital and operational cost savings. It is relatively acceptable to dispose sludge to landfill but the production of biosolids could cause complications due to the concept that biosolids are a higher quality than sludge and, therefore, are more suitable for reuse than disposal.
4. A tipping fee will be charged.
5. The sludge/biosolids may be used as daily or intermediate cover, but this is not necessarily the case. It is possible for this material to be incorporated directly into the landfill, with waste matter.

3.2 Use for Plant Growth

This is the main approach to sludge and biosolids management throughout the world, and recognises the nutritional value that this type of organic matter can provide to plant life.

Although there are policy guidelines published by the CCME to encourage the use of biosolids in Canada, there are no Federal regulations governing the use of biosolids. In 2002, the Province of BC promulgated the Organic Matter Recycling Regulation (OMRR), which is intended to facilitate the management of septage, sludge and biosolids to encourage use, rather than disposal. The OMRR outlines the practices

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for the acceptable treatment and application of organic matter to land for plant growth. There are three aspects to the OMRR:

1. Quality requirements
2. Treatment requirements
3. Requirements for the application to land

All three aspects are important when considering the requirements for the use of biosolids and biosolids products to land.

3.2.1 Quality Requirements

Under the OMRR, organic matter is separated into five different categories:

- Class A compost;
- Class B compost;
- Class A biosolids;
- Class B biosolids; and,
- A biosolids growing medium.

Table 3.2 summarises the quality of the 5 organic products which are identified in the OMRR. Biosolids growing medium and Class A compost have the highest quality. These products have no restrictions regarding their uses or access by the public. The quality requirements for a biosolids growing medium are higher than a Class A compost, as a biosolids growing medium is intended to be used in place of a soil. A Class A compost is intended to be used as an organic amendment and blended with soil to enhance soil nutrient content. A Class A biosolids is still a high quality product, and is intended to be blended with soil to enhance soil nutrient content. For quantities less than 5 m³, the conditions for use of a Class A biosolids are exactly the same as those for a biosolids growing medium and a Class A compost, with no use or access restrictions. However, there are constraints on the use of Class A biosolids when the intent is to use more than 5 m³ per year per parcel of land. The lowest quality categories apply to a Class B compost and Class B biosolids, and the use of these materials is subject to a number of constraints. In both cases, these biosolids products are intended to be blended with soil to enhance the soil nutrient content.

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Table 3.2: Summary of Material Quality under the OMRR

Parameter	Medium Type				
	Biosolids Growing Medium	Class A Compost	Class B Compost	Class A Biosolids (Note 1)	Class B Biosolids
Access	Unrestricted	Unrestricted	Restricted	Some restrictions	Restricted
Foreign Matter Content (% dry weight)	< 1	< 1	<1	<1	< 1
Sharp Foreign Matter	None present	None present	None present	None present	None present
C:N Ratio	> 15:1	> 15:1 and < 35:1	N/A	N/A	N/A
Faecal Coliforms (MPN/g dry weight)	< 1,000	< 1,000	< 2,000,000	< 1,000	< 2,000,000
Maximum Element Concentration (µg/g dry weight)					
Arsenic	13	13	75	75	75
Cadmium	1.5	3	20	20	20
Chromium	100	100	1,060	1,060	1,060
Cobalt	34	34	150	150	150
Copper	150	400	2,200	757	2,200
Lead	150	150	500	500	500
Mercury	0.8	2	15	5	15
Molybdenum	5	5	20	20	20
Nickel	62	62	180	180	180
Selenium	2	2	14	14	14
Zinc	150	500	1,850	1,850	1,850

Note 1: The quality criteria for a Class A biosolids is based on Federal requirements, stated in the Trade Memorandum T-4-93. This trade memorandum has no standards for copper or chromium, both of which are important for biosolids and biosolids products. The values stated in Table 3.2 for these metals are the proposed standards which have been indicated as reasonable by the BC Ministry of Environment.

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3.2.2 Treatment Requirements

The treatment requirements under the OMRR relate to pathogen reduction and vector attraction reduction. Pathogen reduction is the decrease in micro-organisms which may have the potential to cause illness or disease and vector attraction reduction is the reduction in the potential for nuisance conditions (e.g. odour, attracting flies, etc.).

The requirements for pathogen reduction are outlined in Schedule 1 of the OMRR and are based on a temperature-time relationship for the destruction of enteric micro-organisms. The temperature-time relationship allows for either short periods of time when the sludge is exposed to elevated temperature or long periods of time when the sludge is exposed to low or ambient temperatures. The higher quality biosolids products (i.e. a biosolids growing medium, Class A compost and Class A biosolids) all require a period of elevated temperature (i.e. ≥ 50 °C) for an enhanced pathogen destruction to be achieved. Class B products (i.e. Class B biosolids and Class B compost) only require low or ambient temperature conditions, with the result being that there will likely be higher concentrations of potential pathogens associated with a Class B biosolids product.

From Schedule 1 of the OMRR, a biosolids growing medium or a Class A biosolids product can be achieved using a digestion process (aerobic or anaerobic digestion or composting) under elevated temperature conditions. The high temperature digestion processes are the most common approach for sludge treatment to create a biosolids product. Aerobic or anaerobic digestion normally requires an external energy source to achieve the elevated temperatures, but composting will achieve these temperatures naturally, as long as the organic matter is highly biologically active. The OMRR also recognises the potential to produce a Class A biosolids/biosolids growing medium by the addition of a highly alkaline substance, which will cause the temperature and pH to be raised. Treatment with the highly alkaline substance is not sufficient on its own to create a Class A biosolids/biosolids growing medium. Once treated, the biosolids must then be air dried to a minimum solids content of 50%. Lime is the most common alkaline substance which is used for sludge treatment. The wording in Schedule 1 of the OMRR also allows for any heat treatment method to be recognised as suitable to create a Class A biosolids/biosolids growing medium, as long as certain temperature conditions are met for a specified length of time. This wording in the OMRR was intended to allow the future inclusion of treatment processes which either were not developed or were not being used for sludge treatment at the time of the development of the regulation.

The acceptable processes to produce a Class B biosolids or a Class B compost are similar to those outlined for the Class A products (i.e. namely aerobic or anaerobic digestion, composting or lime stabilisation), however, the temperature-time requirements are less stringent. There are two further differences to the acceptable treatment processes for a Class B product: there is no requirement for air drying after treatment with lime, and air-drying on open beds under ambient temperature conditions is recognised as an acceptable treatment process.

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Vector attraction reduction is the process by which the organic matter undergoes a change which will result in a biosolids or compost having low biological activity and a low odour potential. The acceptable vector attraction reduction methods are outlined in Schedule 2 of the OMRR and, unlike the pathogen reduction processes, there is little difference between a Class A and a Class B treatment process. The most common methods of vector attraction reduction involve biodegradation (i.e. composting and aerobic or anaerobic digestion). However, the use of an alkaline substance to increase the pH to the pH 11 to 12 range and the drying the sludge to at least 90% solids content are also acceptable treatment processes in the OMRR. However, in both of these cases, the treatment process does not destroy the organic matter but simply creates conditions which are not conducive to microbial activity. Should the conditions change either by a decrease in the pH or if the biosolids should become wet, it microbial activity can commence and nuisance conditions could be created. Therefore, unlike a digested/composted product, it is important that a pH-treated or dried product is handled carefully and appropriately in order to avoid nuisance conditions. In the case of the dried product, the OMRR does state that there is a requirement to maintain the dryness of the biosolids until application to land. This is to avoid nuisance conditions during storage.

The OMRR does identify alternatives to implementing one of the recognised treatment processes for vector attraction reduction. These alternatives are:

1. Laboratory testing to prove that there is low, or the potential for low, biological activity associated with the organic matter. The approach to this testing is open-ended, allowing flexibility within the regulation and emerging processes, technologies and analyses.
2. If the product does not meet the Class B biosolids or a Class B compost requirements, then the organic matter can still be applied to land for beneficial use as long as the risks associated with an unclassified product are managed through the land application practices, such as direct sub-surface injection or tilling into the soil within a short period of time.

3.2.3 Requirements for Application to Land

Under the OMRR, organic matter can be used to enhance vegetation or plant growth. There is a whole range of different types of lands where biosolids and biosolids products could be used, including back yards, community parks, agricultural lands, forestry lands and the rehabilitation of disturbed lands, such as mines, gravel pits and landfills. In the case of landfills, as indicated above, the use of biosolids/biosolids products for final cover to enhance rehabilitation of the land is perceived as a beneficial use, whereas use for daily and intermediate cover is perceived as disposal and is discouraged. The type of biosolids or biosolids product is important when developing direction for application to land.

A Class A compost, a biosolids growing medium and a Class A biosolids (for volumes less than 5 m³/parcel of land) can be used without restriction. As such, it is possible for these types of products to be used in back yards, community parks as well as the standard approaches to application such as agricultural land and the rehabilitation of disturbed lands. However, there are more restrictions for a

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Class B compost, a Class B biosolids or larger volumes of Class A biosolids, and a Land Application Plan is required in each case. The Land Application Plan is to be prepared by a qualified professional and submitted to the BC Ministry of Environment before the organic matter is used. The Land Application Plan outlines appropriate application methods, timing, weather conditions, crop and soil needs, testing and monitoring requirements, and site-specific precautions which are needed.

Although the OMRR focuses on allowing the land application of biosolids or biosolids products which have met both treatment and quality requirements, it is possible for sludge to be applied to land, even if the sludge does not meet all of the quality or treatment criteria outlined in the OMRR. In this case, additional testing or site specific controls or application methods would likely be needed in order to protect public health and the environment.

3.2.4 Discussion on Land Application

The land application of biosolids and biosolids products is a controversial subject with many prejudices, misunderstandings and concerns. On the positive side, the use of biosolids and biosolids products for the enhancement of plant growth has been a practice throughout the world for many centuries. There is a clear nutritional benefit to the use of these products, with advantages including:

- The nutrients present in biosolids and biosolids products provide a good balance of macro and micro-nutrients, organics and minerals – i.e. the full package needed for plant growth.
- The use of biosolids and biosolids products will reduce, and may even eliminate, the need for chemical fertilizers.
- Biosolids and biosolids products will allow for a slow release of the nutrients over time, which reduces risk associated of a fast flush of nutrients through the soils. The fast flush of nutrients is often associated with rainfall/irrigation after a period of dryness and is related to the inability of the plants to take up the excess nutrients which have been applied to the soil through a heavy fertilizer application. The flushing of nutrients through the soil raises risks with respect to run-off and groundwater contamination. The slow release of nutrients from biosolids/biosolids products also allows for the nutrients to be used by the plants throughout the growing season.
- The organic nature of biosolids and biosolids products can result in improved soil structure and increase the ability of the soil to hold water. This increases in importance in dry conditions as it can result in the need for less watering.

The use of biosolids and biosolids products for the enhancement of plant growth is regulated by the OMRR, which was developed based on scientific information. The treatment, quality and application of the biosolids and biosolids products are all controlled, which provides the ability to manage health and environmental concerns. By comparison, there is no control over the use of manures, which could contain significant concentrations of pathogens, heavily metals or medications used in agricultural processes, and there is no control over the use of chemical fertilizers, which can easily be misused or

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over-applied. From this, there could be both health and environmental impacts as a result of using manures or fertilizers, due to the lack of control.

However, concerns are raised with the use of biosolids and biosolids products. Some of these concerns relate to misunderstandings, but some are valid. Some of these concerns are discussed in further detail below.

It is possible that malodours could be caused as a result of biosolids and biosolids products, with the risk of odours being greater for a Class B or Class A biosolids, compared with a compost or biosolids growing medium. The cause of the odours is related to the continued self-digestion of the biosolids/biosolids product during storage and will become a higher risk during prolonged storage of large stockpiles. Although similar odours can be associated with manures, there is a perception that manure odours are acceptable, but an odour which results from biosolids/biosolids products is not acceptable. The risks associated with odours can be managed through increased treatment (vector attraction reduction), storage conditions and application conditions. However, one unfortunate factor is that a little odour can travel a long way and, once neighbours become aware of a disagreeable odour, there is an increased sensitivity to even slight odour conditions.

Biosolids and biosolids products can be seen as human waste and, therefore, are automatically perceived as being toxic to human health and the environment. There are many misquotes where biosolids and biosolids products are described as human sewage. There is a lack of understanding that biosolids and biosolids products are not sewage, but are the excess micro-organisms which are used to treat sewage and most of these micro-organisms are found naturally in the environment, e.g. a wetland or in lake sediments, but have simply been concentrated as part of the sewage treatment process. There is also a lack of understanding of the treatment to create a biosolids/biosolids product and that there is a difference between biosolids and sludge. However, while it should be recognised that biosolids and biosolids products are not sewage, they are created from sewage and components of that sewage could affect the quality, with three key concerns being pathogens and the presence of pharmaceuticals and heavy metals.

Pathogens or micro-organisms which could cause illness or disease will be present in sewage and may also be present in the sludge, biosolids or biosolids products. This is no difference to similar micro-organisms being present in manures which are also used to enhance plant growth. These micro-organisms can be treated, as indicated in the various pathogen reduction processes for Class A and Class B standards, but they are also at a disadvantage to surviving during the sewage treatment process or in soils, as their natural environment is the digestive system. In addition, other considerations such as direct contact, ingestion and the need to be in contact/ingest a certain number of specific disease-causing organisms is required before illness or disease can occur. The presence of pathogens or micro-organisms which could cause illness or disease are regulated under the OMRR.

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Pharmaceuticals or other similar substances are present in sewage and the concern is that these substances can interfere with the endocrine system. The best documented effect is the feminisation of male species as a result of contact with female hormones which are present in sewage effluents. The challenge with these substances is that they are only found in trace amounts and are difficult and expensive to analyse for. Some of these substances remain associated with the effluent and should not be considered as a concern for the land application of biosolids or biosolids products. However, some of these substances adhere to sludge and will be present during land application. Scientific research has indicated that these substances prefer to remain associated with the biosolids, which lessens the concern that they have the ability to migrate through soils to contaminate the environment. Scientific research has also indicated that by being associated with biosolids/biosolids products, this increases the potential and rate at which these substances are broken down biologically. The presence of pharmaceuticals and similar substances is not regulated under the OMRR. This is largely due to several factors such as the emerging nature of this topic, challenges with analysis and detection, and the extremely low concentrations in which these substances are found. Pharmaceuticals and other similar substances can also be present in manures.

Heavy metals are present in sewage and have a natural tendency to migrate to and accumulate in the sludge. Therefore, heavy metals will be present in biosolids and biosolids products. While heavy metals can be used as trace nutrients, there is a concern with contamination and, although heavy metals prefer to be associated with sludge/biosolids/biosolids products, it may be possible for them to become soluble and move through soils, potentially entering groundwater and surface water. The presence of heavy metals is regulated under the OMRR, with standards including pre-application concentrations and post-application concentrations, which also consider the presence of heavy metals in soils and the need to protect health and the environment. Heavy metals are also found in manures and commercial fertilizers, and there is limited ability to regulate or control activities related to the application of manures and commercial fertilizers.

Sludge, biosolids and biosolids products are also perceived to be associated with pollution. However, commercial fertilizers and the use of manures can also cause pollution if used in the wrong place at the wrong time. Unlike commercial fertilizers and the use of manures, there are strict controls over the use of sludge, biosolids and biosolids products in order to reduce the risk that pollution could occur.

With respect to the CRD, there is an additional roadblock relating to the application of waste organic solids from a wastewater treatment plant to land – a policy statement was passed by the CRD Board indicating the desire not to apply biosolids to land.

The advantages and disadvantages of using sludge/biosolids and biosolids products to enhance plant growth are summarised in Table 3.3.

Table 3.3: Advantages and Disadvantages of Land Application

Advantages	Disadvantages
Provide valuable nutrients to enhance plant growth and soil conditions.	Treatment to develop a high quality product is costly and will not be realised through sales.
Can result in less water usage.	Costs incurred could also include trucking to the application site, the Land Application Plan (development, monitoring and reporting) and the physical application.
Can result in less commercial fertilizer use.	Public perception, concerns and fears can result in challenging situations and strong bias against land application.
Can reduce risks to the environment as a result of the slow release of nutrients.	A policy statement was passed by the CRD Board indicating the desire not to apply biosolids to land.
Strict controls for treatment, quality and application.	Lower quality products can result in limitations to their use – i.e. only available use is application to agricultural lands, forestry lands or disturbed lands.
High quality products can be sold, with some cost recovery and many potential outlets, including back yards and municipal projects. High quality products can have very high support from members of the community.	

To summarise for the approach of use for land application:

1. The land application of sludge, biosolids and biosolids products has been practiced throughout the world for centuries, with clear benefit to plant growth and soil conditions.
2. The higher quality products can be used without restrictions and could be sold. The lower quality products require greater control and there is no real opportunity for sale of the product.
3. There are treatment, quality and application requirements in the OMRR. The higher the quality of the product, the greater the treatment requirement, which could be costly with little return on these costs through sales. However, treatment is not always necessary and it is possible to land apply a sludge, but this may require additional testing and more stringent application controls.

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4. No authorisation is needed from the BC Ministry of Environment, but there is the need to register biosolids activities under the OMRR, e.g. a compost operation or a Land Application Plan.
5. There could be significant public opposition to land application, due to misconceptions, prejudice and misunderstandings. This opposition may be less if a Class A compost or biosolids growing medium is developed, which could be given away or sold to members of the public. However, with the large volume of product which could be available in the local area, there is also a risk that the market for individual sales could be saturated, leaving a potential stockpile with limited additional opportunities for use.
6. A policy statement was passed by the CRD Board indicating the desire not to apply biosolids to land.

3.3 Use as an Energy Source

3.3.1 Introduction to Incineration and Gasification

This approach considers the use of processes such as incineration and gasification where organic matter undergoes combustion in order to produce heat and the potential ability to generate electricity. Incineration is the heating of organic matter using excess oxygen. The sludge does not have to be dry before it is fed into the incinerator, although a higher moisture content will result in an increased need for supplemental fuel. Incineration has been used as a means of sludge management throughout the world for several years. In Switzerland, incineration is the only acceptable approach to sludge management. The basic principle of gasification is to convert organic matter into gases (syngas) which can then be used as a fuel source. Unlike incinerators, gasifiers require the feed organic matter to have a low moisture content (e.g. only 10 to 20%). Although gasification has been used to produce energy from coal for over 200 years, gasification is a relatively new technology with respect to sludge management and, as such, there is limited information available on the performance of full-scale units. Gasification has the potential to be a successful approach to the management of sludge/biosolids, but there is a level of uncertainty and the need for sufficient information to prove the viability of this process.

3.3.2 Operational Considerations

The organic content of the sludge/biosolids is a suitable potential alternative or additional energy source for incinerators or gasifiers. Organic matter and moisture content are both important when considering diverting sludge/biosolids to use as an alternative energy source. The highest calorific value will be achieved for an organic material which has a high organic matter and low water content.

With respect to the organic matter, the highest calorific value will be associated with a young sludge. Treatment for vector attraction reduction through composting or aerobic/anaerobic digestion or even a simple long-term storage of sludge will result in the biological degradation of the organic matter into a more stable product. This will lower the calorific value. Therefore, unless concerns are raised regarding nuisance conditions such as odours, there is no advantage to treating sludge to create a

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biosolids/biosolids product if the intent is to use the organic matter as an energy source. (Note that the odours relate to operator considerations at the incineration/gasification site, rather than a nuisance factor to surrounding properties, as the odours can be contained and foul air treated before release.) Avoiding the need for treating sludge will also avoid the additional capital and operational costs which are incurred to create a biosolids or biosolids product. There is an additional concern with respect to allowing biological degradation of the sludge before incineration/gasification. The action of biological degradation will also reduce the amount of organic matter which is available for burning. This could result in the inability to provide sufficient organic matter to allow the efficient operation of an incinerator/gasifier.

With respect to the water content, although a sludge/biosolids does not have to have significant water removed before it can be considered as a suitable energy source, the drier the material the higher will be the calorific value and ease of handling, especially with respect to the feed conveyor. For incinerators, it is possible that a solids content as low as 15% could be suitable, but this would require a sufficient balance with dry material being fed into the energy recovery process. It is important that this balance is maintained, as the potential result could be the need to supplement the heating process with propane or electricity. The direction is to improve process efficiency by seeking approaches which will further increase the solids content from the standard 20 to 30% range through to the 35 to 50% range. Incinerators are more flexible for operation with a higher moisture feed, compared with gasifiers, where drying to a solids content in the 85 to 93% solids content is required. Pre-drying of the sludge is possible and can be assisted by capturing and recycling heat generated from the combustion process. The ultimate goal for combustion processes is to produce energy which could be sold, but the reality is to aim for a process which will produce sufficient energy to cover the operational requirements. For the information which is available on sludge incinerators which have been in operation for a number of years, in some cases, this goal is not even met.

3.3.3 Regulatory Considerations

In theory, the use of sludge or biosolids/biosolids products as an alternative energy source does not need any direct authorisation or approval from the BC Ministry of Environment, but any emissions do need to be authorised. The products from a combustion process include gases, heat, a solid waste and, in some cases, a liquid waste stream. Authorisations for gases, solid waste and the liquid stream need to be considered, with no further consideration for the produced heat, as it is assumed that this would be recirculated within the facility to increase process efficiency.

The release of gases will require a permit from the BC Ministry of Environment for air quality emissions. This would include the need for studies to determine the movement of contaminants within the airshed and the potential for environmental and health impacts. As this process is approval by permit, there is the need to include public consultation. There could be complications with respect to public input and the release of gases due to the potential for toxic substances to be present in the emissions.

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The solid waste could be regarded as a potential beneficial product which could be applied to land to enhance plant growth, especially with regards to the ash being a valuable source of phosphorus. It may be possible to register this activity under the OMRR, however, this would require discussion with the BC Ministry of Environment as the definitions in the OMRR are not necessarily clearly aligned with the nature of the solid waste. There could be regulatory challenges as to how land application of the solid waste could be authorised or approved. The solid waste could also have the potential to be incorporated into building materials, such as bricks and asphalt. As a result of the combustion process, metals become concentrated in the waste solids and, in some instances, this has resulted in the solids being regarded as a toxic waste which requires disposal to landfill or even a special disposal site for contaminated waste. Disposal to an authorised site would not necessarily need approval from the BC Ministry of Environment, but must not contravene the requirements of the landfill permit or operational certificate.

The liquid stream would only need to be authorised by the BC Ministry of Environment if it is to be released to the environment, either with or without on-site treatment. As this liquid stream is no longer considered to be sewage, this authorisation would likely be under a permit. The release of the liquid stream to the sanitary sewer system would need agreement with the local municipality and would need to comply with any sewer by-laws and the quality standards outlined in the BC Hazardous Waste Regulation. By receiving the liquid stream, it is the responsibility of the local municipality to ensure that there are no detrimental impacts on the sanitary sewer system or effluent quality.

There is also the risk that an energy source solution could trigger the BC Environmental Assessment Act. This risk increases if the immediate intent is to co-combust sludge/biosolids with municipal solid waste. Sludge and biosolids typically fall under the definition of “municipal liquid waste”, rather than “municipal solid waste” and, therefore, are dealt with under the Liquid Waste Management Plan process, rather than the Solid Waste Management Plan process. If the immediate intent is to use the incinerator or gasifier to combust only sludge/biosolids, the resulting project could be seen as a local government liquid waste management facility. Under the BC Reviewable Project Regulation local government liquid waste management facilities do not require a BC environmental assessment as long as the facility is part of an approved Liquid Waste Management Plan.

3.3.4 Discussion

The advantages and disadvantages of using sludge/biosolids as an alternative energy source are summarised in Table 3.4.

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Table 3.4: Advantages and Disadvantages of Use as an Alternative Energy Source

Advantages	Disadvantages
Ability to generate energy.	Uncertainties regarding authorisations until these processes become more established in BC, including interpretations which require input from the BC Ministry of Environment and the BC Environmental Assessment Office.
Ability to utilise the excess heat generated by the combustion.	Public perception on air emissions can be poor and controversial.
Possibility of developing an energy neutral process which will allow for the recovery of operational costs.	Permitting for air emissions can be lengthy and require complex technical information on airshed conditions.
Good documentation on incineration process for sludge in Europe, including approaches to optimise.	Uncertainties regarding waste solids from combustion process – may be classified as toxic waste.
Ability to avoid capital and operational costs for pathogen reduction and vector attraction reduction.	High capital and operational costs for incinerators.
If disposal of combustion solid waste is required, this will have lower trucking and tipping costs compared with raw sludge, due to moisture and volume reduction.	Energy production may not cover energy requirements.
Lower footprint requirements compared with traditional processing of sludge for land application (such as anaerobic/aerobic digestion and composting).	Risk with gasification as relatively new process for sludge/biosolids management.
Potential for waste solids (ash) to be used as a fertilizer or valuable source of phosphorus for land application.	

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To summarise for the approach of use as an energy source:

1. The common approach to using sludge as an energy source is an incineration-type process. However, this results in high capital and operational costs, which could include the need to dry the sludge before combustion in order to increase process efficiency.
2. There are risks associated with the gasification process, as this approach is relatively new for sludge/biosolids management and, as such, there is little information on the long-term operation.
3. The process efficiency is dependent on the calorific value and moisture content of the sludge. There is no advantage to treating the sludge to create biosolids or a biosolids product, unless there are concerns from the site operators regarding odours. As the odours can be contained and managed, there is no concern with respect to nuisance conditions for neighbouring properties.
4. There is a risk with respect to the authorisation requirements, until incineration and gasification of sludge/biosolids is established in BC. From the information available, it is expected that no authorisation is needed from the BC Ministry of Environment for the development of a combustion process for sludge/biosolids. Depending on the management approach for the waste solids and any wastewater which may be produced as a result of combustion, it is possible that no further authorisations are needed from the BC Ministry of Environment, with the only authorisation being a permit for air emissions. There is also a risk with respect to the requirement of a BC environmental assessment, although this may be avoided, depending on interpretations regarding the material for combustion and wording in the approved CRD Liquid Waste Management Plan. Clarification on these interpretations would be required from the BC Environmental Assessment Office.

4. SUMMARY

There are three common options available for the management of sludge. These options are: disposal to landfill, use for plant growth and use as an energy source. Figure 4.1 summarises the potential for these options with respect to sludge. For disposal to landfill and use for energy recovery, treatment to create biosolids or a biosolids product is not required. In fact, such treatment would be of detriment to the proposed management option through the perception that biosolids is a product which should have a beneficial use and should not be disposed to landfill, and the reduced organic matter as a result of treatment will lower the calorific value and the amount of organic matter available for combustion, both of which are essential to maximise the energy recovery process. Although it is possible to apply a sludge to land for plant growth, the preferred route would be to treat the sludge to create biosolids or a biosolids product. The treatment options and the resulting type of organic matter produced are summarised in Figure 4.2. These treatment options are all recognised in the OMRR, although the regulation does include flexibility to acknowledge additional processes, depending on the technical information which is available.

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The following authorisations and approvals would be needed for each management option:

- Disposal to landfill No approval needed from the BC Ministry of Environment as long as this is in accordance with the permit or operational certificate. Agreement would be needed with the landfill owner.
- Use for plant growth Registration under the BC OMRR.
- Use as an energy source There is a risk with respect to the authorisation requirements, until incineration and gasification of sludge/biosolids is established in BC. Clarification on regulatory interpretations would be required from both the BC Ministry of Environment and the BC Environmental Assessment Office.

Permit required from the BC Ministry of Environment for air emissions.

No approval needed from the BC Ministry of Environment for disposal of solids to landfill, as long as this is in accordance with the permit or operational certificate. Agreement would be needed with the landfill owner and solids may have to be disposed at a special site for contaminated waste.

Use of waste solids on land could be registered under the OMRR, but discussion required with the BC Ministry of Environment on whether this is possible or if another authorisation route is needed.

Liquid stream could be released to sanitary sewer – will require agreement with local sanitary sewer owner and will need to meet by-law and BC Hazardous Waste Regulation requirements. If approach is to treat and release, this will need authorisation by BC Ministry of Environment, likely under a permit.

Sincerely,

URBAN SYSTEMS LTD



Dr. Joanne Harkness
Water and Wastewater Specialist

/jh

Appendix E

Pump Station Cost Curves

DRAFT

Sewage Lift Stations

PIR Base Asset Code:

C2 Sewage Lift Stations <500 L/s

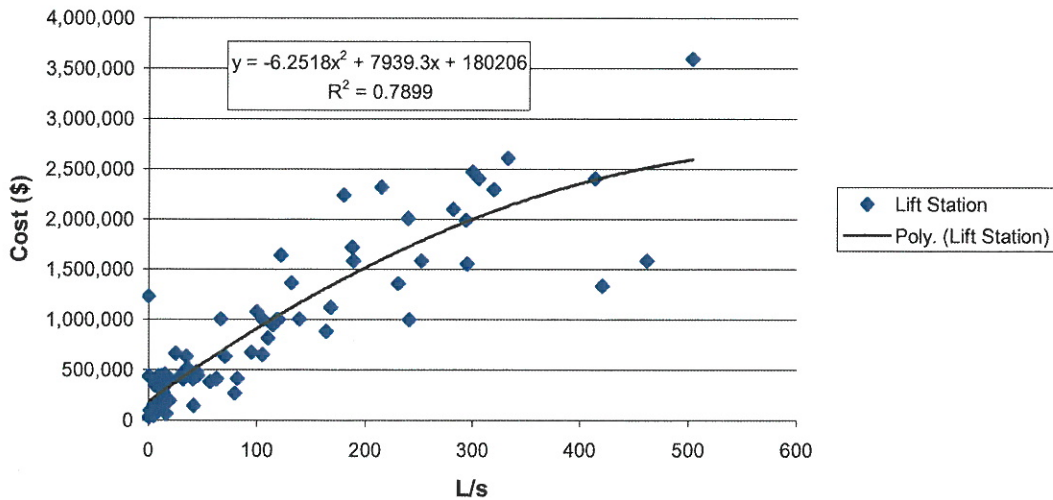
Capacity Measure:

Capacity of the wastewater pumps in L/s

Equation: <500 L/s $y = -6.2518x^2 + 7939.3x + 180206$

R²: <500 L/s 0.7899

C2 Lift Station <500 L/s



Assumptions and Comments:

- Combined General Multiplier = 1.33 (to be added to base cost curve)
- Costs associated with this asset include the wastewater pumps, manhole structure and associated mechanical and electrical components
- Breakpoint identified at +/- 500 L/s

Sewage Lift Stations

PIR Base Asset Code:

C2 Sewage Lift Stations >500 L/s

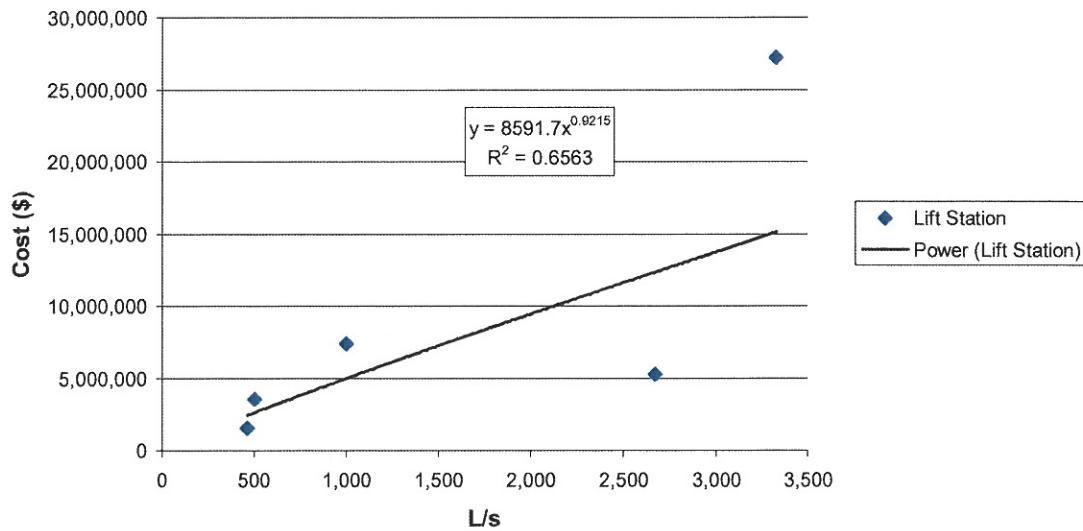
Capacity Measure:

Capacity of the wastewater pumps in L/s

Equation: >500 L/s $y = 8591.7x^{0.9215}$

R²: >500 L/s 0.6563

C2 Lift Station >500 L/s



Assumptions and Comments:

- Combined General Multiplier = 1.33 (to be added to base cost curve)
- For additional comments see C2 < 500 L/s

Appendix F

Updated Site Prioritization

DRAFT

Appendix F – Updated Site Prioritization

Site Number	Site Name	Estimated Usable Area (ha)	Comments	Conclusion
1	Langford VMP at Kelly Road	1.85	By way of comparison to Site 2a there is no appreciable advantage and Site 2a is closer to the trunk sewer. It is not close to another piece of property that could be combined with it.	Not Preferred
2a	Langford VMP at Meaford Avenue	1.89	This site is in Langford, is large enough to handle the 2045 flows and adjoins Site 2b which if required could be added. It is close to the CRD trunk sewer and is in a commercial district.	Preferred
2b	Colwood VMP at Meaford Avenue	0.50	This site is in Colwood and is not large enough on its own to handle the 2045 flows from Langford.	Not Preferred
3	Colwood Gravel Storage	2.64	The South Colwood node is significantly further away from the CRD trunk, which increases the infrastructure required, compared to the North Colwood node. The South Colwood sites are also further away from the reuse opportunities (boulevard irrigation, golf course irrigation and aquifer recharge) that have been identified compared to the North Colwood sites.	Not Preferred
4	Colwood Gravel Pit	9.72	The South Colwood node is significantly further away from the CRD trunk, which increases the infrastructure required, compared to the North Colwood node. The South Colwood sites are also further away from the reuse opportunities (boulevard irrigation, golf course irrigation and aquifer recharge) that have been identified compared to the North Colwood sites.	Not Preferred
5	Colwood City Hall	3.06	The South Colwood node is significantly further away from the CRD trunk, which increases the infrastructure required, compared to the North Colwood node. The South Colwood sites are also further away from the reuse opportunities (boulevard irrigation, golf course irrigation and aquifer recharge) that have been identified compared to the North Colwood sites.	Not Preferred
6	Colwood Pattison Pit	4.97	The South Colwood node is significantly further away from the CRD trunk, which increases the infrastructure required, compared to the North Colwood node. The South Colwood sites are also further away from the reuse opportunities (boulevard irrigation, golf course irrigation and aquifer recharge) that have been identified compared to the North Colwood sites.	Not Preferred

Appendix F – Updated Site Prioritization

Site Number	Site Name	Estimated Usable Area (ha)	Comments	Conclusion
7	Colwood Lower Allandale Pit	1.24	The South Colwood node is significantly further away from the CRD trunk, which increases the infrastructure required, compared to the North Colwood node. The South Colwood sites are also further away from the reuse opportunities (boulevard irrigation, golf course irrigation and aquifer recharge) that have been identified compared to the North Colwood sites.	Not Preferred
8	Colwood Upper Allandale Pit	1.66	The South Colwood node is significantly further away from the CRD trunk, which increases the infrastructure required, compared to the North Colwood node. The South Colwood sites are also further away from the reuse opportunities (boulevard irrigation, golf course irrigation and aquifer recharge) that have been identified compared to the North Colwood sites.	Not Preferred
9	Colwood City Centre	1.02	This is a private site that is encumbered with some extensive building foundations already built. It is also further from the north boundary of Colwood than other sites in the North Colwood node.	Not Preferred
10	Colwood VMP City Centre Adjacent	0.66	This is a private site that is encumbered with a lot of commercial businesses.	Not Preferred
11	Colwood Park and Ride	0.74	This site is owned by the City of Colwood and is large enough to handle the 2045 flows assuming tertiary liquid treatment and no solids treatment is required on the site.	Preferred
12	Colwood Island highway	1.70	This a relatively large private site, but compared to Site 11 it is not preferred because of risks associated with private landowners.	Not Preferred
13	Colwood Wale Road	0.41	This a private site that is too small to handle the 2045 flows.	Not Preferred
14	Colwood West Shore Parks :& Rec.	6.62	This park site is owned/managed by five municipalities. It is ideal from a land area perspective, but may be complicated to secure. It would be possible to use land on the site that is not currently used for recreational purposes.	Preferred

Appendix F – Updated Site Prioritization

Site Number	Site Name	Estimated Usable Area (ha)	Comments	Conclusion
15	Esquimalt Nation	3.72	This land is owned by the Esquimalt First Nation and is the second largest site available. It is also the closest, large site to the Macaulay Outfall. It is large enough to handle the liquid treatment to 2045 but not the liquid and solids to 2045. The site is on Admirals Road right beside the CRD trunk.	Preferred
16	View Royal Burnside & Watkiss	1.13	This site is owned by the Province and has a high voltage BC Hydro line bisecting the property. Since the site would only handle View Royal flows the area is okay for 2045 flows.	Preferred
17	Esquimalt Bullen Park	2.18	This park site requires restoration of the recreational aspects, which means much of the plant would have to be underground. The area is inadequate to treat 2045 flows. The site is in a residential neighbourhood as well.	Not Preferred
18	Esquimalt Town Centre	0.77	This site is too small to handle 2045 flows.	Not Preferred
19	Esquimalt Works Yard	0.69	This site is too small to handle 2045 flows.	Not Preferred
20	Esquimalt Lampson Field	1.38	This site is too small to handle 2045 flows.	Not Preferred
21	Colwood Golf Club	0.60	This site is too small to handle 2045 flows.	Not Preferred



**REPORT TO WESTSIDE WASTEWATER TREATMENT AND RESOURCE RECOVERY
SELECT COMMITTEE
MEETING OF TUESDAY, NOVEMBER 24, 2015**

SUBJECT **TECHNICAL ANALYSIS FOR FURTHER COMPREHENSIVE EVALUATION
OF POTENTIAL SITES, SCENARIOS AND TECHNOLOGIES**

ISSUE

To provide Select Committee members with Terms of Reference and expected outcomes of the next phase of technical analysis on possible wastewater/resource recovery facilities on the Westside.

BACKGROUND

The Westside technical committee, consisting of technical staff and consultants from the participating communities, has been involved in guiding the technical work and analysis of Westside activities.

Under the direction of the municipal technical committee, Urban Systems and Corollo Engineers prepared and presented a report to the Westside Select Committee on October 29, 2015. The objectives of the report included:

- Wastewater Treatment Technologies (liquids): focus on technologies that span secondary to tertiary treatment for potential costing.
- Solids Treatment and Recovery: focus on technologies for gasification and digestion for one-plant, two-plant and four-plant comparisons.
- Resource Recovery Target Market: focus on target markets and highest potential locations for reclaimed water and solids recovery.
- Indicative Design: focus on instructional outcomes from the workshop to guide option set analysis and costing.
- Order of Magnitude: focus on costing for one-plant, two-plant or four-plant option sets.
- Site Reprioritization: focus on incorporating technical analysis, real estate findings and overall feasibility into a node-by-node update.

The technical committee conducted a high-level assessment and provided comment on the report's findings and analysis (see Appendix A). The analysis concluded that while there were valuable information and insights in the report, there needed to be a further, more detailed look at a number of critical factors.

Urban Systems and Corollo are in the process of integrating the technical and financial analysis they produced for the Westside, with sites and scenarios brought forward by the Eastside Select Committee in conjunction with the Technical Oversight Panel. This work will be brought forward for public consultation in December and January.

In a meeting with the Westside technical committee on November 16, 2015, Urban Systems provided a verbal update as to how they are addressing the issues raised by the technical

committee for the December report to the Core Area Liquid Waste Management Committee (Technical Memo #3). That report will consist of a more thorough analysis of sites, scenarios, technologies and order of magnitude costing associated with the various options.

Urban Systems has agreed to provide a verbal report to the Westside Select Committee on their technical analysis and how it responds to issues raised by the Westside municipal technical committee.

CONCLUSION

As Technical Memo #3 will be presented to the Core Area Liquid Waste Management Committee in December and then brought forward for public consultation, a Westside Select Committee update from Urban Systems is a critical step in ensuring that the committee's Terms of Reference and Project Framework are being met.

WESTSIDE STAFF WORKING GROUP

The Westside staff working group is in agreement with this report.

RECOMMENDATION

That the Westside Select Committee receive this report for information.

Submitted by:	Dan Telford, P.Eng., Project Manager, Core Area Wastewater and Resource Recovery Project
Concurrence:	Glenn Harris, Ph.D., R.P.Bio., Acting General Manager, Parks & Environmental Services

CH:cl

Attachment: Appendix A – Westside Technical Team Analysis

Westside Technical Team Analysis

In the time available to fully consider the report authored by Urban Systems for Phase 2 of the Westside Wastewater Treatment Plant Siting Analysis, the technical committee has conducted a high level assessment to help inform recommendations and actions in moving the wastewater treatment and resource recovery process forward for the Westside. Regardless of the time constraints, the technical team has great confidence in the work done by Urban Systems in the short period of time and limited budget available to do the level of analysis that this important project deserves.

The report highlights several important points for consideration, most notably issues regarding dealing with solids, and enlisting the private sector in providing solutions that meet the outcomes to be articulated by decision makers.

As this report is only one step in the overall project, it is hoped that following steps will incorporate a more comprehensive and detailed evaluation of the following factors in order to arrive at a decision that best meets the needs, values and aspirations of the communities:

- Integration of public opinions as indicated in the various public engagement activities over the last year and how it applies to the characteristics of each solution set,
- Full life cycle costing as per industry standards - potentially over 50 years
- Further and a more thorough cost analysis including potential revenues and cost offsets with sensitivity analyses for those factors that are very difficult to forecast, e.g., availability and value of water,
- Inclusion of costs associated with acquiring sites for proposed facilities,
- Exclusion of those sites that are not available for acquisition,
- Quantifying non-financial benefits and liabilities associated with options particularly associated with water reclamation, energy recovery and climate change, and
- Addressing the need for resiliency within proposed solutions.

As a final note it needs to be documented that the flows used in the report do not match the flows now anticipated from Saanich and Victoria West. Unfortunately these revisions were received too late to be used in the calculations. Clearly the conclusions on viable sites – particularly in Esquimalt - could be affected by the significant difference in these numbers and must be addressed without delay.

Based on the draft report the following matrix broadly summarizes the characteristics of the three solution sets covered by the report and in accordance with the decision criteria support by the Select Committee in its Project Framework.

West Side Option Set Matrix	Positive Neutral Fair			NC	North Colwood	Lang	Meaford	
	Option 4A - Lang/NC/VR/EFN Four Plant			EFN	Esquimalt First Nation	VR	View Royal	
Criteria				Option 1B - EFN One Plant			Option 2C - NC/EFN Two Plant	
Capital \$			Fair	Positive				Neutral
Operating \$		Neutral			Neutral			Neutral
Life Cycle \$			Fair	Positive			Positive	
Existing Infrastructure			Fair	Positive				Neutral
Revenue and Resource		Neutral			Neutral		Positive	
Water re-use		Neutral				Fair	Positive	
Capacity Phasing	Positive			Positive			Positive	
Carbon Footprint			Fair	Positive				Neutral
Positive and Safe for Public	Positive				Neutral		Positive	
Water Quality Tertiary	Positive					Fair		Neutral
Size	Positive				Neutral		Positive	
Near Trunk Main	Positive			Positive			Positive	
Near Truck Route	Positive			Positive			Positive	
On Site Solids (EFN)	Positive			Positive			Positive	
Include other waste (EFN)	Positive			Positive			Positive	

The matrix presented above is not intended to be an in depth and definitive recommendation from the WTC, however it may assist the reader in comparing the 3 options presented.



**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, APRIL 13, 2016**

SUBJECT **Accountability and Representation in Governance of Components of Eastside and Westside Sub-systems**

ISSUE

To provide the Core Area Liquid Waste Management Committee (CALWMC) with information on procedural changes and/or governance enhancements that ensures each participant is adequately represented in decision-making on all system components for which they are paying a portion.

BACKGROUND

At the meeting of March 23, 2016 the CALWMC was provided with the following background information and motion with notice for consideration:

Under some options for the proposed core area liquid waste management system that may be considered, part of the total flow volume to the proposed Westside infrastructure will originate from the District of Saanich and City of Victoria. It has also been suggested at the Board table that even if none of the East side flows are treated in the West side system, a part of the costs of these West side systems will be paid by East side taxpayers. The option sets and other preliminary planning undertaken for the Westside sub-system within the Core Area Liquid Waste Management Plan has occurred in the absence of participation, representation and input from the East side municipalities or directors. In accordance with the principle of representation for users of a service provided by a regional district, it is proposed that the Core Area Liquid Waste Management Committee provide direction to staff to bring forward in a timely way recommendations on procedural changes and/or governance enhancements to ensure that each user of components of the service and each area that is paying for components of the system, are adequately represented in decision-making.

MOTION BE IT RESOLVED THAT the Core Area Liquid Waste Management Committee directs staff to report back at the next meeting on procedural changes and/or governance enhancements that will ensure that each participant who is anticipated to use or pay for a component of the eastside or westside wastewater treatment sub-systems is included in the governance system directing the design and eventual operation of that component of the system.

The motion was adopted as presented.

CONCLUSION

Due to the time constraints and the unavailability of key staff at this time, the report back to the CALWMC had to be deferred to the next scheduled committee meeting.

RECOMMENDATION

That the Core Area Liquid Waste Management Committee receive this report for information.

Submitted by:	Mike Walton, Acting General Manager, Parks & Environmental Services
Concurrence:	Kevin Lorette, P.Eng., MBA, Acting Chief Administrative Officer

DT:mer

**REPORT TO ENVIRONMENTAL SERVICES COMMITTEE
MEETING OF WEDNESDAY, MARCH 23, 2016**

SUBJECT **Winter Shoreline Bacterial Levels – Core Area and Saanich Peninsula**

ISSUE

Investigations indicate a number of high-use public beaches in the Core Area and Saanich Peninsula have conditions that exceed Health Canada guidelines for recreational use during and after winter rainfall events.

BACKGROUND

There are two types of concerns at shoreline and beach areas during the winter related to rainfall events. During times of high rainfall when conveyance systems are overwhelmed, sewage overflows of highly dilute sewage occur, on average, one or two times per month in areas along the Core Area shoreline and very rarely on the Saanich Peninsula. During all rainfall events, including those that do not trigger overflows, contamination from stormdrains can enter the ocean.

Health Canada has set water quality guidelines for recreational contact with marine water using a risk management approach to safe recreational water quality. Island Health monitors Capital Regional District (CRD) swimming beaches from late May to early September (dry season) each year. Historically, no beach monitoring occurred during the winter due to the assumed lower level of public recreation.

Following discussions with Island Health staff, the CRD undertook a four-month investigation in the winter of 2015-2016 and collected samples for enterococci analysis at areas with the potential for high winter public use – nine beaches/shorelines in the Core Area and eight beaches/shorelines on the Saanich Peninsula (Appendix A, Maps 1 and 2). Staff collected seawater samples twice per month, approximately 1.5 m out from the shoreline, with a focus to target rainfall events when possible, although sampling also captured some dry periods.

This is a preliminary report of findings that are currently being discussed with Island Health and municipalities, which will be presented in the 2015 Core Area and Saanich Peninsula Stormwater Quality Annual Reports due in late 2016.

ENVIRONMENTAL IMPLICATIONS

As part of an integrated watershed management strategy, the CRD has improved efforts to evaluate receiving environment effects due to stormwater. Winter use of our nearshore waters has become more common in recent years; therefore, assessment of these conditions is prudent. Additionally, climate change is causing more intense rain events in the winter, which has the potential to increase loading of contaminants in stormwater. There are more than 1,000 stormwater discharges in the region and the majority are either at the shoreline or to watercourses that ultimately discharge to the ocean.

The results of shoreline sampling over the winter of 2015-2016 are presented in Appendix A, Tables 1 and 2. Island Health uses Health Canada guidelines to determine public health safety and the Integrated Watershed Management Program uses these same guidelines as an assessment tool. For enterococci, the guidelines are a geometric mean of 35 CFU/100 mL over five samples or a single sample exceeding 70 CFU/100 mL. In Tables 1 and 2, each result highlighted in a grey cell indicates a sample exceeding the single sample guideline. Black highlighted cells show locations that exceed the sample geometric mean over the study period (all samples are included rather than using the five-sample Health Canada guideline).

This data has been shared with Island Health and the relevant municipalities. Island Health monitors many local beaches during the peak usage time of May to September. Island Health data indicates that contamination is not widespread during the dry season. CRD sampling agrees with Island Health's dry season results where CRD sampling is done in the same locations.

The next steps in this work are to determine sources of bacteria in order to assist local governments to develop management actions. Enterococci bacteria can be from humans (e.g., sewage, septic tanks) or animals (e.g., deer, dogs, birds) and bacterial source tracking analysis can often determine the source. Different parts of the region have different issues. On the Saanich Peninsula, staff expect more contribution from animals and agriculture sources, whereas in the Core Area, more infrastructure-related issues are anticipated. This study did not assess different weather and tidal conditions nor the spatial distribution of bacteria in the water, and more work is needed to gather that data.

PUBLIC HEALTH IMPLICATIONS

Due to the findings in this report, the CRD will continue investigations and work with municipalities and Island Health to further assess the shoreline areas of high public use and develop public education and notification strategies for the 2016-2017 winter season.

FINANCIAL IMPLICATIONS

This work was funded from the 2015 and 2016 Core Area and Saanich Peninsula stormwater program budgets. Further studies in 2016 and 2017, if required, will be funded from these budgets by diverting funds from other work plan items, if needed. CRD staff will be undertaking 2016 summer and winter marine monitoring for District of Sooke and Juan de Fuca Electoral Area as part of the 2016 work plan, which will provide some nearshore bacterial data for the Sooke Harbour, Inlet and Basin.

CONCLUSIONS

Island Health data, supplemented with CRD data, indicate that summer conditions at beaches in the Core Area and Saanich Peninsula generally meet recreational contact guidelines. CRD data from the past winter indicate that bacterial levels in the ocean near stormdrains are likely to exceed those guidelines. All locations sampled by the CRD in the winter of 2015-2016 had at least one sample over the Health Canada guidelines and almost all sites exceed the longer-term average guideline. CRD, municipalities and Island Health will work together to collect more data and work on public education and notification strategies as needed for the 2016-2017 season.

RECOMMENDATION

That the Environmental Services Committee receive this report for information.

Submitted by:	Glenn Harris, Senior Manager, Environmental Protection
Concurrence:	Larisa Hutcheson, General Manager, Parks & Environmental Services
Concurrence:	Robert Lapham, Chief Administrative Officer

DG:cam

Attachment: Appendix A – Core Area and Saanich Peninsula Beaches Enterococci Sampling Station Maps and Sampling Results Tables

Table 1: Core Area Beaches Enterococci Sampling Results

Sampling Location		Enterococcus (CFU/100 mL)										Geomean
		Sampling Dates										
		15-Oct-15	26-Oct-15	24-Nov-15	08-Dec-15	29-Dec-15	04-Jan-16	18-Jan-16	05-Feb-16	22-Feb-16	23-Feb-16	
Cordova Bay	574-M	46	1,400	40	360	NS	NS	NS	NS	NS	NS	175
	578-M	220	450	10	1,600	32	10	12	14	1000	NS	76
Cadboro Bay	508-M	24	170	16,000	2,100	28	20	24	6	NS	9	77
	505-M	36	1,500	1	610	17	13	12	310	NS	4	36
	503-M	100	1,200	60	770	380	120	1200	3600	NS	1200	478
Willows Beach	322-M	7	1,000	74	280	14	170	34	350	NS	9	69
	320-M	11	1,500	1,800	9	76	280	1600	330	38	NS	169
McNeill Bay	249-M	9	560	7	40	14	12	9	8	85	NS	22
	245-M	3	78	49	600	92	140	29	37	1300	NS	79
Gonzales Bay	230-M	7	330	240	68	27	14	21	12	7	NS	31
	229-M	5	500	32,000	2,800	290	20	640	1300	NS	13	289
Ross Bay	222-M	15	870	13	79	10	31	19	5	60	NS	31
	216-M	72	27	21	240	17	41	130	230	210	NS	70
Upper Harbour, Swift St.	622-M	8	200	410	2,000	200	60	25	350	270	NS	149
Gorge Park	742-M	25	230	310	2,600	180	130	230	200	350	NS	229
Selkirk Trestle	641-M	1	330	230	3,100	25	48	87	67	NS	34	73
Total Rainfall (mm; previous 2 days and day sampling occurred)		0.0, 0.0, 0.0	0.3, 9.8, 1.5	0.0, 7.7, 0.8	2.8,5.8,35.8	4.8, 0.3, 1.8	0.0, 0.2, 1.2	3.8, 2.5, 0.5	1.1, 2.2, 6.6	0.0, 0.0, 1.4	0.0, 1.4, 0.0	

Notes:

Samples were collected in the marine environment in front of stormwater discharges,. **NS=Not Sampled**

Grey shading indicates single sample values above the Health Canada recreational guideline for primary contact (70 CFU/100 mL)

Black shading indicates that the geomean of the past several sample results is greater than 35 Enterococci per sample

Rainfall data is for 2 days previous, 1 day previous to sampling and the day sampling occurred, in that order.

Rainfall data from KWL rainfall gauge, Douglas and Finalyson

Counts were estimated by lab on November 24, 2015 due to overgrowth at 508-M and 229-M

Sampling was targeted during rainfall, when possible.

Map 1: Core Area Enterococci Beach Sampling Stations

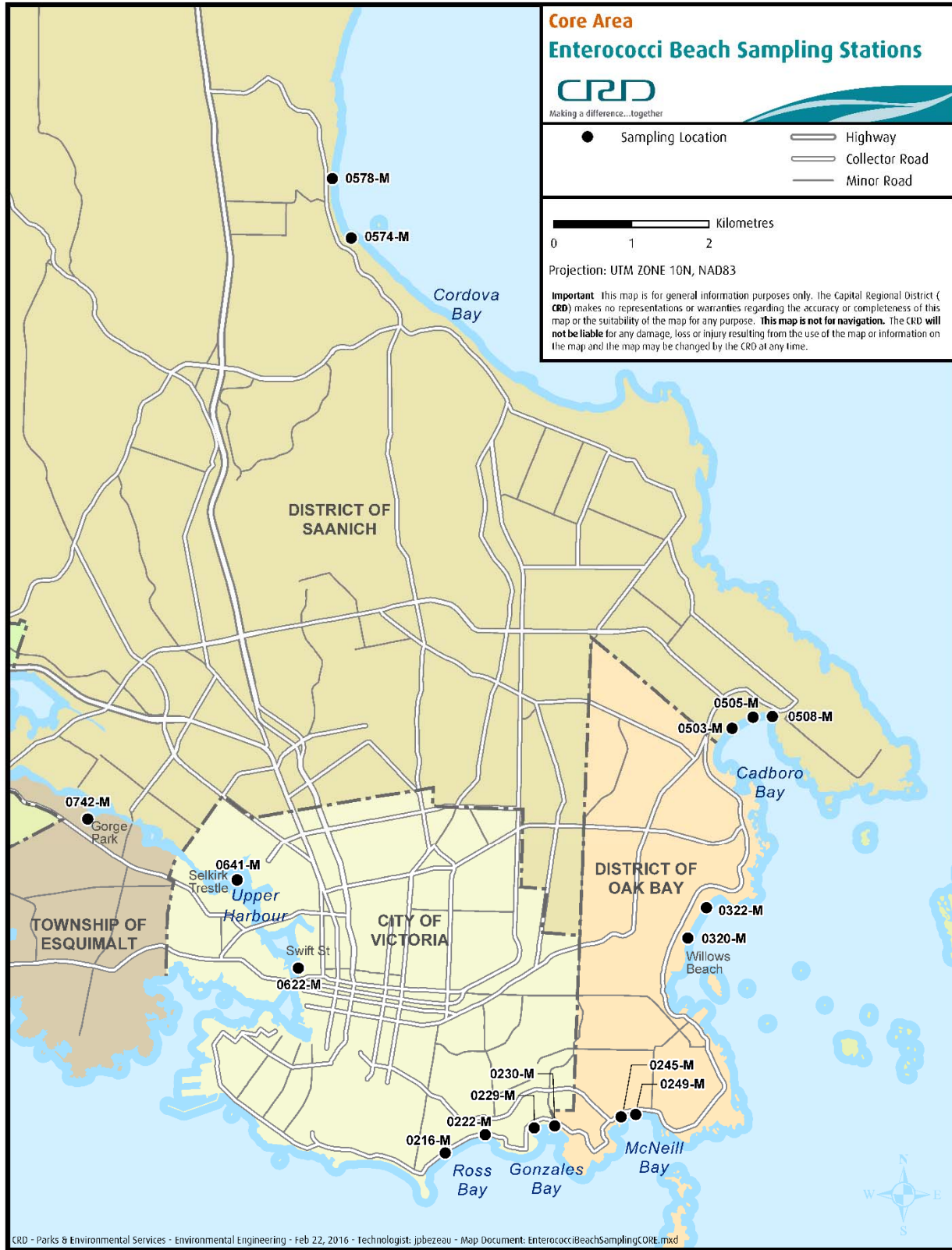


Table 2: Saanich Peninsula Beaches Enterococci Sampling Results

Sampling Location		Enterococcus (CFU/100 mL)										Geomean
		Sampling Dates										
		14-Oct-15	28-Oct-15	12-Nov-15	23-Nov-15	11-Dec-15	22-Dec-15	08-Jan-16	21-Jan-16	01-Feb-16	15-Feb-16	
Saanichton Bay	416-M	15	1200	240	16	ns	5	2	ns	25	ns	29
Bazan Bay, Tulista Park	446-M	1	94	1800	2	16	6	8	1200	1	2	15
	447-M	14	1600	2400	1	34	1	730	840	1	370	58
Robert's Bay	3005-M	13	1500	37	1	20	20	2	10000	4	820	42
	3006-M	1	1600	700	12	60	20	1	2100	11	2500	63
Deep Cove	3078A-M	12	320	35	4	7	16	10	250	14	570	32
	3079-M	36	460	20	9	38	21	5	1000	23	250	48
Coal Point	3087-M	12	9100	1000	13	34	9	1	1800	48	1700	96
Patricia Bay	3114-M	4	150	94	2	13	12	5	38	7	100	17
Coles Bay	3118-M	22	270	2600	37	14	40	5	1700	6	1000	83
	3120-M	14	92	560	16	21	16	3	1200	5	1200	49
Brentwood Bay	3142-M	16	250	1600	130	79	29	1	1600	120	1200	116
Total Rainfall (mm; previous 2 days and day sampling occurred)		0.0, 0.0, 4.9	7.7, rain, 12.8*	4.0, 1.4, 22.6	0.0, 0.0, 8.6	some rain, 5.0, 0.0*	8.4, 4.4, 3.4	0.4, 0.0, 0.0	trace, 3.8, 36.6	1.6, 1.4, 1.4	10.2, 2.0, 45.0	

Notes:

Samples were collected in the marine environment in front of stormwater discharges

Sampling occurred every two weeks and targeted rainy days, when possible.

ns = not sampled; beach was inaccessible due to tide levels.

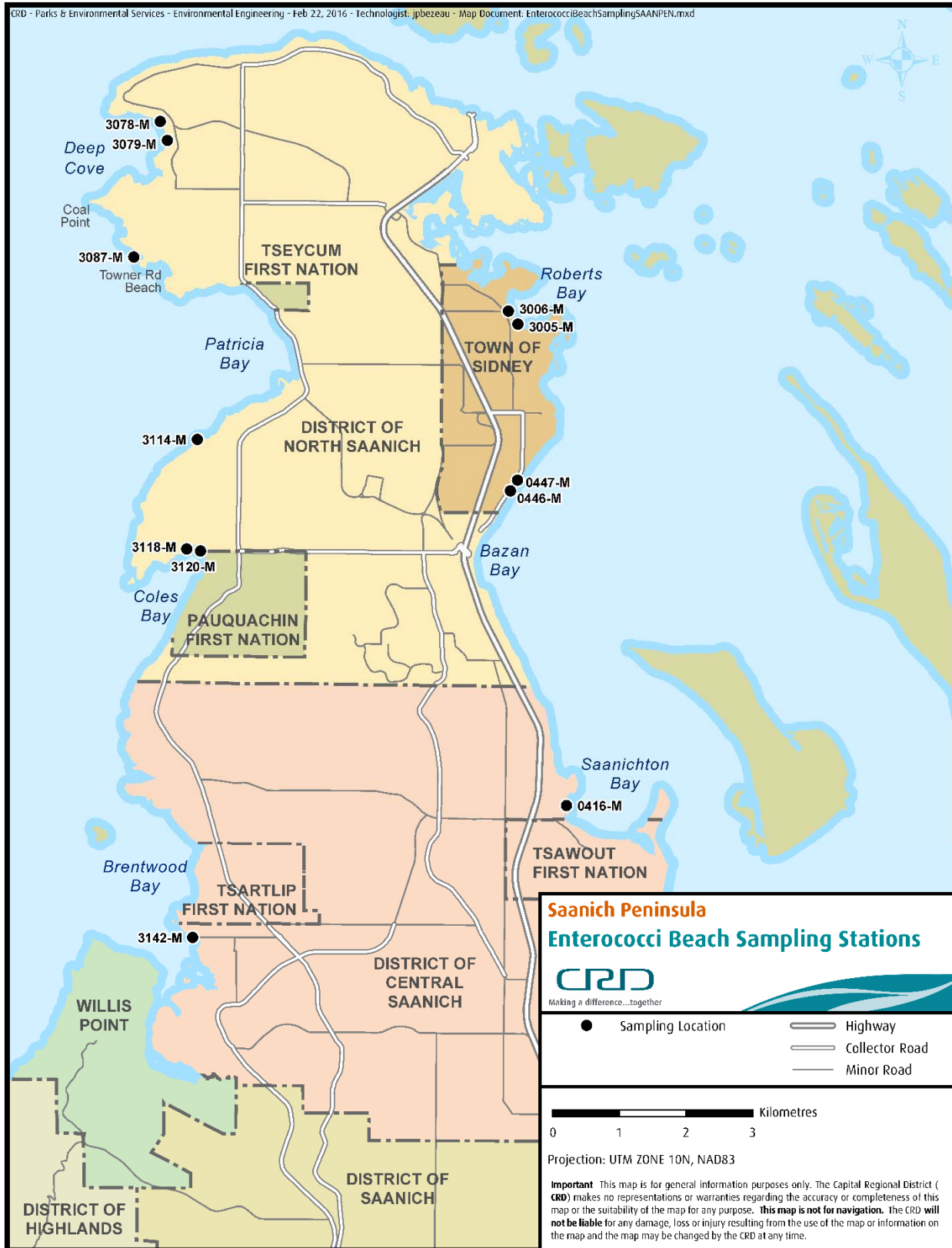
Rainfall data from Environment Canada for Victoria International Airport

*EC's rainfall data was missing on October 27 and December 9

Grey shading indicates single sample values above the Health Canada recreational guideline for primary contact (70 CFU/100 mL)

Black shading indicates that the geomean of the past several sample results is greater than 35 Enterococci per sample

Map 2: Saanich Peninsula Enterococci Beach Sampling Stations





PPP Canada

Chief Executive Officer

100 Queen Street, Suite 630
Ottawa, Ontario K1P 1J9

Premier dirigeant

100, rue Queen, Suite 630
Ottawa (Ontario) K1P 1J9

March 30, 2016

Robert Lapham
Chief Administrative Officer
Capital Regional District
625 Fisgard Street, PO Box 1000
Victoria, BC, Canada, V8W 2S6

Dear Mr. Lapham:

RE: Extension of the Conditional Financial Agreement (CFA) for the Biosolids Energy Centre with the Capital Regional District (CRD)

Thank you for your letter dated March 24, 2016, regarding the CRD's Amendment No. 10 to the Core Area Liquid Waste Management Plan and the requested additional extension to the Conditional Financial Agreement (CFA) between the Capital Regional District (CRD) and PPP Canada Inc., made effective on July 1, 2011, for the Biosolids Energy Centre (Project).

We recognize the efforts and steps taken by the CRD to address the challenges encountered with respect to the site selection for the wastewater treatment plant. Based on the additional information provided, including the revised Proposed Work Plan Overlay (Plan), we are willing to grant your request to extend the CFA to allow you additional time to make progress in accordance with the Plan. Attached is an amendment to the CFA granting an extension of six (6) months.

Subsequent extensions of the CFA, beyond September 30, 2016, will be based on the CRD's ability to move forward with the selection of a site for the wastewater treatment plant and to make real progress with respect to the Plan. I would also like to reiterate that the CFA applies to the Project, as set out in the CFA. Significant changes to the Project would constitute a new project and would require a new application from the CRD. Furthermore, given the delay in achieving Key Projected Project Milestones in Schedule A of the CFA, there will likely be a need to refresh the Project Business Case in the future.

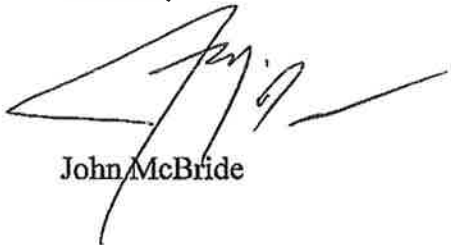
I appreciate the ongoing collaboration between our organizations and look forward to working with the CRD and the Province in moving forward with the common goal of achieving a successful Project.

.../2

Canada

A copy of Amendment #2 is attached and shall serve as an amendment to the CFA once signed, in accordance with the CFA Amendment Clause. Please sign by March 31, 2016, and return to my attention. Thank you for your immediate consideration of this matter.

Sincerely,



John McBride

ry

AMENDMENT #2

BIOSOLIDS ENERGY CENTRE WITH CAPITAL REGIONAL DISTRICT ("CRD")
CONDITIONAL FINANCIAL AGREEMENT

BETWEEN:

PPP Canada Inc.

AND:

Capital Regional District

(hereinafter collectively referred to as the "Parties")

WHEREAS the Parties executed a Conditional Financial Agreement (the "Agreement") on the 16th day of July 2012;

AND WHEREAS the Parties amended the Agreement to extend the 'Closing', extend the 'Expiry Date' and update the 'Projected Dates for Project Milestones' ("Amendment 1") on the 27th day of March 2015;

AND WHEREAS the Parties now wish to further amend the Agreement to extend the 'Closing' and the 'Expiry Date' ("Amendment 2").

NOW THEREFORE, in consideration of the mutual covenants and subject to the terms and conditions hereinafter set forth, the Parties agree as follows:

ARTICLE 1 - DEFINITIONS AND INTERPRETATION

1.1 In this Amendment 2, unless specifically defined herein, all capitalized terms shall have the meanings ascribed thereto in the Agreement.

ARTICLE 2 – AMENDMENTS

2.1 The Section of the Agreement titled "**Closing**" on page 5 of 16 is hereby deleted in its entirety and replaced with the following:

"The Eligible Recipient and PPP Canada agree to work in good faith to negotiate and enter into the Financial Agreement and complete the transactions contemplated by this Agreement by **September 30, 2016** or such later date as may be agreed in writing by PPP Canada and the Eligible Recipient."

2.2 The Section of the Agreement titled "**Expiry Date**" on page 5 of 16 is hereby deleted in its entirety and replaced with the following:

“If the Financial Agreement has not been entered into by September 30, 2016 this Agreement shall expire and the Support shall be revoked by PPP Canada without further notice or liability to the Eligible Recipient. The Eligible Recipient hereby acknowledges and agrees that PPP Canada shall not be liable to the Eligible Recipient for any damages arising out of the termination or revocation of this Agreement and hereby releases PPP Canada from any and all such claims.”

2.3 The Section of Schedule “A” titled Key Projected Project Milestones on page 8 of 16 is hereby deleted in its entirety.

ARTICLE 3 – EFFECTIVE DATE

3.1 This Amendment 2 shall be made effective upon signing by all the Parties (“Amendment 2 Effective Date”). If signed on different dates then the Amendment 2 Effective Date shall be the date of the last signature.

ARTICLE 4 - AFFIRMATION OF AGREEMENT

4.1 All other terms and conditions of the Agreement remain unamended.

ARTICLE 5 – COUNTERPART EXECUTION

5.1 This Amendment 2 may be signed in counterpart, and the signed copies will, when attached, constitute an original agreement. The Parties further agree that a faxed or emailed signature will be deemed to be and shall have the same effect as an original signature.

IN WITNESS WHEREOF this Amendment 2 has been executed by the duly authorized officers of the Parties as of the dates provided below.

PPP CANADA INC.:

Name: John McBride, CEO, PPP Canada

Signature:.....

Date:..... MARCH 24 2016 .



CAPITAL REGIONAL DISTRICT:

Name:..... ROBERT LAPHAM, CAO

Signature:..... 

Date:..... MARCH 30, 2016





Making a difference...together

Capital Regional District

625 Fisgard Street, PO Box 1000

Victoria, BC, Canada V8W 2S6

T: 250.360.3000

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www.crd.bc.ca

March 30, 2016

File: 0360-20
Core Area Liquid Waste Management Committee
Correspondence/Other

Mayor Barbara Desjardins and Council
Township of Esquimalt
1229 Esquimalt Road
Esquimalt, BC V9A 3P1

Dear Mayor Desjardins and Council:

CLARIFICATION REGARDING LAND USE APPROVALS – WASTEWATER TREATMENT

Further to our letter of March 10, please find below the *full* recommendation approved by the Capital Regional District (CRD) Board at its meeting on March 9, 2016:

Options Analysis and Recommendation - Core Area Wastewater Treatment and Resource Recovery

1. *That a conditional Liquid Waste Management Plan Amendment No. 10 be prepared as a basis for approval and submitted to the Minister of Environment with the following elements:*
 - a) *A secondary, advanced (tertiary) or equivalent to advanced (tertiary) wastewater treatment plant at Clover Point, servicing all flows currently directed to Clover Point, up to 20301, and;*
 - b) *A secondary, advanced (tertiary) or equivalent to advanced (tertiary) wastewater treatment plant at McLoughlin Point or Macaulay Plain, servicing all flows currently directed to Macaulay Point outfall, up to 2030¹, and;*
 - c) *Provision for a Westside wastewater treatment plant for future growth, at a location to be determined*
 - d) *Hartland Landfill as the preferred site for biosolids processing with technology to be confirmed by the process below.*

2. *That included within the Plan amendment is a process under which the CRD would invite the submission of project concepts to achieve the goals of the Project Charter. The submissions would include sufficient detail to allow for meaningful evaluation of the project concepts against each other and against the base case, including details regarding sites, technology, a feasibility assessment, demonstration of compatibility with current infrastructure, compliance with provincial and federal requirements and demonstration of significant fiscal advantages and/or environmental advantages over the base case, including financial backing.*

The submissions could demonstrate solutions for:

- a) *A Rock Bay/Westside combination.*
 - b) *A secondary, advanced (tertiary) or equivalent to advanced (tertiary) wastewater plant at either McLoughlin Point or Macaulay Point as an alternative to Rock Bay, an advanced (tertiary) wastewater plant at Clover Point, provision for an advanced (tertiary) plant on the Westside.*
 - c) *The treatment of biosolids at Hartland, possibly in combination with food scraps, municipal solid waste and wood waste.*
 - d) *Other feasible alternatives that demonstrate compatibility with current infrastructure, compliance with provincial and federal requirements and demonstration of significant fiscal advantages and/or environmental advantages and financial backing.*
3. *That the preferred approach be formally communicated to all senior levels of government involved in funding the project, including the Province, 3P Canada and Infrastructure Canada.*
 4. *That a referral be made to both Esquimalt and Victoria Councils seeking approval in principle of the proposed sites as locations for tertiary wastewater treatment plants.*
 5. *That staff be directed to continue working with Colwood, Songhees and Esquimalt First Nations on issues related to purchased capacity and cost considerations for those system users and report back to Committee.*

Note 1: Facility footprint to accommodate 2045 flows with tender process to incent longest-term capacity.

Please also note that the Core Area Liquid Waste Management Committee considered the matter of community engagement with respect to the role of the host municipality as outlined in the March 23 staff report attached. The committee passed the following resolution:

That City of Victoria be requested to co-operate with the CRD on the community engagement process for the proposed facility at Clover Point, and that the process be funded from the Core Area Liquid Waste Management Program Phase 2 Planning Process.

And that the City of Victoria be invited to provide comment to the Core Area Liquid Waste Management Committee on this approach by April 13, 2016.

That the matter be referred to Esquimalt to determine how they would like to deal with the lead of the community engagement process in their community, that the process be funded from the Core Area Liquid Waste Management Program Phase 2 Planning budget and that Esquimalt report back to the Core Area Liquid Waste Management Committee on April 13, 2016.

I understand that CRD staff will be in attendance at your Council meeting on April 4th, 2016 to make a presentation regarding the Liquid Waste Management Plan amendment and will be able to answer questions of Council at that time.

Yours truly,

A handwritten signature in black ink, appearing to read 'R. Lapham', written in a cursive style.

Robert Lapham, MCIP, RPP
Chief Administrative Officer

cc: Larisa Hutcheson, General Manager, Parks & Environmental Services, CRD

**REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, MARCH 23, 2016**

SUBJECT **Update on Municipal Referrals – Core Area Wastewater and Resource Recovery System**

ISSUE

To provide the Core Area Liquid Waste Management Committee with an update on referrals made to the Township of Esquimalt and the City of Victoria regarding Core Area wastewater treatment facility siting.

BACKGROUND

On March 9, 2016, the Capital Regional District (CRD) Board approved that a conditional amendment to the Core Area Liquid Waste Management Plan be submitted to the Province. Under this amendment, two wastewater treatment plant sites were identified as a base case: Clover Point and McLoughlin Point/Macaulay Plain. The Board directed staff to refer these sites to both the City of Victoria and the Township of Esquimalt for endorsement in principle.

The City of Victoria dealt with the matter on March 10, 2016 at its Committee of the Whole meeting. The following motion was passed:

That Council:

1. *Request that the CRD meet with the Fairfield Gonzales CALUC and present a concept drawing of an underground plant at Clover Point and engage the Community with regard to their concerns and desires specific to this concept.*
2. *THEN the CRD report back to Council and also present a concept plan for an underground plant to Council.*
3. *That Council's consideration of any approval in principle of expansion of existing wastewater facilities at Clover Point would be based on conditions including, but not limited to:*
 - (1) *That staff work through the Local Area Planning process to engage residents of Fairfield, Gonzales and other Victoria neighbourhoods to identify neighbourhood amenities and community amenities that would be provided to ensure the most effective integration of this project into the neighbourhood and city;*
 - (2) *The surface of the entire footprint of the proposed site being restored upon completion as publicly accessible parkland, with the final elevation of the parkland not to exceed the current elevation of the roadway at Dallas Road;*
 - (3) *The provision of a neighbourhood amenity and community amenity package to the satisfaction of the City of Victoria; and,*

- (4) *Mitigation of construction impacts, including: provision for potential continuous waterfront public access around the perimeter of Clover Point from Dallas Road Park in the west to Ross Bay in the east; aesthetic features including artistically adorned hoarding; negotiation of permissible working hours; and provision around access, egress and transport to the site.*
- (5) *Request the Capital Regional District to make best efforts to pursue the most cost effective option for the proposed facility*

4. *All of the above is subject to land use approval by Council.*

The Township of Esquimalt dealt with the matter March 14, 2016 at a special meeting of Council. Council requested that the CRD attend a subsequent Council meeting to make a presentation on the process and how these sites came to be included in the amendment. This presentation is scheduled for April 11, 2016.

ALTERNATIVES

Alternative 1

That the Core Area Liquid Waste Management Committee recommend to the CRD Board:

That the host municipalities lead the community engagement process in their respective communities, that the processes be funded from the Core Area Liquid Waste Management Program Phase 2 Planning budget and that the approach be referred to both Esquimalt and Victoria Councils.

Alternative 2

That this report be received for information.

INTER-GOVERNMENTAL IMPLICATIONS

To be successful, the process required to achieve community support and the approvals necessary from Victoria and Esquimalt Councils must be municipally led. The Minister responsible for approval of the Liquid Waste Management Plan, Minister Polak, has recently stated "The Province respects local government jurisdiction, and would not take lightly any decision to impinge on that." While the Ministers of Environment and Community, Sport and Cultural Development have committed to providing assistance and to help facilitate the process, it is essential that the host municipalities endorse a process that will identify community expectations and requirements. The CRD is not able to determine the ultimate siting of wastewater treatment facilities without municipal support and collaboration.

To support the host municipalities, the necessary capacity and resources are needed to allow a team of engagement specialists to work with municipal constituents to identify a meaningful consultation process and obtain community input. The process will need to identify design guidelines, mitigation features and opportunities to address community integration and resolve the municipal expectations and requirements for approval of the projects. A similar process will

be necessary if additional sites are identified from the Call for Concepts process. The outcomes of the process will be brought back as proposals to the CRD Board, which in turn will inform development applications and mitigation packages.

FINANCIAL IMPLICATIONS

Funding for the process would be drawn from the Core Area Liquid Waste Management Program Options Development - Phase 2 Budget, which had a balance of \$498,820 as of February 29, 2016. Staff propose bringing back a detailed budget for the process to a future meeting, once the respective Councils have considered the matter, likely to be in the order of \$150,000 for each community.

The financial envelope for mitigation measures will be set by the CRD Board, to be based on pro-rated 2030 design flow to the respective facilities.

RECOMMENDATION

That the Core Area Liquid Waste Management Committee recommend to the Capital Regional District Board:

That the host municipalities lead the community engagement process in their respective communities, that the processes be funded from the Core Area Liquid Waste Management Program Phase 2 Planning budget and that the approach be referred to both Esquimalt and Victoria Councils.

Submitted by:	Larisa Hutcheson, P.Eng., General Manager, Parks & Environmental Services
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

LH: cl



Reference: 297626

MAR 30 2016

Barbara Desjardins, Chair
and Directors
Capital Regional District
625 Fisgard Street
PO Box 1000
Victoria BC V8W 2S6

Dear Chair Desjardins and Directors:

Thank you for your letter of March 17, 2016, regarding the Capital Regional District (CRD) Core Area Liquid Waste Management Plan (CALWMP) Amendment No. 10. Pursuant to Section 24(5) of the *Environmental Management Act*, I hereby conditionally approve the following aspects of the CRD's CALWMP Amendment No. 10 request:

- 1) With respect to the timing of sewage treatment: Revise deadline of "by the end of 2018" to "by the end of 2020" for the provision of wastewater treatment.
- 2) With respect to biosolids processing: Replace "using a solids stabilization process to stabilize and reduce solids, kill pathogens and generate biogas of use onsite or offsite and preparing the biosolids for beneficial use" with "beneficial use of biosolids while potentially integrating solid and liquid waste functions at Hartland landfill."

I recognize that the CRD is no longer pursuing a single wastewater treatment facility at McLoughlin Point and that the process for identifying a new site and level of treatment is ongoing through the proposed Project Concept Call. It is expected that the outcomes of this process will ensure the timely achievement of providing secondary sewage treatment for the CRD core area no later than December 31, 2020.

...2

In accordance with Section 24(3)(b) of the *Environmental Management Act*, the following interim reports shall be submitted to me no later than December 31, 2016:

- A site acquisition report;
- A finalized business plan report;
- A report on Class B detailed capital and operating costs to implement the plan and costs per user both with and without government funding; and
- A preliminary schedule report for Amendment No. 11, which includes, but is not limited to, time frames for when the following activities/products will be initiated and completed: all Environmental Impact Study (EIS) work, resource recovery and beneficial use plan, review of commitments, Municipal Wastewater Regulation (MWR) registrations and other waste discharge authorizations associated with biosolids management.

In accordance with Section 24(3)(a) of the *Environmental Management Act*, I look forward to receiving the next plan amendment on or before December 31, 2017, which shall include, but not be limited to, the following:

- Finalizing the approach to sludge management;
- The results of construction EIS for each sewage facility;
- The results of EIS for each new discharge location;
- Completed applications for MWR registrations for each sewage treatment facility/discharge location;
- Completed applications for authorizations for biosolids management;
- Updated commitments (e.g., Section 5 – Management of Inflow and Infiltration and Control of Wastewater Overflows; Section 6 – System Configuration; Section 7 – Resource Recovery; Section 11 – Costs, Cost Sharing, Funding and Costs per User); and
- A consultation summary report.

As the CRD has committed in Amendment No. 10, please continue to engage the public and First Nations on all aspects of the CALWMP, including but not limited to details regarding wastewater treatment and biosolids processing, with respect to siting, technology, cost analysis environmental impacts and regulatory requirements.

Please continue to work with Ministry of Environment, Environmental Protection Division staff to ensure that all wastewater treatment facilities are registered under the MWR prior to December 31, 2017. Please also inform ministry staff of all beneficial uses of biosolids being contemplated to ensure that all necessary forms of authorization are obtained in advance of discharge.

Approval of Amendment No. 10 to the LWMP does not authorize entry upon, crossing over or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the local government. This amendment is approved pursuant to the provisions of the *Environmental Management Act*, which asserts it is an offence to discharge waste without proper authorization. It is also the regional district's responsibility to ensure that all activities conducted under this plan amendment are carried out with regard to the rights of third parties and comply with other applicable legislation that may be in force.

Sincerely,



Mary Polak
Minister

cc: Honourable Peter Fassbender, Minister of Community, Sport and Cultural Development
AJ Downie, Director - Authorizations South, Regional Operations Branch,
Environmental Protection Division, Ministry of Environment
Robert Lapham, Chief Administrative Officer, Capital Regional District
Larisa Hutcheson, General Manager, Parks and Environmental Services, Capital
Regional District



AMBASSADOR OF THE UNITED STATES OF AMERICA
OTTAWA, CANADA

March 22, 2016

Mayor Lisa Helps
Greater Victoria Region
1 Centennial Square
Victoria, BC V8W 1P6

MAYOR'S OFFICE
APR - 5 2016
VICTORIA, B.C.

Dear Mayor Helps:

Thank you for your March 16 update regarding the Core Area Liquid Waste Management Committee's selection of a two-plant treatment option, thereby advancing the wastewater treatment strategy for the Capital Regional District. I appreciate your personal engagement on this very important matter and your efforts to ensure that the U.S. Embassy is kept informed of progress identifying siting solutions for the treatment facility.

The protection of our shared waters is a critical issue for the people of Washington state. Water quality of the Salish Sea ecosystem remains a high priority for the United States government.

The U.S. Embassy in Ottawa and U.S. Consulate General in Vancouver look forward to receiving additional updates on the waste management plan's progress with respect to planning and implementation. Thank you for your continued cooperation on cross-border environmental challenges and opportunities.

Sincerely,

Bruce A. Heyman

cc: Consul General Lynne Platt, Consulate General of the United States in
Vancouver

CORE AREA SEWAGE AND RESOURCE RECOVERY SYSTEM 2.0

Phase 2: Analysis, Options Costing and Public Engagement

Project Charter - FINAL

Approved: October 2, 2015
(updated on November 2, 2015)
(Attachment 2 updated on January 19, 2016)

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1. VISION

In partnership with the public, the Core Area Liquid Waste Management Committee (CALWMC) will deliver a sewage treatment and resource recovery system that is proven, innovative and maximizes the benefits for people and the planet – economic, social, and environmental – for the long term.

2. BACKGROUND

In 2006, an environmental report commissioned by the Ministry of Environment noted the contamination of seabed sites close to Capital Regional District (CRD) outfalls where the region's wastewater is discharged. As a result, the Province mandated that the CRD plan for and initiate secondary sewage treatment for the region.

In 2007, the CRD received a letter from the Ministry of Environment giving six directives for the Core Area Liquid Waste Management Plan (LWMP). These six directives continue to inform the goals and commitments of this project.

Minister's Requirements:

1. Meet the regulatory standard for liquid waste
2. Minimize total project cost to the taxpayer by maximizing economic and financial benefits, including beneficial reuse of resources and generation of offsetting revenue
3. Optimize the distribution of infrastructure based on number 2 above
4. Aggressively pursue opportunities to minimize and reduce greenhouse gas emissions (e.g., reduced requirement of energy for pumping purposes and beneficial reuse of energy)
5. Optimize 'smart growth' results (e.g., district services, density, Dockside Green-like innovation)
6. Examine the opportunity to save money, transfer risk and add value through a public private partnership

In 2012, the federal government passed a law requiring all high-risk Canadian cities to provide secondary sewage treatment by 2020 at the latest. The CRD's core area was considered to be in the high-risk category.

Between 2009 and 2014, the CALWMC, CRD staff and consultants, and the Core Area Wastewater Program Commission (the Commission) worked to create and implement a publicly acceptable sewage treatment and resource recovery system for the Core Area.

While the approved CALWMP continues to identify McLoughlin Point as the location for the wastewater treatment facility, in April 2014, the CRD's revised McLoughlin Point rezoning application did not meet the zoning requirements for Esquimalt. In June 2014, the plan to build one regional plant at McLoughlin Point was put on hold by the CRD Board, in response to public input.

In June 2014, Langford, Colwood, View Royal, Esquimalt and the Songhees Nation formed the Westside Select Committee to begin planning for a new project to treat sewage and recover resources in those municipalities and the Nation. In September 2015, Esquimalt Nation joined the Westside Select Committee. In January 2015, a similar body – the Eastside Select Committee,

comprised of Saanich, Oak Bay and Victoria – was formed to develop a similar plan for the Eastside municipalities.

Since June 2014 and January 2015, respectively, both Select Committees have been engaged in in-depth public engagement activities to share information with the public, build trust, and seek public input on a range of factors including, but not limited to, level of treatment, treatment technologies, siting of treatment plants, costs, risks and long-term social, economic and environmental benefits.

In July 2015, both select committees presented their work and recommendations to the CALWMC. The CALWMC approved the solution sets and recommendations from the Eastside Select Committee, including potential sites and direction with regard to investigating secondary and tertiary treatment, anaerobic digestion and gasification, and resource recovery and revenue generation. The CALWMC received a presentation from the Westside Select Committee outlining five technically preferred sites and two scenarios, detailing its technical work to date. The Committee accepted the Westside Select Committee's proposal to carry on with further public engagement and more detailed costing and engineering analysis as per its terms of reference to be presented to the CALWMC as more fully-developed solutions in fall 2015.

The work of the Eastside and Westside Select Committees, the CALWMC, and the public between June 2014 and July 2015 lays the groundwork for the current project, *Core Area Sewage and Resource Recovery System 2.0*.

3. GOALS AND COMMITMENTS

The *Core Area Sewage and Resource Recovery System 2.0* project will deliver the following goals and meet the following commitments. *NB goals should be measurable. Each of these goals needs a corresponding metric so at project completion the CALWMC can determine whether it achieved its goals.*

Goals

- a) Meet or exceed federal regulations for secondary treatment by December 31, 2020
- b) Minimize costs to residents and businesses (life cycle cost) and provide value for money
- c) Produce an innovative project that brings in costs at less than original estimates
- d) Optimize opportunities for resource recovery to accomplish substantial net environmental benefit and reduce operating costs
- e) Optimize greenhouse gas reduction through the development, construction and operation phases and ensure best practice for climate change mitigation

Commitments

- a) Develop and implement the project in a transparent manner and engage the public throughout the process

- b) Deliver a solution that adds value to the surrounding community and enhances the livability of neighbourhoods
- c) Deliver solutions that are safe and resilient to earthquakes, tsunamis, sea level rise and storm surges
- d) Develop innovative solutions that account for and respond to future challenges, demands and opportunities, including being open to investigating integration of other parts of the waste stream if doing so offers the opportunities to optimize other goals and commitments in the future
- e) Optimize greenhouse gas reduction through the development, construction and operation phases and ensure best practice for climate change mitigation

4. SCOPE

The scope of this phase of the Core Area Sewage and Resource Recovery System 2.0 project, is to complete the Options Development Phase, by submitting an amendment to the Liquid Waste Management Plan and receiving conditional approval from the Minister of Environment of an Amendment for the Core Area. This Plan amendment will be approved by the provincial and federal funding agencies. Completion of this phase includes securing sites for all facilities (wastewater treatment and resource recovery).

The scope of this phase does not include detailed site assessments such as Environmental and Social Reviews, submission of detailed business cases (as may be required by funding agencies), indicative design, finalized cost sharing agreements or the procurement of infrastructure.

5. KEY STAKEHOLDERS

The graphic illustration (see Attachment 1) outlines all of the Core Area Sewage and Resource Recovery 2.0 project stakeholders and displays the relationships between them. For a description of the roles and responsibilities of each stakeholder, please see Section 6.

6. ROLES AND RESPONSIBILITIES

Project Lead (TBD)

Federal Government – In 2012, the federal government passed a law requiring all high-risk Canadian cities to provide secondary sewage treatment by 2020 at the latest. The CRD's Core Area was considered to be in the high-risk category. The federal government agreed to contribute up to \$253 million towards the project out of three different funding programs: Building Canada Fund (\$120 million), Green Infrastructure Fund (\$50 million) and 3P Canada (\$83.4 million).

- Secondary treatment mandated by 2020
- Funding up to \$253 million

Provincial Government – In 2006, an environmental report commissioned by the Ministry of Environment noted the contamination of seabed sites close to CRD outfalls where wastewater is discharged. As a result, the CRD was mandated by the province to plan for and initiate secondary

wastewater treatment for the region. Provincial funding agreements provide a maximum of \$248 million towards the project.

- Funding up to \$248 million
- Approval of LWMP amendment and regulatory requirements

Capital Regional District Board (CRD Board) – The CRD Board is responsible for selecting final site locations and securing lands for wastewater treatment facilities, obtaining the rezoning of lands, approving the architectural design for facilities, and approving funding agreements and the budget. The CRD Board is responsible for delivering the project outlined in the Vision.

- Final approving body for funding, budget and major decisions
- Collect and disburse the local portion of the funding of \$287 million

Core Area Liquid Waste Management Committee (CALWMC) – A standing committee of the CRD Board, the CALWMC consists of Directors from municipalities and First Nations participating in the Core Area Liquid Waste Management Plan (CALWMP). The committee is responsible for overseeing the CALWMP and making recommendations to the CRD Board about the CALWMP and certain aspects of the Core Area Wastewater Treatment Program.

- Standing Committee of CRD Board
- Responsible for overseeing CALWMP

Core Area Liquid Waste Management Committee (CALWMC) Chair – The CALWMC Chair is selected by the Chair of the CRD Board annually. The CALWMC Chair is responsible for participating in CALWMC agenda meetings and chairing CALWMC meetings. The Chair is also responsible for building and maintaining relationships, and liaising with the Chair of the Core Area Wastewater Program Commission and the Chair of the Technical Oversight Panel. The CALWMC Chair is the public face of the project and is responsible for communicating with other public bodies at the political level, as well as with the media.

Core Area Liquid Waste Management Committee (CALWMC) Vice Chair – The CALWMC Vice Chair is responsible for fulfilling the roles and responsibilities of the CALWMC Chair in the Chair's absence.

Westside Wastewater Treatment and Resource Recovery Select Committee – In June 2014, Westside participants (Colwood, Esquimalt, Langford, View Royal, and Songhees Nation) formed the Westside Wastewater and Resource Recovery Select Committee to evaluate Westside treatment options and develop a sub-regional wastewater treatment and resource recovery plan. The member municipalities' role is to provide political input and take feedback from the public and report to the Westside Select Committee. The participating municipalities also have zoning authority. In September 2015, the Esquimalt Nation joined the Westside Select Committee. The Songhees and Esquimalt Nation representatives provide political input to the Westside Select Committee. The Committee reports to the CALWMC and is supported by CRD staff, Westside staff, consultants and a technical working group.

The Westside Select Committee participants initiated the Westside Solutions Project as a way to engage residents to work collectively to identify solutions for wastewater treatment and resource recovery that meet the unique needs of the Westside communities. The Westside option sets

consider flow scenarios that include Eastside flows from Vic West and Saanich West. This work, along with the work from the Eastside Select Committee, will inform the Core Area Sewage and Resource Recovery 2.0 project and the amendment to the Liquid Waste Management Plan.

- Representatives from Colwood, Esquimalt, Langford, View Royal and Songhees Nation
- Reports to CALWMC
- Evaluates options to develop a sub-regional wastewater treatment plan
- Supported by CRD staff, Westside municipal staff, consultants and a technical working group

Eastside Wastewater Treatment and Resource Recovery Select Committee – In January 2015, Oak Bay, Saanich and Victoria formed the Eastside Wastewater and Resource Recovery Select Committee to engage with their communities and develop wastewater treatment options that meet the needs of the Eastside municipalities. The role of the participating municipalities is to provide political input and take feedback from the public and report to the Eastside Select Committee. The participating municipalities also have zoning authority. The Eastside Select Committee reports to the CALWMC and is supported by CRD staff, participating municipal staff and consultants.

The Eastside option sets consider a regional option, which includes all flows from Eastside and Westside, as well as a sub-regional and distributed option that includes flows from Eastside municipalities only and Eastside Clover Point outfall catchment flows. The Eastside Select Committee's plan, in combination with the work from the Westside Select Committee, will inform the Core Area Sewage and Resource Recovery 2.0 project and could form the basis for an amendment to the CALWMP.

- Representatives from Oak Bay, Saanich and Victoria
- Reports to CALWMC
- Working to develop wastewater treatment options for Eastside municipalities
- Supported by CRD staff, participating municipal staff, and consultants

CRD Chief Administrative Officer – The CAO oversees all administrative operations and staff, ensures CRD Board policies are implemented, oversees the operations and functions of the CRD, and aligns the organization to achieve strategic priorities set by the Board. This includes working with federal and provincial staff to coordinate funding agreements and providing advice to the CRD Board regarding potential risks and opportunities for the CRD Board.

- Oversees CRD operations and staff
- Works with partners and stakeholders
- Provides advice to the CRD Board

General Manager of Parks & Environmental Services – The GM of Parks & Environmental Services provides general direction and leadership to CRD staff and advises the CALWMC and the Eastside and Westside Wastewater Treatment and Resource Recovery Select Committees regarding the technical and legal aspects of the CALWMP and the wastewater treatment planning process. The General Manager's role is also to provide information to the Core Area Municipalities' CAOs and First Nations Administrators.

- Provides general direction and leadership to CRD staff

- Advises on technical and legal aspects of the CALWMP
- Informs Core Area Municipal CAOs and First Nation Administrators about the project

General Manager of Finance & Technology – The GM of Finance & Technology is the Chief Financial Officer for the CRD. The GM of Finance and Technology is responsible for the budget and all financial services, information technology and geographic information services (IT & GIS), property and real estate services, insurance and risk management, facilities management, and arts development for the Capital Region.

Corporate Officer – The CRD Corporate Officer provides support and procedural advice to the CRD Board and the CALWMC, and is responsible for maintaining the official records of these bodies. The officer also processes requests for records in accordance with the Freedom of Information and Protection of Privacy Act.

First Nations Liaison – The First Nations Liaison serves as a point of contact for First Nations communities involved with the project and provides departmental support and assistance in the areas of service delivery, referral processes, outreach, engagement and relationship building.

Manager, Corporate Communications – The Senior Manager of Corporate Communications provides professional expertise and leads the CRD Corporate Communications team, which works with the General Manager of Parks & Environmental Services and the CAO on overall communications for the CRD Board. There is a communications coordinator dedicated to working on the CALWMP.

Technical Oversight Panel (ToP) – The role of the Technical Oversight Panel is to review the costing and feasibility studies developed by the Engineering Team during the planning phase of the project and to ensure that the studies for the wastewater treatment options include the necessary due diligence. The Technical Oversight Panel will also advise on how to best engage the private sector in this phase of the project. Fundamental to providing independent technical oversight and confirming due diligence is to ensure that the engagement of the private sector in this phase of the project and the innovative solutions that may come forward is informed by, not necessarily bound by (as per the ToP Terms of Reference), decisions to date regarding sites, option sets, timelines, definitions of treatment and other potential limitations on analysis and costing.

The role of the ToP does not include public consultation, media interaction, land acquisition and rezoning, contract management or direction of the Engineering Team. The ToP receives information from and liaises with the Engineering Team (Urban Systems and Carollo Associates), and provides feedback and recommendations to the CALWMC. The Chair of the ToP reports to the CALWMC biweekly. The ToP liaises with the Eastside and Westside Select Committee.

- Independent Technical Oversight Panel
- Reviews costing and feasibility studies
- Reports findings to the CALWMC

Independent Engineering Resources – The Independent Engineering Team’s role is to conduct the Feasibility and Costing Analysis (Urban Systems partnered with Carollo) for the CALWMP Wastewater Treatment System. The Engineering Team is also working with the Westside Select Committee to do a more detailed analysis on the Westside flows. The team provides information

to and liaises with the ToP, and reports to and receives direction from the CALWMC. Additional external resources may be required for staff to prepare the LWMP amendment. The team is assessing the feasibility of a regional and sub-regional system in the Core. The team is also looking at a distributed system option based on the potential sites put forward from the Eastside Select Committee and Westside Select Committee.

- Conducts feasibility and costing analysis
- Assesses feasibility of regional and sub-regional systems in the Core Area
- Assists with preparation of LWMP amendment

Fairness and Transparency Advisor (FTA) – The FTA’s role is to act as a point of contact for the public to submit complaints regarding the process of costing the options, working with the host jurisdiction(s) and preparing an amendment to the LWMP and to ensure that the process is fair, transparent, impartial and objective. The FTA is independent of the CRD. The FTA’s role is to investigate appropriate complaints and report to the Board, through the CALWMC, the results of an investigation, to help strengthen the fairness, transparency or objectiveness of the process followed. The FTA is to provide monthly status reports to the CALWMC. The role of the FTA does not restrict the public from going to other sources for complaints and requests to review processes, such as the office of the Ombudsperson.

- Independent of the CRD
- Investigates public complaints regarding process
- Ensures process is fair, transparent, impartial and objective

Core Area Wastewater Treatment Program Commission (the Commission) – As part of the funding negotiations with the Province, the CRD was required to establish an independent non-political governance body to manage, implement and commission the Core Area Wastewater Treatment Program. The Commission governs the implementation and operation of the Wastewater Treatment Program and oversees the procurement process for all components of the Program. The Commission operates autonomously of the CALWMC and Regional Board; however, the Commission is required to seek CRD Board and funder approval on predetermined items as detailed in the CRD Commission bylaw. Several steps have been taken to scale back operations and reduce costs as the CRD continues its planning work to find a new solution to wastewater treatment. The Commission remains in place waiting to implement whatever system of wastewater projects the CRD Board decides upon, and is approved by the Province.

- Independent Commission required by Province
- Manages implementation and operations of the Wastewater Treatment Program
- Oversees procurement process

Technical and Community Advisory Committee (TCAC) – The Technical and Community Advisory Committee is an LWMP requirement of the province, and provides technical and community consultation advice and input to the CALWMC. TCAC assists the CALWMC in making appropriate recommendations to the CRD Board in the following areas: (a) plant design criteria and treatment technology, including opportunities for resource recovery, sludge management, odour control and general plant design criteria, (b) number and location of treatment plants, and (c) timing/scheduling of treatment.

- Provides technical and community consultation advice

- Makes recommendations regarding design criteria, treatment technology, number and location of treatment plants, and schedule for treatment

Eastside Public Advisory Committee (EPAC) – The Eastside Public Advisory Committee takes input from the public and provides guidance to the Eastside Wastewater and Resource Recovery Select Committee on the public consultation process.

- Takes input from the public
- Provides Eastside Select Committee on the public consultation process

Core Area CAOs + First Nation Administrators – The Core Area CAOs and First Nations Administrators are the principal policy advisors to councils, and provide support to the Eastside and Westside Select Committees. The Core Area CAOs and First Nations Administrators receive project-specific information and updates from the CRD’s General Manager of Parks & Environmental Services regarding the progress of the CALWMC and the Eastside and Westside Select Committees.

- Principle policy advisors
- Receive project information
- Provide recommendations from municipal staff perspective

Municipal Councils – The role of municipal councils is to make land-use decisions for facility siting and to negotiate development agreements with the CRD.

Westside Communications Team – The Westside Communications Team is made up of Communications Coordinators from Colwood, Esquimalt, CRD and Aurora Consultants. The Team provides communication and public consultation support to the Westside Select Committee.

Eastside Communications Team – The Eastside Communications Team consists of a consultant from Public Assembly and the CRD Communications Manager and CRD CALWMP Communications Coordinator. The Eastside Communications Team provides communication and public consultation support to the Eastside Select Committee

Westside Technical Team – The Westside Technical Team consists of municipal staff, supported by Urban Systems. The technical team provides technical information and input to the Westside Select Committee.

- Comprised of municipal staff and supported by Urban Systems and Aurora Innovations for facilitation and coordination support
- Provides technical advice to the Westside Select Committee

Eastside Technical Team – The Eastside Technical Team is comprised of municipal staff and supported by Urban Systems and CRD Staff. The Technical Team provides support and input to the Eastside Select Committee.

- Comprised of municipal staff; provides support and information to the Eastside Select Committee

7. MILESTONES

The Proposed Work Plan Overlay, which was adopted and submitted to 3P Canada in March 2014, provides the overarching timelines and milestones through the completion of the project (Attachment 2). A draft schedule identifying key tasks and milestones of the feasibility and costing exercise to be achieved by the end of 2015 during Phase 2 of the Core Area Sewage and Resource Recovery System 2.0 project is included for discussion (Attachment 3). The scheduling and implementation of the public consultation on the preferred solution sets (after the costing analysis) is anticipated to occur in early December, but is dependent on all of the deadlines being met up until that point.

A detailed schedule is under development and will be circulated for comment.

8. BUDGET

Funding for the project will be drawn from the Core Area Liquid Waste Management Plan operating reserve, funded by all participants in the service based on projected design capacity for 2030. A total budget of \$1,450,000 has been identified to support this phase of the project, including engineering and public consultation consulting fees, Technical Oversight Panel honorarium and disbursements, Fairness and Transparency Advisor, public consultation process delivery and CRD staff time.

Phase 2 Budget

Item	Cost
Project Oversight (FTA & ToP)	\$280,000
Public Consultation	\$240,000
Feasibility and Costing Analysis	\$450,000
Property and Zoning	\$75,000
LWMP Amendment No. 10	\$75,000
Staff and Wages	\$300,000
Miscellaneous and Legal	\$30,000
TOTAL	\$1,450,000

9. CONSTRAINTS, ASSUMPTIONS, RISKS AND DEPENDENCIES

a) *Constraints*

- The timelines for this phase of the project are extremely aggressive with no buffer
- The schedule is dependent on multiple parties and governance bodies meeting their sub-project schedules

b) *Assumptions*

- The Minister of Environment will provide direct *conditional* approval of the Liquid Waste Management Plan upon submission to the Province

c) *Risks*

- The costing analysis and public consultation processes will be subject to criticism due to time constraints
- The governance model of the project is complex, leading to miscommunication or contradictory decision making
- Municipal councils do not endorse siting preferences of the CRD Board
- Potential loss of senior government funding if timelines are not met

d) *Risk Mitigation*

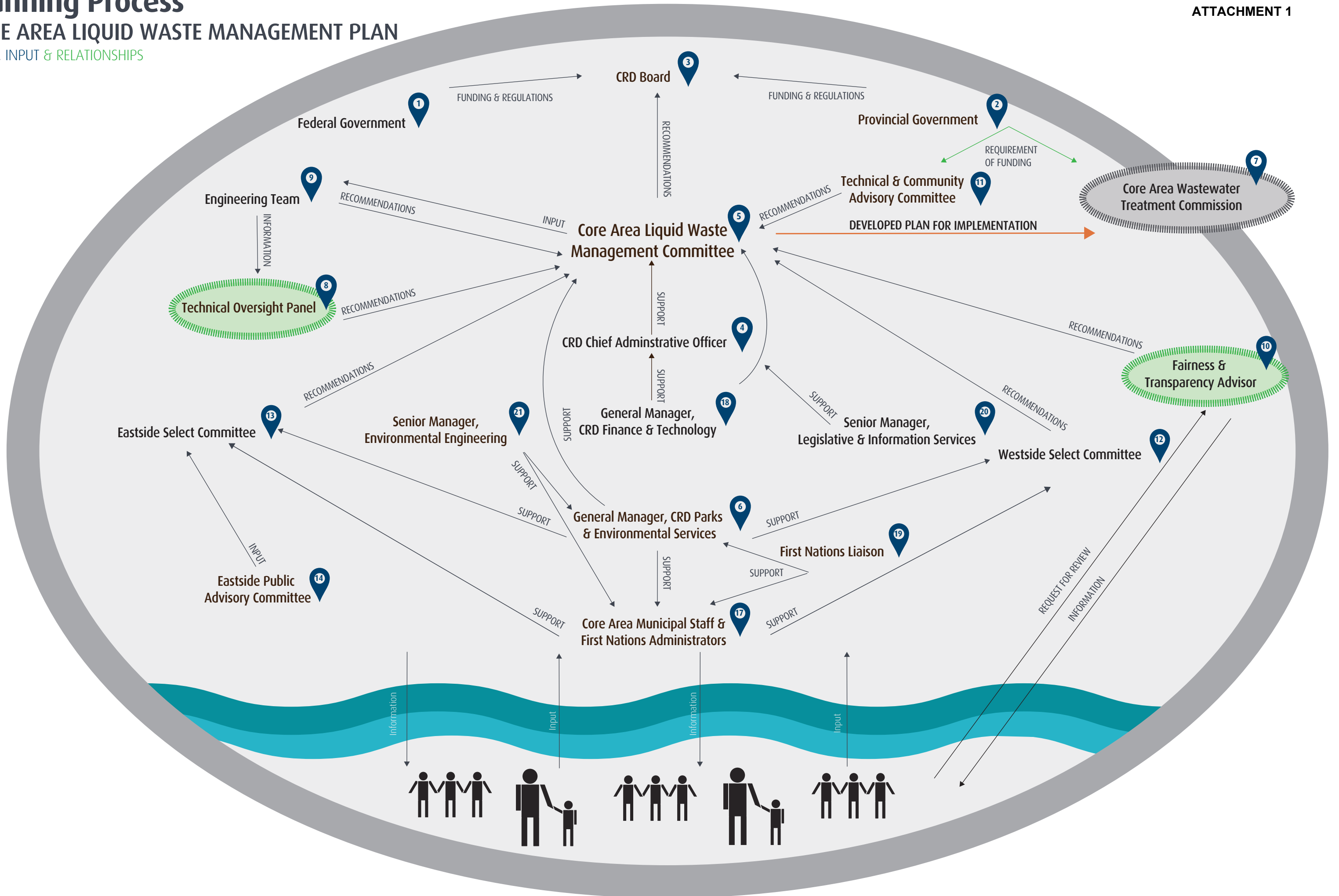
- Ensure regular, open reporting of all parties to the Core Area Liquid Waste Management Committee to ensure “no surprises” when public consultation is formally conducted
- Engage in close municipal council and staff involvement as preferred sites emerge and municipal planning/siting processes are initiated
- Ensure ongoing and open discussions with the funding agencies to ensure “no surprises” when the LWMP amendment is submitted for approval and the project is submitted for funding
- Ensure transparent and deep engagement with the community
- Ensure there is enough time required to rezone and that there is public support for rezoning

Attachments: Attachment 1: Planning Process – Core Area Liquid Waste Management Plan – Roles, Input & Relationships
Attachment 2: Proposed Work Plan Overlay – 3P Canada Funding Considerations
Attachment 3: Proposed Feasibility and Costing Analysis Schedule (Urban Systems) – August 31, 2015

Planning Process

CORE AREA LIQUID WASTE MANAGEMENT PLAN

ROLES, INPUT & RELATIONSHIPS



Proposed Work Plan Overlay

3P CANADA FUNDING CONSIDERATIONS

OPTION DEVELOPMENT, PLANNING & IMPLEMENTATION PHASES

