

DATE: April 11, 2018

FILE: 5360-30

TO: Chair and Directors
Comox Valley Regional District (Comox Strathcona Waste Management) Board

FROM: Russell Dyson
Chief Administrative Officer

Supported by Russell Dyson
Chief Administrative Officer

R. Dyson

**RE: Solid Waste Management Plan-
Five Year Effectiveness Review.**

Purpose

To provide the Comox Strathcona Waste Management (CSWM) Board an update of the five year effectiveness review of the Solid Waste Management Plan (SWMP). Morrison Hershfield will be presenting their report to the board on April 19th 2018.

Recommendation from the Chief Administrative Officer:

THAT the Comox Strathcona Waste Management board continue to implement the Comox Strathcona Waste Management 2012 Solid Waste Management plan with a particular focus in the following areas:

- Closure of CSWM landfills in compliance with Ministry of Environment (MoE) requirements;
- Increased diversion of organic waste;
- Continued optimization and development of recycling programs to achieve 70 per cent diversion or greater;
- Investigation of increased environmental controls;
- Further monitoring of Waste to Energy technologies as per the April 12, 2018 Waste to Energy business case assessment staff report.

Executive Summary

The CSWM service and programs are supported by the SWMP which is mandated by the provincial Environment Management Act. The SWMP reflects the long term vision for solid waste management in the region as a means of reducing the amount of solid waste requiring disposal. This in turn contributes to the protection of the environment and public interest. The SWMP for the CSWM service was drafted in 2012 and received approval from the MoE on May 23, 2013.

The MoE published their finalized “*Guide to Solid Waste Management Planning*” in September 2016 which recommended a review of a regional district’s SWMP after five years.

Morrison Hershfield was contracted in the spring of 2017 to conduct an effectiveness review of SWMP. In June 2017 a draft preliminary report was presented to the board. Morrison Hershfield is now presenting their final draft of the Five Year Effectiveness Review report, and feedback from the board will be integrated into the final report.

Key improvements identified in the SWMP effectiveness review include:

- Reduction of waste disposal from 660kg to 570kg per capita from the year 2012 to 2016;
- Establishment of a pilot project composting residential organics in the year 2013, and securing grant funding for a regional organics composting facility;

- Closure of CSWM landfills in compliance with MoE’s requirements (Cortes, Sayward, and partial closure at Comox Valley Waste Management Centre (CVWMC));
- Construction of a landfill gas collection system and construction of a new engineered lined landfill and leachate treatment facility at the CVWMC;
- Continued review of Waste-to-Energy as an alternative option to landfilling.

Recommendations from the SWMP identified that require further work include:

- Establishing a model bylaw for recycling space allocation for multifamily and industrial, commercial and institutional;
- Implementing initiatives to specifically encourage private and non-profit sectors to develop construction and demolition recycling services.

From the report the CSWM waste diversion estimate has decreased since the original 2012 SWMP estimate. This was due to an updated estimate of private recyclable material from the original 2012 estimate. The SWMP effectiveness report reviewed the waste composition study conducted in 2017, and determined that potentially if all organics were captured, the diversion rate could increase to 62 per cent or further increase to 73 per cent if all recyclable materials could be captured.

The report identified the need to continually assess the financial sustainability for the waste management service due to increased costs of implementing diversion programs and decreased revenue of landfill fees balanced with a sustainable increase for taxation and tipping fees. This is currently being addressed with further analysis of the CSWM financial model.

Prepared by:

C. Makinson

Cole Makinson, EIT
Engineering Analyst

Concurrence:

G. Bau Baiges

Gabriel Bau Baiges, P.Eng
Manager of CSWM Projects

Concurrence:

A. McGifford

Andrew McGifford, CPA,
CGA, Senior Manager of
CSWM Services

Attachments: Appendix A – “Draft Five Year Effectiveness Review Report”

DRAFT FINAL REPORT

FIVE-YEAR EFFECTIVENESS REVIEW REPORT

COMOX STRATHCONA WASTE MANAGEMENT

Presented to:

Comox Strathcona Waste Management
600 Comox Road |
Courtenay, BC V9N 3P6

MH Project # 5170519

Submitted by:

Veronica Bartlett
Project Manager
Morrison Hershfield Ltd.
310-4321 Still Creek Drive
Burnaby, BC V5C 6S7
Tel: (604) 454 0402
Fax: (604) 454 0403

E-mail: vbartlett@morrisonhershfield.com



EXECUTIVE SUMMARY

FIVE-YEAR EFFECTIVENESS REVIEW

Morrison Hershfield (MH) has been commissioned to undertake a five-year effectiveness review of the Solid Waste Management Plan (SWMP or simply Plan) developed in 2012 by Comox Strathcona Waste Management (CSWM). The main objective of the review is to analyze the Plan's implementation and effectiveness.

This report describes the implementations status of initiatives identified in the 2012 SWMP, as of September 2017. The effectiveness review was undertaken to meet solid waste planning requirements of the Ministry of the Environment.

In 2016, there were 63,390 tonnes of solid waste disposed of at the CSWM's landfill facilities and an estimated 56,433 tonnes of waste diverted through various reuse and recycling programs. The resulting CSWM diversion rate is 47% in 2016. From 2012 to 2016, the CSWM reduced the per capita disposal rate from 660 kg per capita per year down to 570 kg per capita—a reduction of 14%.

Waste composition studies conducted at CSWM's two larger landfill facilities indicate that approximately 50% is divertable from landfill. The largest component of divertible materials is organic materials (29% of total by weight) that includes food waste (20%), yard waste (4.6%) and tissue/towelling (4.1%). Other potentially divertible materials include paper and paper packaging (8%) and plastic packaging (4%).

Waste management activities in the CSWM service area include: waste management centres for drop off of refuse, recyclables and products covered by Extended Producer Responsibility (EPR), curbside collection services, and landfill sites.

Currently the CSWM operates a pilot composting facility at the Comox Valley Waste Management Centre. The CSWM has received grant funding to design and build a regional organics processing facility. In 2017, the CSWM hired an engineering firm for the provision of engineering services to assist with oversight of planning, development and procurement for the CSWM regional organics composting facility and transfer station. The project involves designing and building a regional organics composting facility and designing and constructing an organics transfer station. The project is scheduled to be completed by 2020.

Summary of Implementation Status

During the first five years of the Plan implementation, the CSWM has implemented the vast majority of initiatives outlined in the 2012 SWMP. Some of the key initiatives include:

- Closure of CSWM landfills in compliance with Ministry of Environment requirements.
- Increased diversion of organic waste, for example by providing residential organics curbside collection programs, composting services and securing grant funding for increased organics processing capacity in the service area.
- Continued review of Waste-to-Energy (WTE) as an alternative option to landfilling residual waste.

The CSWM established a pilot composting facility to divert organics from the landfill. The CSWM has partnered with other local governments to secure grant funding through the New Building Canada Fund, and will continue to collaborate to ensure effective planning and construction of the facility.

The CSWM has commenced the landfill closures at the Comox Valley Waste Management Centre (CVWMC) and the Cortes Island and Sayward Landfills, and has prepared and submitted a Design Operations and Closure Plan for the Campbell River Waste Management Center that will see the Campbell River landfill closed by 2023.

The CVWMC is transitioning from an unlined landfill with limited environmental controls to an engineered site with a double-lined cell and landfill gas and leachate management systems. The Gold River, Tahsis and Zaballos landfills are still in operation. The closure of the Gold River Landfill will be reviewed when the Tahsis and Zaballos Landfills are closed. The Tahsis and the Zaballos landfills have another 10 years to operate based on MoE approvals. The Gold River Landfill only accepts inert waste for disposal. After closure of these facilities, residual waste will be delivered to the lined landfill site at CVWMC. To facilitate the transfer of residual waste, improvements have been made to the Waste Management Centres in Cortes Island, Hornby Island, Campbell River and CVWMC.

The CSWM is currently completing an assessment of Waste-to-Energy (WTE) technologies and the viability for implementation within the Comox Valley Regional District (CVRD) and Strathcona Regional District (SRD). The assessment is planned to be completed by May, 2018. The assessment has so far identified WTE technologies, which involve converting the waste into a waste-derived fuel on the facility site, and then shipping the waste-derived fuel to a third party for combustion.

There are only two initiatives that the CSWM Service has not progressed on:

- Multi-family and ICI buildings are not yet required across the service area to implement a recycling collection service. The CSWM has also not developed a model bylaw for mandatory physical space allocation for recycling in multi-family and ICI buildings across the service area. The CSWM may want to review the model bylaw that has been developed by Metro Vancouver, which is aimed at allowing sufficient physical space and service vehicle access to recycling and garbage amenities in multi-family and commercial developments.
- The CSWM service has not implemented any initiatives to specifically encourage the private and non-profit sectors to develop construction and demolition (C&D) waste recycling services locally. There are already private facilities in place for C&D recycling and disposal. However, the CSWM recognizes that limited data is available on these diversion activities. The CSWM may want to consider a regulatory approach using waste stream facility licensing to require reporting for commercial recyclers. If the CSWM wants to pursue a waste stream management license (WSML) system, it needs to be reflected in an update to the existing SWMP. For the next 5 years, it may be more suitable to focus on improved voluntary reporting. Dedicating the responsibility to CSWM staff to start building relationships with private sector operators will also help pave the way for the regulation of solid waste management facilities through a facility licensing program administered by the CSWM Service in the future.

Budget Status Update

When comparing the CSWM budget included in the SWMP 2012 with actual capital expenditures for the Plan period 2012 to 2016, the actuals exceeded the budget due to a variety of factors, including regulatory changes requiring landfill design and operational changes, changes in the size of landfill closure areas from original estimates, capital expenditures brought forward compared to the timing of

plan components specified in the SWMP 2012 and that the scope of the work items may have changed from what was planned initially.

The funding of CSWM services is primarily through tipping fees and taxation in accordance with the SWMP. Tipping fees still represent the majority of funding for the CSWM Service. Funding from taxation, which was not identified in the SWMP, is currently set at \$4 million for 2019, with an increase to \$6 million in future years.

Strengths and Challenges

The CSWM has made significant progress on implementing specific aspects of the solid waste management plan, with both limited staffing and financial resources. Much of the work done over the past five years has involved upgrading existing facilities to address compliance issues, investigating options for optimizing parts of the solid waste system (e.g. remote community waste management, regional organics, staffing), improving overall financing of the solid waste system and moving toward a regional organics diversion solution. A number of challenges have been identified by either CSWM staff or by the authors.

In the effectiveness review, the following aspects of the CSWM’s waste management system have been identified as strengths and challenges to meeting Plan goals and targets.

Strengths

<i>Organics diversion capability</i>	Organics diversion programs are already in place in many areas of the CSWM service area, and the capacity will improve further once a regional organics processing facility is established. Facility construction must be completed by 2020 in accordance with the grant funding requirements.
<i>Positive Impact on Local Economy</i>	CSWM’s waste management system has positive impacts on local job creation.
<i>Environmental Improvements</i>	The CSWM has made significant environmental improvements thanks to the closure of landfills and landfill gas collection. Further improvements will come from the establishment of a leachate treatment facility.

Challenges

<i>Accurate Recording of Disposal and Diversion Quantities</i>	Use of more accurate codes is needed to improve the measurement of program performance. Reporting on diverted quantities can be required from waste management facilities in the Region by means of waste stream licensing requirements.
<i>Financial Sustainability of Waste Management Services</i>	As the CSWM achieves higher waste diversion, revenues from tipping fees will decrease. Tipping fees cannot be increased indefinitely without waste flowing out of the CSWM waste system. The CSWM service should continue to assess the financial sustainability for the entire waste management system and the long term financial performance of the system.



<i>Improving Disposal and Diversion Performance</i>	In addition to increasing organics diversion and introducing waste stream licensing requirements, the CSWM may want focus on waste diversion activities, e.g., focus on ICI waste and food waste diversion, as well as coordinating communication and education initiatives, as well as the enforcement of disposal bans on materials that can be diverted.
<i>Waste Leakage to/from the Service Area</i>	The CSWM can utilize a waste stream management license bylaw to address this potential issue and require transfer stations to report on waste quantities handled.
<i>Diverting Used Mattresses and Bulky Furniture</i>	Mattresses and bulky furniture make up a significant part of illegally dumped materials. There may be an opportunity to collaborate with a neighbouring regional district to send used mattresses for mattress recycling in Vancouver.

Recommendations

Since the adoption of the SWMP 2012, the CSWM have implemented the majority of the initiatives in accordance with the Plan. Some of the planned waste diversion initiatives that were included in the SWMP 2012, have not yet been fully completed. For example multi-family and ICI buildings are not yet required across the Service area to implement a recycling collection service.

Based on the effectiveness review the CSWM may want to consider the following recommendations for revisions to the SWMP:

- The CSWM has already signaled the intention in its SWMP 2012 to review WTE as a part of the solid waste management system, however if the CSWM deems WTE feasible to implement, this must also be reflected in the SWMP. The CSWM must seek public support for a WTE facility in principle by clearly identifying the need, and the provision of information showing that WTE is a preferable option to meet that need. If public support is gained, the SWMP can be amended.
- If the CSWM wants to pursue a WSML system, it needs to be reflected in an update to the existing SWMP. For the next 5 years, it may be more suitable to focus on improved voluntary reporting.
- The current SWMP only identifies four active private disposal facilities that receive wood waste and / or inert construction / demolition / land clearing waste. In reality this number is probably larger. When the SWMP is due to be updated, there is a need to expand the list to include all operational/ permitted landfills in the CSWM service area. These facilities can be listed in a Schedule, which can be updated if minor amendments are needed. If a facility is not listed in the current SWMP and the owners want to start accepting waste materials which are included in CSWM's SWMP, a major amendment to the SWMP is required. This applies to any facility which is opening or implementing changes to status of a site or facility.

The MOE recommends that regional districts renew their solid waste management plans every 10 years (in this case before 2023). It may also be necessary to amend the plan before this time if there are significant changes, for example with the inclusion of a WTE facility in the service area or, the opening of a new waste management facility that manages wastes that are currently covered by the existing SWMP.

Based on the effectiveness review, there is no need to amend the existing Plan before 2023, unless significant changes are proposed.

TABLE OF CONTENTS

	Page
1. PURPOSE	1
1.1 Population And Growth Estimates	1
2. WASTE STREAM CHARACTERIZATION	3
2.1 WASTE DISPOSAL AND DIVERSION	5
2.2 Waste Disposal Trends in the CSWM Service Area	7
2.3 Comparison of Waste Disposal Performance To Neighbouring Regions	8
3. GREENHOUSE GAS EMISSIONS RELATING TO SOLID WASTE MANAGEMENT	9
3.1 GHG Emission Savings Relating To CSWM Waste Diversion Activities	9
3.2 GHG Emissions Relating To CSWM Landfills	10
4. SOLID WASTE MANAGEMENT PLAN IMPLEMENTATION STATUS	10
5. SUMMARY OF COMPLIANCE ACTIVITIES COMPLETED	20
6. ECONOMIC DEVELOPMENT AND REGIONAL GROWTH STRATEGY CHANGES IMPACTING PLAN IMPLEMENTATION	22
7. FIRST NATIONS LINKAGES TO PLAN IMPLEMENTATION	22
8. SOLID WASTE PROGRAM FINANCIALS	22
9. EVALUATION OF STRENGTHS AND OPPORTUNITIES FOR IMPROVEMENT	24
9.1 Assessment of Waste to Energy and Emerging Technologies	24
9.2 Potential Impact of a New Private Landfill	25
9.3 Hazardous Waste Management	26
9.4 Options for C&D Recycling Business Reporting	31
9.5 Identification of Strategies to Improve First Nations Linkages	34
10. ASSESSMENT OF OVERALL STRENGTHS AND CHALLENGES TO MEETING PLAN GOALS AND TARGETS	35
10.1 Strengths	35
10.2 Challenges	36
11. CONCLUSIONS AND RECOMMENDATIONS	38
12. REFERENCES	40

APPENDIX A: Plan Area Information



TABLE OF CONTENTS (Continued)

Page

List of Tables

Table 1 CSWM 2011 and 2016 Population	1
Table 2 Population Projections.....	2
Table 3 Top Five Divertible Materials by Sample Type for CVWMC & CRWMC Combined.....	4
Table 4 Disposal and Diversion Estimates (2016)	5
Table 5 Avoided GHG Emissions (2016) Based on Waste Diversion Activities	10
Table 6 Implementation Status of Initiatives Regarding General Policies, Reduction and Reuse Outlined in the 2012 SWMP.....	11
Table 7 Implementation Status of Initiatives Regarding Recycling Outlined in the 2012 SWMP.....	12
Table 8 Current Residential Organics Curb-side Collection Programs	15
Table 9 List of Recycling Depots within the CSWM Service Area	16
Table 10 Implementation Status of Residual Waste Management Initiatives Outlined in the 2012 SWMP.....	17
Table 11 Compliance Activities Undertaken by the CSWM Service	20
Table 12 Capital expenditures as per SWMP, actuals to date and revised costs to complete.	23
Table 13 Potential Impact on the CSWM Service and Plan Implementation	26
Table 14 ICI Hazardous Waste Disposal Service Providers in CSWM Area	28

List of Figures

Figure 1 Overall Composition of All Sources Combined at CVWMC and CRWMC.....	3
Figure 2 CSWM Disposal Rates 2012 - 2016	8
Figure 3 AVICC Disposal Rates 2015 with current tipping fees.....	9
Figure 4 Waste dry wall being “stored” on private land in the Cowichan Valley RD.....	32



1. PURPOSE

Morrison Hershfield (MH) has been commissioned by the Comox Valley Regional District (CVRD) to undertake a five-year effectiveness review of the current Solid Waste Management Plan (SWMP or Plan), aimed at analyzing the Plan’s implementation and effectiveness. Regional solid waste services are provided to the combined CVRD and Strathcona Regional District (SRD) geographic areas by the CVRD. The service is branded as Comox Strathcona Waste Management (CSWM). The 2012 SWMP provides a long term vision for solid waste management in the Comox Strathcona Waste Management (CSWM) area.

The current Solid Waste Management Plan (SWMP) was completed in 2012 and received Ministry of Environment (MoE) approval in 2013. The first stage of the effectiveness review process involves assessing the effectiveness of the current plan. This review was undertaken to meet requirements of the MoE Guide to Solid Waste Management Planning (September 2016).

1.1 POPULATION AND GROWTH ESTIMATES

The population in the CSWM service area in 2016 was 111,198. According to 2016 census data, approximately 1,800 people live on First Nation Reserves in the CSWM area. The populations in both waste sheds have not changed significantly since 2011 (as shown in Table 1). For information on the Plan area and the location of communities in the CSWM service area, refer to Appendix A.

Table 1 CSWM 2011 and 2016 Population¹

Area	Population 2011	Population 2016
Southern Wasteshed Area		
Comox	13,627	14,028
Courtenay	24,099	25,599
Cumberland	3,398	3,753
Baynes Sound-Denman/Hornby Islands (Electoral Area A)	6,899	7,213
Lazo North (Electoral Area B)	6,939	7,095
Puntledge-Black Creek (Electoral Area C)	8,325	8,617
First Nations Reserves	251	222
Sub Total	63,538	66,527
Northern Wasteshed Area		
Campbell River	31,186	32,588
Gold River	1,267	1,212
Sayward	317	311
Tahsis	316	248
Zeballos	125	107
Kyuquot/Nootka-Sayward (Electoral Area A)	807	764
Cortes (Electoral Area B)	1,007	1,035

¹ Based on Statistics Canada's 2016 Census Profile data

Area	Population 2011	Population 2016
Discovery Islands-Mainland Inlets (Electoral Area C)	2,601	2,431
Oyster Bay-Buttle Lake (Electoral Area D)	4,037	4,396
First Nations Reserves	1,589	1,579
Sub Total	43,252	44,671
Total	106,790	111,198

Table 2 provides the estimated population projections for the CSWM service area as provided by BC Stats². Over the coming 10 years the southern wasteshed population is expected to grow at an average rate of 1.1% per year and the northern wasteshed population is expected to grow at an average rate of 0.6% per year. From 2027 onwards, the population growth is expected to grow at an average rate of 0.9% and 0.3% for the southern and northern wastesheds respectively. The next SWMP update should consider projected growth rates of individual member municipalities in order to better estimate long-term waste projections.

Table 2 Population Projections

Year	Southern Wasteshed Area	Northern Wasteshed Area	Total CSWM Area
2016	65,387	45,792	111,179
2017	66,195	46,146	112,341
2018	66,983	46,480	113,463
2019	67,755	46,798	114,553
2020	68,523	47,103	115,626
2021	69,280	47,390	116,670
2022	70,035	47,665	117,700
2023	70,791	47,932	118,723
2024	71,540	48,186	119,726
2025	72,277	48,431	120,708
2026	73,002	48,661	121,663
2027	73,715	48,874	122,589
2028	74,415	49,079	123,494
2029	75,099	49,269	124,368
2030	75,768	49,448	125,216
2031	76,415	49,614	126,029
2032	77,049	49,770	126,819
2033	77,674	49,917	127,591
2034	78,268	50,045	128,313
2035	78,842	50,158	129,000
2036	79,411	50,269	129,680

² Sub-Provincial Population Projections - P.E.O.P.L.E. 2016 (Aug 2016)

2. WASTE STREAM CHARACTERIZATION

The composition of landfilled waste in the CSWM service area is estimated based on a regional waste composition study conducted from September 25 to October 6, 2017. AET Group Inc. was commissioned by the CSWM to undertake a physical waste composition study of inbound waste entering each of the two facilities (CVWMC & CRWMC) destined for disposal. During the sampling period, approximately 50 waste samples were audited from each facility from all incoming sources; self-haul (cash drop), small ICI/multi-family, large ICI, C&D and curbside (single family residential)³. The audits were designed to represent a general baseline of waste disposed of at the facilities from all sources.

Figure 1 shows the overall composition of waste from both facilities audited. The composition takes into account all waste sources. Of the combined waste from both facilities approximately 50% is divertible from landfill with organic material making up the largest component of divertible materials (29% of total by weight). Divertible organic material can be further broken down into food waste (20% of total by weight), yard waste (4.6%) and tissue/towelling (4.1%). All of these organic materials are accepted in the organics compost program. Other large components of the divertible material categories include paper and paper packaging (8%) and plastic packaging (4%). Approximately 50% of the audited waste stream is non-divertible and does not have a current diversion program in place and must be disposed of in the landfill.

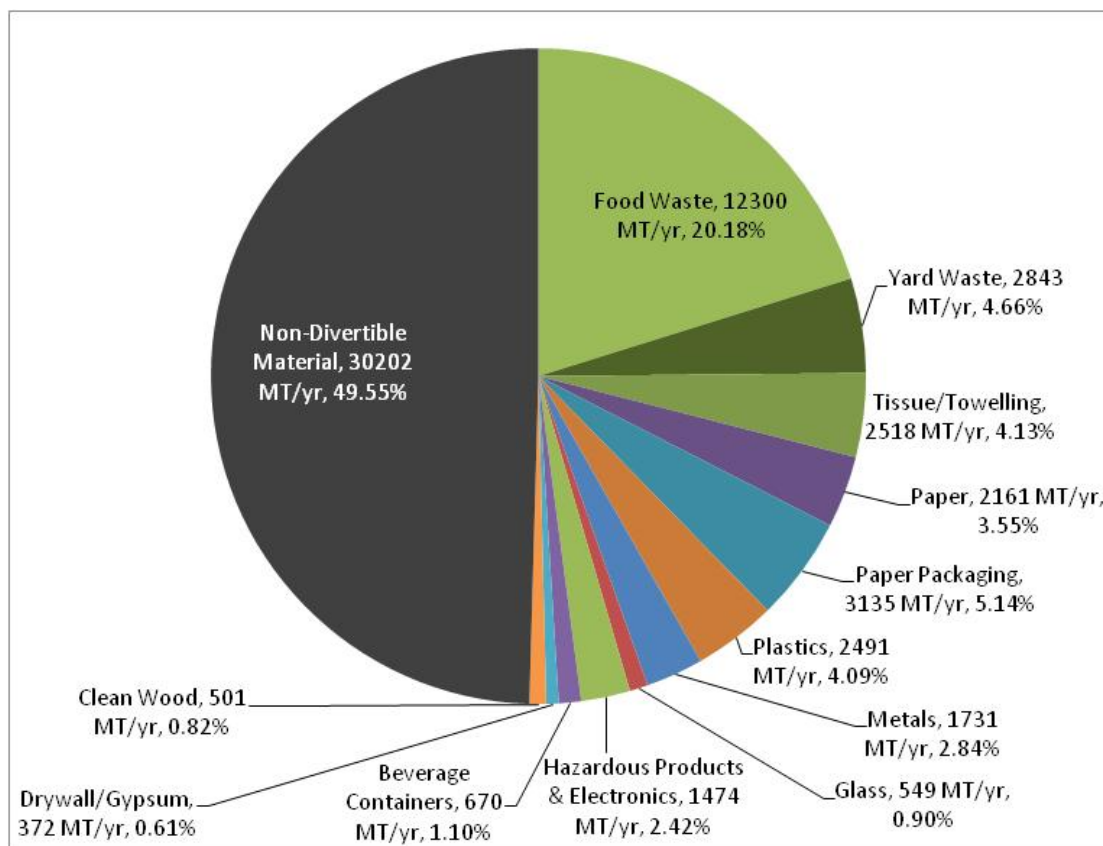


Figure 1 Overall Composition of All Sources Combined at CVWMC and CRWMC

³ “Small ICI/Multi-Family” loads refers to front-end truck with mixed sources of waste, while “Large ICI” refers to roll-off bins containing waste from presumably one (larger) facility.

The waste audit from the CVWMC & CRWMC showed the following percentages of divertable materials in waste coming from the sources, also presented in Table 3:

- Self-haul (cash drop): 16% divertable materials.
- Small ICI / multi-family: 38%.
- Large ICI: 48%.
- C&D: 6%.
- Curbside (single family residential): 47%.

Table 3 Top Five Divertible Materials by Sample Type for CVWMC & CRWMC Combined

Sample Type	Ranking	Material Category	Tonnage (kg/yr)	MT/yr	% of Sample Type	
Self Haul (Cash Drop)	1	Yard Waste	201,760	201.76	5.99%	
	2	Food Waste	151,918	151.92	4.51%	
	3	Clean Wood	109,051	109.05	3.24%	
	4	Other Steel (non-packaging)	49,510	49.51	1.47%	
	5	Hazardous Products & Electronics	28,515	28.51	0.85%	
	Total Top 5 Self Haul (Cash Drop)			540,754	540.75	16.06%
	Total All Self Haul (Cash Drop) Material			3,366,899	3,366.90	100.00%
Small ICI/Multi-Family	1	Food Waste	4,605,649	4,605.65	19.97%	
	2	Paper Tissue/Towelling	1,295,801	1,295.80	5.62%	
	3	Yard Waste	1,153,252	1,153.25	5.00%	
	4	Hazardous Products & Electronics	943,945	943.95	4.09%	
	5	Other Printed Paper (Obligated)	831,809	831.81	3.61%	
	Total Top 5 Small ICI/Multi-Family			8,830,456	8,830.46	38.29%
	Total All Small ICI/Multi-Family Material			23,063,475	23,063.48	100.00%
Large ICI	1	Food Waste	962,906	962.91	24.72%	
	2	Yard Waste	329,781	329.78	8.46%	
	3	Old Corrugated Cardboard	244,875	244.87	6.29%	
	4	Newsprint Flyers and Inserts	203,893	203.89	5.23%	
	5	Hazardous Products & Electronics	141,554	141.55	3.63%	
	Total Top 5 Large ICI			1,883,009	1,883.01	48.33%
	Total All Large ICI Material			3,895,998	3,896.00	100.00%
CND	1	Clean Wood	240,336	240.34	2.28%	
	2	Other Steel (non-packaging)	153,350	153.35	1.45%	
	3	Yard Waste	101,988	101.99	0.97%	
	4	Old Corrugated Cardboard	99,105	99.10	0.94%	
	5	Drywall/Gypsum	83,546	83.55	0.79%	
	Total Top 5 CND			678,324	678.32	6.42%
	Total All CND Material			10,557,919	10,557.92	100.00%
Curbside (Single Family Residential)	1	Food Waste	6,525,415	6,525.42	32.52%	
	2	Paper Tissue/Towelling	1,121,959	1,121.96	5.59%	
	3	Yard Waste	1,055,984	1,055.98	5.26%	
	4	Flexible Film Plastic – LDPE & HDPE (packaging)	444,678	444.68	2.22%	
	5	Clear and Coloured Glass containers	369,209	369.21	1.84%	
	Total Top 5 Curbside (Single-Family Residential)			9,517,245	9,517.24	47.43%
	Total All Curbside (Single-Family Residential) Material			20,063,830	20,063.83	100.00%

Across almost all waste sample types, divertable organic waste (e.g. food waste, yard waste and paper tissue / towelling) represents the greatest opportunity for the CSWM to increase waste diversion. For C&D waste, the diversion of clean wood represents the largest opportunity.

The waste composition audit was conducted over a two-week period in the fall of 2017 and therefore represents conditions and characteristics of waste received at the facilities during that period of time (i.e. a “snapshot” in time). The composition of waste can change over time (e.g. seasonality).

In total, when considering combined tonnages for each material category, there is the potential to divert approximately 17,500 tonnes of organic materials per year from waste at CVWMC & CRWMC. Other divertible material (e.g., paper, packaging, metals, glass, hazardous products, electronics, drywall, clean wood) has the potential to divert approximately 13,100 tonnes per year.

2.1 WASTE DISPOSAL AND DIVERSION

Table 4 provides a summary of estimated waste disposal and waste diversion quantities. In 2016, the CSWM service area disposed of approximately 63,000 tonnes of waste and diverted from landfilling an estimated 56,000 tonnes of materials. Unless stated, the data comes from the CSWM Service based on scale data and estimates (from facilities where scales are absent).

Table 4 Disposal and Diversion Estimates (2016)

Activity	Tonnes (2016)
Disposal	
Municipal waste by contract ⁴	20,064
Industrial, commercial, and institutional (ICI) and household (self-haul)	30,327
Construction waste	10,518
Controlled waste/carcasses	252
Refuse from volunteer clean up	122
Mixed waste with recyclables (ICI/construction waste with metal or drywall)	351
Illegal dumping	0.3
Refuse from operation of the waste management centres	3
Tahsis Landfill (estimated)	708
Zeballos Landfill I (estimated)	582
Gold River Landfill (inert waste) (estimated)	463
Total landfill disposal	63,390
Diversion	
Municipal yard waste programs	1,493
Cut grass and raked leaves	426
Organics/food waste from Comox and Cumberland curbside collection pilot	2,575
Yard waste from curbside collection in Courtenay (estimated) ⁵	2,056
Yard waste from curbside collection in Campbell River (estimated) ⁴	1,580
Yard waste from Campbell River at free drop at the private facility (estimated) ⁴	2,522
Household hazardous waste (HHW) – not under Extended Producer Responsibility (EPR)	24

⁴ MSW collected by contract is from the City of Courtenay, Village of Cumberland, City of Campbell River, and Town of Comox (residential curbside pickup and partially ICI waste). The ICI sector pays municipal for a certain amount of MSW collection. If greater than allocated collection, ICI customers are charged individually to the company/hauler and coded under ICI.

⁵ Based on data provided by a member municipality.

Activity	Tonnes (2016)
Commercial Cardboard at the Waste Management Centres in Comox Valley and Campbell River	11
Commercial Packaging and Printed Paper (PPP) collected by private contractor (estimated ⁶)	24,532
Clean fill	3,926
Scrap Metal (including some non- chlorofluorocarbon (CFC) containing major appliances)	666
Drywall/gypsum waste	3,154
Clean wood waste	594
Cooking oil recovery (estimated)	1.2
HHW related (Non EPR) (including paints without labels, lids, adhesives, etc.)	4
Diversion from Extended Producer Responsibility Programs	
Recycle BC - PPP (residential)	4,368
Encorp Return-It - Beverage Containers	2,361
Canadian Electrical Stewardship Association (CESA) - Electronics Recycling	92
Electronic Products Recycling Association (EPRA) - Electronics Recycling	489
ReGeneration- Alarm Recycle	0.3
ReGeneration- Light Recycle	815
BC Used Oil Management -Used Oil, oil containers and anti-freeze	1,684
ReGeneration - Paint and HHW	1,219
Tire Stewardship BC	1,116
Major Appliances - only Refrigerators/CFCs (non-CFC products are captured as scrap metal)	676
Batteries - automobile batteries and household batteries	48
Total Diversion (all diversion activities listed above)	56,433
Total waste generation (disposal + diversion)	119,822
Diversion rate (diversion / waste generation)	47%
Total disposal per capita	0.570

The quantities of waste disposed via CSWM facilities are primarily based on scale data. However, there are currently three active private disposal facilities within the CSWM service area that receive various waste materials, such as wood waste and inert construction, demolition and land clearing waste. Current private disposal facilities within the service area include:

- Giese Holdings - a demolition and land clearing (DLC) waste landfill and open burn site near Campbell River.
- Upland Excavating - a DLC waste landfill and open burn site near Campbell River (with an updated permit under review by MoE).
- West Shore Aggregates - a DLC waste landfill located across the road from the entrance to the Campbell River Waste Management Centre.

⁶ In 2012, Regional District of Nanaimo reported 38,717 tonnes of PPP materials from all sectors (ICI and residential) based on data acquired through waste facility licencing requirements. This represents approximately 260 kg per capita. If this is applied to the CSWM population (2016 census data), this would equate to 28,911 tonnes. When the known quantities of PPP are deducted, i.e. residential PPP quantity (4,368 tonnes) and existing commercial cardboard collection (11 tonnes), the ICI sector is estimated to divert 24,532 tonnes PPP.

Data from these facilities is not reported to CSWM and is therefore missing from CSWM's reported waste disposal and diversion performance. Private facilities are not required to report to CSWM on quantities of waste disposed/diverted from landfill. However, they may be required to report on disposal quantities to the MoE, depending on type/age of permit.

The data presented in Table 4 is based on available information. However, not all recycling and diversion activities have available data.

The following is a list of some of the information sources for which diversion quantities listed in Table 4 are missing:

- Quantities of recyclables diverted by the ICI sector are estimated since these are managed through private contractors (e.g., Emterra, Sun Coast Waste Management, Progressive, Waste Management and B&D containers). Refer to the footnote of Table 4 for the assumptions used for estimates of recyclables from the ICI sector.
- Diverted materials sold at Free Stores operated by volunteers in the remote communities (e.g., Hornby Island, Cortes Island, Gold River, Tahsis and Sayward).
- Construction and demolition (C&D) wastes being diverted by private contractors, such as Pacific Wood Waste and Vancouver Island Enterprise, that are not included in CSWM's diversion quantities.
- Textile reuse by charity shops.
- Diversion of land clearing waste by private operators.
- Private metal recyclers.
- Backyard composting.

Based on the available disposal and diversion quantities, the CSWM achieved a diversion rate of 47% in 2016. This figure is lower than the estimated rate in 2011 (51%, as presented in the SWMP). The difference stems from now using a more accurate estimate of tonnages of PPP diverted by the ICI sector based on actual performance reported by the RDN prior to the implementation of the stewardship program for residential PPP. The CSWM Service had previously used more generic estimates to quantify the diverted PPP from the ICI sector.

2.2 WASTE DISPOSAL TRENDS IN THE CSWM SERVICE AREA

Figure 2 shows the waste disposal trends per person for the CSWM service area following the development of the SWMP. Since 2012 the per capita waste disposal rate has gone down from 666 kg/capita in 2012 to 570 kg/capita in 2016 when accounting for the same disposal activities each year. The decrease is likely due to increased organics diversion and the re-establishment of the clean wood waste and drywall diversion program.

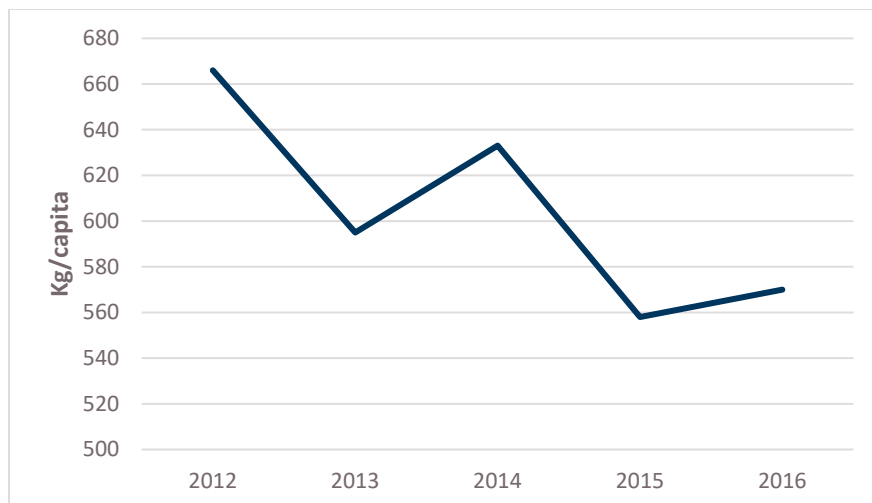


Figure 2 CSWM Disposal Rates 2012 - 2016⁷

2.3 COMPARISON OF WASTE DISPOSAL PERFORMANCE TO NEIGHBOURING REGIONS

The CSWM Service is an active participant in the Association of Vancouver Island and Coastal Communities (AVICC) special committee on solid waste services initiatives planning. Although not required as part of an effectiveness review, the CSWM has included Figure 3 to compare the 2015 disposal rate of the CSWM Service area (558 kg/capita in 2015) to those of other AVICC regional districts and the provincial average (497 kg/capita)⁸. The current provincial waste disposal goal, as expressed in MoE’s Service Plan, is a provincial average disposal rate of 350 kilograms per capita by 2020.

2015 disposal rates were provided to the MoE by regional districts using the municipal solid waste disposal calculator. In 2015 the CSWM had the second highest per capita disposal rate (558 kg/capita) of the eight regional districts that make up the AVICC.

There is still a lack of standardization in the reporting to the MoE. For example, to date, few regional districts fully capturing or tracking the management of construction and demotion (C&D) waste. These are often recycled and diverted by private operators, disposed of at private landfills or some may be exported out of a region. The report commissioned by the AVICC noted the lack of consistency in tracking of C&D waste across the region.

Figure 3 includes the current tipping fees (as of 2017). The tipping fees have not changed significantly from 2015, with one exception. The Alberni-Clayoquot RD (ACRD) had a tipping fee of \$95 per tonne in 2015. It is unclear how waste leakage between the regions impacts individual disposal rates. The CSWM may experience waste leakage in form of waste import from the adjacent regional districts of the Sunshine Coast (SCRD) and Cowichan Valley (CVRD), where the tipping fees are \$150 and \$140 per tonne respectively. These are higher than that of the CSWM (\$130 per tonne).

⁷ Ministry of Environment, 2017, Municipal Solid Waste Disposal in B.C. (1990-2015), available via URL: <http://www.env.gov.bc.ca/soe/indicators/sustainability/municipal-solid-waste.html>

⁸ Disposal rates reported on include waste from the residential sector, institutional, commercial, and light industrial sources as well as waste from construction, demolition and renovation activities. Disposal rates do not include hazardous, biomedical, or agricultural waste, motor vehicles or components, heavy industry, or contaminated soil. Waste that is reused or recycled is also not included.

Disposal rates are influenced by many factors, including population density, economic activity, tourist and transient population fluctuations, distance to recycling markets, the role of various stewardship agencies operating in an area and the capacity and infrastructure in place in a region. While not the only indicator worth considering, disposal rates may be used to assess system performance and set the stage for continuous improvement in waste management for a region.

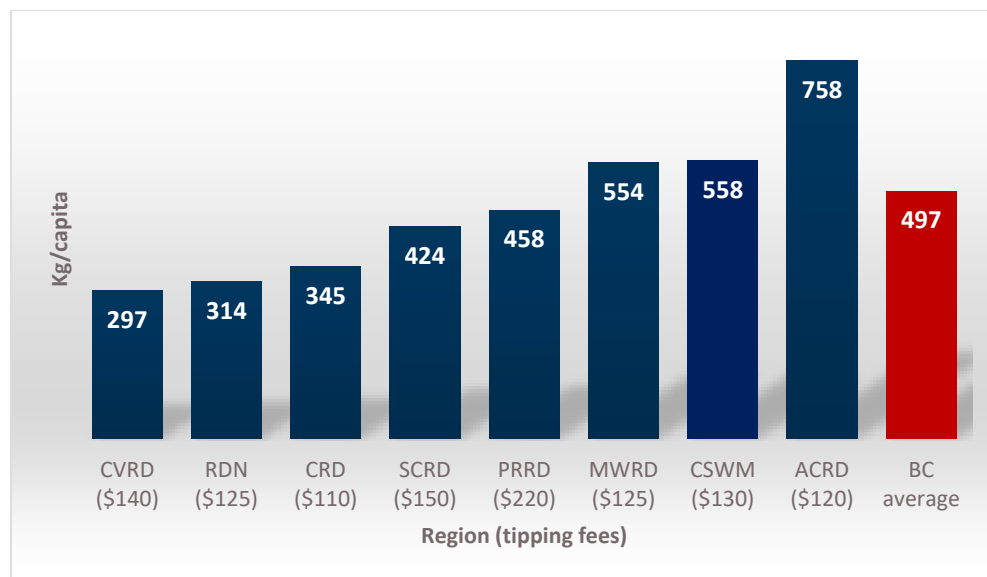


Figure 3 AVICC Disposal Rates 2015 with current tipping fees^{9,10}

3. GREENHOUSE GAS EMISSIONS RELATING TO SOLID WASTE MANAGEMENT

The SWMP did not include a specific reduction target for greenhouse gas (GHG) emissions, but listed the following plan objective: “Improvements to the solid waste management system will reduce GHG emissions from solid waste management activities”. The CVRD as a whole has made a commitment to be carbon neutral and the Comox Valley Sustainability Strategy spells out the following goal related to GHG emissions:

- *Goal 3.1: Reduce energy consumption and greenhouse gas emissions in municipal infrastructure*

Since the adoption of the SWMP, the CSWM has, in addition to indirect GHG emissions related to waste diversion activities (Section 4.1.), made significant improvements for the management of landfill gas, which results in ongoing GHG reductions (Section 4.2).

3.1 GHG EMISSION SAVINGS RELATING TO CSWM WASTE DIVERSION ACTIVITIES

The GHG emissions and reductions that relate to CSWM’s waste diversion activities were calculated using Environment Canada’s GHG calculator for waste management. The calculator was published in 2013 to help municipalities and other users estimate GHG emission reductions from different waste management practices, including recycling, composting, and landfilling.

⁹ Ministry of Environment, 2017, Municipal Solid Waste Disposal in B.C. (1990-2015), available via URL: <http://www.env.gov.bc.ca/soe/indicators/sustainability/municipal-solid-waste.html>

¹⁰ In the figure, CVRD stands for Cowichan Valley Regional District

Based on the CSWM’s waste diversion activities in 2016 (refer to Table 4), the avoided GHG emission are approximately 125,000 tonnes CO₂e as shown below in Table 5.

Table 5 Avoided GHG Emissions (2016) Based on Waste Diversion Activities

Waste Diversion Activity	Total Tonnes eCO ₂
Cardboard	-39
Other Paper ¹¹	-115,491
Food Scraps	-2,653
Yard Trimmings	-550
White Goods	-1,112
Computers ¹²	-1,055
Microwaves ¹³	-118
Tires	-3,676
Total Diversion	-124,693

3.2 GHG EMISSIONS RELATING TO CSWM LANDFILLS

A landfill gas (LFG) collection system became operational at the CVWMC in 2016. The LFG collection and flaring that took place from March 11 to December 31, 2016, resulted in the GHG emissions equivalent to 20,151 tonnes eCO₂, as reported by GHD in 2016 CSWM’s Operations and Monitoring Report.

The total annual quantity of LFG collected in 2016 was 103,233,909 standard cubic feet (scf) (2,890,549 m³). GHD estimated the total methane destructed in 2016 was 42,459,634 scf (1,188,870 m³). This is estimated to reduce GHG emissions by 8,288 tonnes eCO₂, resulting in total GHG emission from CSWM’s landfill gas collection and flaring of 11,863 tonnes eCO₂. As this was the first year of operation of the LFG management system, data is not available to complete a year-on-year trend analysis.

As part of the next SWMP update, the CSWM may want to consider setting a specific target for GHG emissions from landfill operations. The next SWMP can include a target such as, “The CSWM to reduce GHG emissions from the landfill and landfill operations by 10 % by 2020”. The CSWM has the option to utilize LFG to heat the leachate treatment facility at the CVWMC and replace the use of fossil fuel (propane). Therefore, this facility could further reduce the CSWM’s GHG emissions.

4. SOLID WASTE MANAGEMENT PLAN IMPLEMENTATION STATUS

Table 6, Table 7 and Table 10 outline all of the initiatives in CSWM’s 2013 Solid Waste Management Plan and the implementation status of each initiative. Further explanation is provided below each of the tables.

As shown in these tables, most of the initiatives outlined in the Plan are either in progress or have been implemented.

¹¹ No breakdown of packaging and printed paper was available and the material category Other Paper was assumed.

¹² All quantities of EPR products reported by EPRA were assumed to be computers.

¹³ All quantities of EPR products reported by CESA were assumed to be computers.

Table 6 Implementation Status of Initiatives Regarding General Policies, Reduction and Reuse Outlined in the 2012 SWMP.

Plan Component/ Initiative	Implementation Status	Comments
General Policies		
3 Stream Waste Management	Completed	Continued improvement of management of the three streams; recyclables, organics and residual waste.
Disposal Bans on Recyclable and EPR Wastes	Completed	Recyclable materials, including EPR program materials are noted in the CVRD Bylaw 170 Schedule B “prohibited waste”. If prohibited waste is noted, the load is charged with a higher tipping fee.
Financial Incentives To Encourage Source Separation	Completed	Bylaw 170 establishes a scale of charges for the disposal of all waste originating within the boundaries of the CSWM service area, which is accepted at the Comox Valley and Campbell River waste management centres. Municipal solid waste (MSW) deposited in the landfill is charged at a higher rate than source separated recyclable materials such as clean wood waste and yard waste.
Long-Range Planning for Waste Management Infrastructure	Completed	Apart from developing the CSWM and conducting a five year effectiveness review of this plan, the CSWM has also completed the CVWMC Masterplan.
Reduction and Reuse		
On-Line Recycling/Reuse Directory	Completed	A list of local non-profit organizations that divert household waste from landfills are listed on the CSWM website.
Reduction and Reuse Promotional Campaign	In Progress	The CSWM Service provides the “Power of R” local educational program that focuses on waste reduction initiatives such as the compost education centre in Campbell River.
Encourage Professional Salvage	Initiative Cancelled	See note below.

Encourage Professional Salvage through Reuse / Free Stores

There are currently five free stores in operation within the CSWM service area, all of which are operating in rural locations by non-profit organizations. There are no facilities in place at the Comox Valley Waste Management Centre (CVWMC) or the Campbell River Waste Management Centre (CRWMC). In 2015, the CSWM investigated the implementation of share sheds at these locations, similar to the facility in place at the Hartland Landfill in the Capital Regional District (CRD).

The CRD’s Hartland Landfill does not have a conventional share shed or free store operating on site. They do however have a salvage area at the landfill that accepts some small reusable items in good working order (such as clothing and textiles), which are then made available to non-profit or charitable organizations for reuse or resale. The salvage area is manned by an on-site attendant, open during landfill operating hours, and items accepted are based on attendant discretion. The non-profit organizations are responsible for collecting the items on a regular basis.

The CSWM investigation found that if free stores or share sheds were to be implemented at the CVWMC, there are a number of other factors that must be considered, including but not limited to: impact on local thrift shops and non-profit organizations that offer similar services, staffing options, required infrastructure and associated footprint, liability issues, illegal dumping, health and safety concerns and overall cost. The projected capital and operational costs, liability concerns and operational and logistical requirements present a significant demand in regards to finances, legal concerns and man hours. The initiative was not recommended to be pursued further.

Table 7 Implementation Status of Initiatives Regarding Recycling Outlined in the 2012 SWMP

Plan Component/ Initiative	Implementation Status	Comments
Residential Recycling		
Maintain Current Curbside Services	Completed	In each community that receives curbside garbage, recycling and yard waste collection through their local government, this service has been maintained through local bylaws since the adoption of the SWMP 2012.
Food Waste Collection	In Progress	See notes below.
Mandatory Multi-Family Recycling	In Progress	Multi-family buildings are not yet made to implement a recycling collection service. The City of Courtenay has a recycling collection for multi-family residents and the City of Campbell River is looking at implementation in January 2018. Courtenay and Campbell River are part of the Recycle BC multifamily recycling program. Campbell River has a bylaw that came into effect in 2016 mandating multifamily buildings to have recycling. The 2017 waste composition study showed that multi-family residents (and small ICI) still dispose of waste with approximately 38% divertible materials. The need for mandatory recycling can be reevaluated.
Recycling Depots	Completed	See notes below.
Recycling at Waste Management Centres	In Progress	The CSWM Service has completed a number of reviews to continually assess that the servicing levels at the recycling centres meet the needs of the local community.
ICI Recycling		
Variable Tipping Fees	Completed	Tipping fees have been adjusted eight times since the 2012 in order divert waste from landfill disposal.



Plan Component/ Initiative	Implementation Status	Comments
Recycling by the ICI Sector	In Progress	The SWMP 2012 states that each local government will determine the most effective approach to recycling by the ICI sector based upon the local government’s current waste management protocols. The City of Courtenay requires the allocation for waste diversion space in the building permit application for ICI new development. The CSWM should continue policing and enforcement of material disposal bans to support waste diversion by the ICI sector. The CSWM may want to implement mandatory recycling for all multi-family and ICI buildings. The waste composition study results (AET, 2017) showed that landfilled waste can comprise approximately 38% of divertible materials. Initially the CSWM can simply provide more education on available resources, such as Recycle Council of BC Recycle Hotline, the CSWM website, etc. The CSWM may want to facilitate waste audits to educate businesses/organizations on what is left in their waste streams, however this can come at a relatively high cost.
ICI Technical Assistance Program	In Progress	To support waste reduction and source-separation of recyclables by the ICI sector, the CSWM has provided a Web-based recycling directory since 2012, and the waste educators have participated in presentations and discussions at community events since 2009.
Local Government Leadership	In Progress	The CSWM is committed to becoming carbon neutral and waste minimization is an important part of this goal. At the CVRD office “zero waste” initiatives includes numerous recycling options for staff. “Zero waste” requirements have not been included in the Regional District contracts. Procurement policy can ensure that waste disposal aspects are considered in purchasing decisions.
Mandatory Space Allocation for Recycling at ICI Facilities	Not Started	The CSWM has not developed a model bylaw for physical space allocation for consideration across the service area. However, the CVRD’s rural Official Community Plan (Bylaw No. 337) include provisions to ensure adequate access to recycling areas by users and service providers. The City of Courtenay requires the inclusion of diversion space allowance in the building permit application for ICI new development.
Organic Waste Diversion		
Develop Composting Capacity	In Progress	See notes below.
Yard Waste Collection	Completed	See notes below.

Plan Component/ Initiative	Implementation Status	Comments
Backyard Composting	Completed	The CSWM service operates the compost education centre located in Campbell River, where education and promotion is provided for backyard composting. The CSWM may want to expand the education program to cover the CVWMC. The North Shore Recycling Program in North Vancouver has presented study results which indicates that backyard composting is undervalued and can be an important tool in terms of source reduction for organic waste. The multi-year study showed that approximately 0.36 tonnes of organic waste would be composted per household every year. The study concludes that the first step is to provide support, such as personal coaching, to those households wishing to further reduce their waste through backyard composting ¹⁴ .
Household Hazardous Waste and EPR		
HHW and EPR	In Progress	See notes below.
Construction & Demolition Waste Management		
CD Project Permitting	In Progress	The CSWM service has not implemented any specific policy tools to encourage diversion of C&D waste. However the selected wood waste products are now being diverted for energy recovery at the Comox Valley and Campbell River Waste Management Centres. The City of Courtenay encourages the uptake of green building standards that will reduce the amount of waste generated during construction and through the life of the building. This effectiveness review will assess options for a reporting methodology for quantities of materials managed by business that are recycling and managing C&D wastes.
C&D Waste Recycling Services	Not started	At this stage, the CSWM service has not implemented any initiatives to encourage the private and non-profit sectors to develop C&D waste recycling services locally.
Promotion and Education		
Promotion and Education	In Progress	Focus has been on developing standardized communications with member municipalities related to new programs. There has been coordination with Cumberland and Comox for the organic composting pilot project. Future coordination with Courtenay, Comox, Cumberland and Campbell River is planned for the development of a regional organic compost facility. The six non-Recycle BC recycling depots are coordinated by the CSWM.

¹⁴ <https://www.biocycle.net/2011/10/19/value-and-benefits-of-backyard-composting/>

Plan Component/ Initiative	Implementation Status	Comments
Bear Human Conflict Management		
Bear Human Conflict Management	Completed	See notes below.
Illegal Dumping Prevention Plan and Bylaw		
Illegal Dumping Prevention Plan and Bylaw	In Progress	See notes below.

Organics Waste Diversion

Collection programs for organics exist across the Region in four main service areas. Table 8 shows the current organics curbside collection methods in these areas.

Table 8 Current Residential Organics Curbside Collection Programs

Service Area	Yard waste collection	Co-mingled food waste and yard waste collection (all year)
Campbell River	Yes (seasonal)	No
Comox	No	Yes
Cumberland	No	Yes
Courtenay	Yes	No

Yard waste is collected at the curb by the City of Campbell River (limited to four months per year) and the City of Courtenay then directed to a private facility for processing. In 2013, a weekly co-mingled food and yard waste collection commenced in the Town of Comox and Village of Cumberland, by their respective municipalities. Apart from the residential curbside collection for organics, yard waste is also collected at the Campbell River and Comox Valley Waste Management Centres. The City of Campbell River also offers a separate free yard waste drop off year round at a drop-off centre.

There is an organics composting pilot facility currently in operation at the CVWMC that processes residential food and yard waste for the Town of Comox and the Village of Cumberland. The composting pilot facility is not available to other municipalities or residents of the CSWM service area. The CSWM recently received grant funding to design and build a regional organics processing facility. In 2017, the CSWM hired an engineering firm for the provision of engineering services during the planning, development and procurement of the CSWM regional organics composting facility and transfer station. The project involves designing and building a regional organics composting facility and designing and constructing an organics transfer station. The project is scheduled to be completed by 2020.

Recycling Depots

There are recycling depots that are approved to accept Recycle BC materials (PPP). These are operated either by CSWM, by local communities or through contracts managed by the CSWM.

The region also has non-Recycle BC depots, where depots cannot accept Recycle BC approved materials such as glass and plastic foam packaging (i.e. Styrofoam). These depot locations are operated by the CSWM service.

Table 9 lists the recycling depots, both Recycle BC-approved and non-Recycle BC depots, within the CSWM service area.

Table 9 List of Recycling Depots within the CSWM Service Area

Recycle BC Approved Depots	Address
CVWMC	2400 Pidgeon Lake Road, Cumberland
CRWMC	6200 Argonaut Road, Campbell River
Courtenay Return-It Depot	493 Puntledge Road, Courtenay (not operated by CSWM service)
Island Return-It	1580-F Willow Street, Campbell River (not operated by CSWM service)
Hornby Island	3600 Central Road
Denman Island	5901 Denman Road
Cortes Island	1300 Squirrel Cove Road
Gold River	100 Hilke Road
Sayward	652 H'Kusam Way
Tahsis	1015 North Maquinna Drive
Zeballos	752 Nootka Place
Non-Recycle BC Depots	Address
Old fire hall in Black Creek	2185 Regent Road, Black Creek
Canex Recycling Depot	1635 Military Row, Comox
Courtenay Country Market	5352 North Island Highway, Courtenay
Quadra Island	658 Harper Road
Sportsplex	1800 Alder Street, Campbell River
Strathcona Gardens recreation complex	225 South Dogwood Street, Campbell River

Household Hazardous Waste and EPR

The CSWM currently manages HHW by providing:

- Permanent HHW depots at Campbell River and Comox Valley Waste Management Centres.
- Special waste recycling depots in communities of the Cortes Island, Village of Gold River, and Hornby Island. These transfer stations accepts residential paint, pesticides, solvents and fertilizers covered under EPR.
- HHW collection in the remote communities of the service area (e.g., Denman Island, Gold River, Hornby Island, Quadra Island, Sayward Valley, Tahsis and Zeballos).

Residents of Denman Island, Quadra Island, and the Sayward Valley are able to drop off the HHW at either the CRWMC or CVWMC facilities. The CSWM service is reviewing the option of having a HHW depot in the communities of Tahsis and Zeballos for certain HHW materials.

In regards to all EPR programs, the CSWM has improved promotion and increased availability of information for product stewardship programs to residents via website, through the waste reduction educator and via community events.

Wildlife Conflict Management

Since the adoption of the Plan, the CSWM has continued many initiatives to minimize conflicts between wildlife and humans and in some cases implemented new initiatives. The following is a list of initiatives:

- The CSWM has continued to work with local Bear Aware groups and the Province to establish an ongoing awareness and education opportunities for waste generators that addresses “bear awareness” and have specific information for residents who have backyard composters.
- Apart from Gold River Landfill, all CSWM landfill sites have electric fences.
- Member municipalities have implemented bylaw requirements including enforced set-out times for curbside collection to minimize wildlife access opportunities. Cumberland is often enforcing its bylaw and providing education to address the issue.
- A bird control program is used at CVWMC and CRWMC from September to March. In order to improve bird management at the landfill working face at the CVWMC and the CRWMC, the CSWM undertook a study in 2012 that included quantitative and qualitative analysis of birds that contact waste at the landfill on adjacent lands and waters. The study helped to inform bird control measures. Currently, bird control techniques are employed, including the use of birds of prey, at both Waste Management Centres from September to March. In the summer months birds are less of an issue at these locations.

Illegal Dumping

The following initiatives have been undertaken by the CSWM Service to address illegal dumping in the region:

- The CSWM Service has recently hired a coordinator to oversee an illegal dumping program (public education, website). The program was launched in May 2017.
- Tipping fees at CSWM disposal facilities are waived for organizations cleaning up illegal dumping sites or conducting community clean-ups.
- Member municipalities are encouraged to provide yard waste collection programs through depots or curbside collection. Yard waste is frequently disposed of on back roads and is believed to lead to the dumping of other waste materials over time.
- A Waste Reduction Educator provides education to the community on available disposal options and to encourage reporting of illegal dumping activities.
- In accordance with Bylaw 170 users of the Waste Management Centres are required to cover their loads in order to prevent litter along transportation routes. The surcharge of \$20 for an unsecured load is rarely applied (only 3 times in the past 5 years). Stricter enforcement may help to reduce littering and illegal dumping.

Table 10 Implementation Status of Residual Waste Management Initiatives Outlined in the 2012 SWMP.

Plan Component/Initiative	Implementation Status	Comments
Residual Waste Management		
CVWMC - Landfill expansion (Lined Cell 1)	Completed	See notes below.
CVWMC - Closure of filled area	Completed	Approximately 70% of the existing landfill has been closed and capped. The landfill surface has been fully closed with a series of layers to stop rainwater



Plan Component/Initiative	Implementation Status	Comments
		infiltrating the landfill and generating leachate. A landfill gas collection system has been installed. The remaining active area is scheduled to be closed in 2018/2019.
CRWMC - Closure of filled area	In Progress	Final landscaping has been done with a partial closure of the outer slopes as part of the Phase 1 closure (currently approximately 5-10% of landfill is closed). A design, operations and closure plan was completed in 2017. The initiative also included building a mechanically stabilized earth wall to increase landfill capacity, which was completed in 2014. The closure of the landfill is anticipated in 2024, pending MoE approval.
Tahsis WMC - Closure of filled area	In Progress	Phase 1 of the closure was completed in 2014. The work included regrading slopes, installation of electric fencing, drainage ponds and improved ditching. The Tahsis Landfill has another 10 years to operate based on MoE approval. The landfill design and operational plan for the facility was completed as required by MoE. The CSWM Service will continue to use this landfill. Closure plan to be updated.
Zeballos WMC - Closure of filled area	In Progress	Closure work including regrading slopes, installation of electric fencing, drainage ponds and improved ditching, was completed in 2014. The Zeballos Landfill has another 10 years to operate based on MoE approval. The landfill design and operational plan for the facility was completed as required by MoE. The CSWM Service to continue to use this landfill. Closure plan to be updated.
Tahsis WMC and Zeballos WMC – Transfer station	Initiative Deferred	Deferred due to continued use of Tahsis and Zaballos landfills. Upon full closure, each of these landfill sites will be replaced with a transfer station.
Gold River WMC - Closure of filled area	Initiative Deferred	The Gold River Landfill is still in operation for disposal of inert waste. Residual waste is delivered to the CRWMC. The closure of the landfill will be reviewed when the Tahsis and Zeballos Landfills are closed.
Regional Transfer Stations	In Progress	After closure of the unlined landfills located in Campbell River, Tahsis and

Plan Component/Initiative	Implementation Status	Comments
		Zeballos, residual waste will be delivered to the CVWMC and the construction of transfer stations at the closed landfill facilities are either in progress or completed. Improvements have been made to Waste Management Centres in Cortes Island, Hornby Island, Campbell River and CVWMC.
Waste to Energy (WTE)	In Progress	An assessment of resource recovery options, including WTE and other emerging technologies, is being conducted in parallel with this effectiveness review. Refer to section 10.1 for more information.
Closure of Cortes Island and Sayward Landfills	In Progress	The CSWM completed a desktop review (Qualitative Environmental Risk Evaluation) in 2016 for both landfills. Additional cover material will be added to sections of the Cortes Landfill that are not meeting final cover requirements. Application to abandon the inactive Cortes Landfill will be submitted in 2018. The Sayward Landfill is now closed and letter received from MoE.
Administrative Revisions for Public Landfills	In Progress	All of the CSWM landfills are now in the name of the CVRD. The only outstanding administrative issues to resolve include the boundary expansion at the Zeballos Landfill and the CRWMC boundary expansion. Finalization is expected in 2018.

Comox Valley WMC - Landfill Expansion (Lined Cell 1)

The Comox Valley Waste Management Centre is transitioning from an unlined landfill with limited environmental controls to an engineered site with a double-lined cell and landfill gas and leachate management systems. The landfill expansion of Cell 1 was completed in 2017, and the leachate management system will be completed by February 2017.

Outstanding Initiatives

There are only two initiatives on which the CSWM Service has not progressed.

The CSWM has not developed a model bylaw to ensure adequate access to recycling areas by users and service providers. The CSWM may want to review the model bylaw that has been developed by Metro Vancouver. The model bylaw is aimed at allowing sufficient physical space for recycling and organics collection and for service vehicle access to recycling and garbage amenities in multi-family and commercial developments. This is an initiative that may require coordination with the planning and building departments within the CVRD and the rest of member municipalities. It may be worthwhile to review the existing requirements already established within the CSWM Service Area. The CVRD has

included provisions to ensure adequate access to recycling areas by users and service providers in its rural Official Community Plan. The City of Courtenay includes the requirement on diversion space allowance in the building permit application for new ICI developments.

At this stage, the CSWM service has not implemented any initiatives to specifically encourage the private and non-profit sectors to develop C&D waste recycling services locally. There are already private facilities in place for C&D recycling and disposal. However, the CSWM recognizes that limited data is available on these diversion activities. The effectiveness review involves a review of options on the reporting methodology for commercial recyclers in the recycling and C&D sector (Section 10.4). The findings may also inform how the CSWM Service can best encourage the private and non-profit sectors to develop C&D waste recycling services locally. The waste composition study conducted in 2017 showed that approximately 6% of landfilled C&D waste is divertable with the top three divertable materials being clean wood, steel and yard waste.

5. SUMMARY OF COMPLIANCE ACTIVITIES COMPLETED

The 2012 SWMP was developed to create an efficient and effective residual waste management system that is fully compliant with MoE requirements and industry best management practices. To meet this goal the Plan recommended that existing non-compliant sites be closed and replaced with transfer stations with the exception of the CVWMC where a new regional engineered sanitary landfill would be constructed adjacent to the existing site.

Table 11 lists the compliance activities undertaken over the past five years by the CSWM Service. No major spills (> 20 Litres) have been reported since 2014. No spills or wildlife incidences (bears or cougars) have occurred over the last five years. All monitoring data was reported by GHD in 2016.

From September to April, birds on site (e.g., gulls) are controlled at the CVWMC with raptors.

Table 11 Compliance Activities Undertaken by the CSWM Service

Site	Compliance Activity Undertaken	Comments on Compliance Status
Campbell River Waste Management Centre	Quarterly monitoring of groundwater and surface water quality Airspace consumption (waste disposal) and remaining airspace annual assessment	Groundwater quality at the site in 2016 is similar to 2015 results, continuing a stable trend which began in approximately 2005. Leachate indicator parameter concentrations observed at both surface water sampling locations were generally low indicating no leachate impacts are present in surface water near the site.
Gold River Waste Management Centre	Bi-annual monitoring of ground and surface water quality	Dissolved manganese concentrations were elevated above the applicable standards at cross-gradient wells during fall 2016 monitoring event. Monitoring wells downgradient had concentrations of manganese below the applicable standards. Therefore the exceedance was reported to not indicate a significant effect on site groundwater quality.

Site	Compliance Activity Undertaken	Comments on Compliance Status
		Cadmium exceedances measured in 2014 at one groundwater monitoring well and two surface water locations were not repeated in either 2015 or 2016.
Comox Valley Waste Management Centre	Quarterly monitoring of groundwater and surface water quality	Leachate indicator parameters were observed at downgradient and landfill area wells. However, groundwater concentrations for leachate indicator parameters elevated above applicable groundwater standards were identified during 2016 at wells located upgradient, crossgradient, and downgradient of the landfill. Downgradient of the standards are likely due to leachate impacts and/or natural background conditions.-
Tahsis Waste Management Centre	Bi-annual groundwater quality monitoring	No monitoring or reporting requirements are specified in MoE authorization permit for site. All parameters analyzed in 2016 at all sampled groundwater monitoring wells were below applicable standards.
Zeballos Waste Management Centre	Bi-annual groundwater and surface water quality monitoring	No monitoring or reporting requirements are specified in MoE authorization permit for site. Based on monitoring results from 2016, the landfill is having minimal impacts on the surrounding groundwater and surface water receiving environment.

6. ECONOMIC DEVELOPMENT AND REGIONAL GROWTH STRATEGY CHANGES IMPACTING PLAN IMPLEMENTATION

Agriculture, tourism and forestry are the cornerstones of the local economy. There have been no significant changes to economic development over the past five years that have influenced the plan implementation. The CSWM service area has seen significant population growth since the adoption of the Plan and projections (Section 2.1) show continued growth.

Currently Upland Excavating Ltd (Upland) operates a disposal facility, named Upland Landfill, for demolition, land clearing and construction materials near Campbell River. In May 2016, they completed a technical assessment report and waste discharge application to obtain an operational certificate to replace the existing permit. This was completed in response to the CSWM's SWMP 2012, which states:

The private DLC waste disposal facilities are expected to satisfy the same standards as publicly owned facilities in the CSWM. It is expected that each private DLC waste disposal facility will prepare a proposed action plan and schedule to upgrade the facility to satisfy MOE standards or to phase-out and close the facility, and that the MOE will replace / update / amend the existing authorizations with updated permits or operational certificates that reflect the action plans and requirements.

The Upland Landfill will be updated to meet the MoE Landfill Criteria and upgrades will include the design and construction of a lined landfill and leachate treatment system. The Upland Landfill will only accept C&D waste, land clearing debris, and non-hazardous contaminated soil from the ICI sector.

As part of undertaking this five-year effectiveness review, the potential impact of a privately run disposal facility on the CSWM service and plan implementation is being assessed (see Section 10.2) together with options for reporting requirements for C&D diversion from CSWM landfills (see Section 10.4).

7. FIRST NATIONS LINKAGES TO PLAN IMPLEMENTATION

In the SWMP 2012, the CSWM identified the need to liaise with local First Nations communities on an ongoing basis.

The waste management requirements of First Nations communities throughout the CSWM service area are currently believed to be adequately met. No current service agreements are in place with the CSWM for collection and disposal. The CSWM must continue to ensure that consultation with local First Nations communities takes place.

8. SOLID WASTE PROGRAM FINANCIALS

Table 12 shows a comparison between CSWM's budgeted expenditures for the period between 2012 to 2022 for each SWMP initiative, actual capital expenditures to date (2012 to 2016), and the revised estimated capital expenditures to complete, which include actuals to date and revised budgets. The Board approved the revised budgets as part of the 2017- 2021 Financial Plan at the March 9, 2017, CSWM board meeting.

Table 12 Capital expenditures as per SWMP, actuals to date and revised costs to complete.

Plan Component	Budgeted Capital Expenditures as per SWMP (2012 – 2022)	Actual Expenditures (2012 -2016)	Total Estimated Capital Expenditure (Actuals and Estimates to Complete)	Comments and Explanation of Differences
Residential Recycling – Food waste collection containers	\$962,000	\$0	\$0	Scope of the work items has changed from what was planned initially.
Organic Waste Diversion – Develop Composting Capacity	\$500,000	\$162,434	\$8,742,434	\$5,321,190 of the total will be funded through the New Building Canada Fund Grant - Small Communities Fund.
Residual Waste Management				
CVWMC - Closure of filled area	\$4,344,000	\$7,161,651	\$9,886,534	Reduction in size of one of the infiltration ponds, the amount of waste relocated, and changes to satisfy the BC Gas Safety authority.
CVWMC - Landfill Expansion - Lined Cell 1 and Leachate Treatment Facility	\$10,274,000	\$6,713,467	\$17,123,071	Regulatory changes requiring landfill design and operational changes. Class C construction estimates increased costs.
CRWMC - Closure of filled area	\$9,526,000	\$5,312,835	\$13,104,191	Size change in landfill closure areas from original estimates
CRWMC – Transfer Station	\$1,500,000	\$1,331,947	\$1,331,947	
Tahsis Waste Management Centre - Closure of filled area	\$633,000	\$487,946	\$1,308,000	Regulatory changes requiring landfill design and operational changes.
Zeballos Waste Management Centre - Closure of filled area	\$641,000	\$359,258	\$933,000	Regulatory changes requiring landfill design and operational changes.
Gold River Waste Management Centre - Closure of filled area	\$650,666	\$125,816	\$1,751,000	Regulatory changes requiring landfill design and operational changes.
Regional Transfer Stations	\$450,000	\$128,937	\$2,042,731	Gold River TS Upgrade \$688,859; Tahsis Transfer Station \$676,936; Zeballos Transfer Station \$676,936;
Closure of Cortes and Sayward Landfills	\$200,000	\$-	\$90,000	
Total	\$29,680,666	\$21,784,291	\$56,312,908	

The 2012 SWMP provided estimated capital expenditures of approximately \$30 million over the full Plan period until 2022. Roughly \$22 million was spent between 2012 and 2016 on capital projects identified in the SWMP. The total budget for each plan initiative has been revised based on actual costs and on more accurate cost estimating completed in 2015. Capital expenditures for Plan components are now estimated to \$56 million with some initiatives implemented by 2027.

Capital costs relating to the closure of CSWM landfills have increased from those identified in the Plan due to regulatory changes necessitating changes to specific aspects of the landfill design and operation, as well as inherently low estimates included in the 2012 SWMP.

In addition to the Plan Components outlined in the SWMP 2012, the CSWM has set the following strategic priority items in the 2017-2021 financial plan:

- Comox Valley Waste Management Centre (CVWMC) leachate treatment system – construction and commissioning.
- Campbell River Waste Management Centre (CRWMC) landfill fill design operation and closure plan and landfill gas (LFG) implementation plan.
- Association of Vancouver Island and Coastal Communities (AVICC) special committee on solid waste services initiative planning.
- LFG utilization end-use technology review.
- Application to the MoE to formally close Cortes Island and Sayward non-compliant landfills.
- Complete the five-year effectiveness review of the SWMP 2012.
- Develop and finalize operational agreement for Village of Tahsis.
- Develop and finalize operational agreement for Village of Zeballos.
- Waste composition studies at CRWMC and CVWMC as per the SWMP.

Funding

The CSWM Service developed a solid waste financial model to assess whether the expenditures and funding program contained in the SWMP 2012, which was largely based on tipping fees and reserves, would be sustainable over the long term to implement the Plan initiatives.

The financial model demonstrated that the waste management system was underfunded and additional revenue sources would be required. As a result, the CSWM Service has increased tipping fees and introduced a new tax across the region.

The funding of CSWM services is primarily through tipping fees, in accordance with the SWMP. Funding from taxation, which was not identified in the SWMP, is currently forecast at \$4 million for 2018, with an increase to \$6 million in future years, at which time the tax level will be maintained for the remainder of the five-year (2017-2021) Financial Plan.

9. EVALUATION OF STRENGTHS AND OPPORTUNITIES FOR IMPROVEMENT

9.1 ASSESSMENT OF WASTE TO ENERGY AND EMERGING TECHNOLOGIES

The CSWM is currently completing an assessment of Waste-to-Energy (WTE) technologies and the viability for implementation within the CVRD and SRD. The assessment is planned to be completed by May 2018.

A detailed evaluation of technology types was undertaken and two suitable types were identified. Both involve converting the waste into a fuel on the facility site, and then shipping the waste-derived fuel to a third party for combustion. The first technology type provides a combination of anaerobic digestion and refuse derived fuel (RDF), while the second provides a combination of pyrolysis and RDF. Three locations were considered for the potential facility: Comox Valley, Campbell River and Gold River.

This analysis is currently underway, and the study report will be presented to the CSWM Board in April 2018.

WTE is an allowable activity under the Environmental Management Act. All local governments that plan to direct a portion of their municipal solid waste (MSW) to a WTE facility must seek an amendment to their SWMP to reflect this intention. The CSWM has already identified the intention to review WTE as a part of the solid waste management system; however, if the CSWM deems WTE feasible to implement, this must also be reflected in the SWMP.

9.2 POTENTIAL IMPACT OF A NEW PRIVATE LANDFILL

Currently, Upland operates a disposal facility for demolition, land clearing and construction materials near Campbell River. In May 2016, Upland completed a technical assessment report and a waste discharge application in order to obtain an operational certificate to replace the existing permit. This was to meet a requirement set by the CSWM's SWMP 2012 and applies to all privately owned disposal facilities in the CSWM service area. The Upland Landfill will be updated to meet the MOE Landfill Criteria and upgrades will include the design and construction of a lined landfill and leachate treatment system. The landfill will be operated for the discharge of MSW as defined by the *Environmental Management Act*, Part 3, Section 23.

In accordance with the Design, Operations, and Closure Plan for Upland Landfill (GHD, 2017), the facility will be authorized for the disposal of the following waste:

- Construction and demolition waste, excluding clean wood and other separated recyclables
- Land-clearing debris
- Non-hazardous contaminated soil, as defined by the Hazardous Waste Regulation (HWR)
- Waste asbestos-containing materials (ACM), managed according to Section 40 of the HWR
- Burn ash (from previous operations) and future burn operations, if authorized

The waste not authorized to be accepted at the Site and discharged into the landfill is:

- Hazardous waste according to HWR, except waste asbestos
- Domestic Solid Waste
- Sludge and Liquid Waste
- Controlled Wastes as defined by the Landfill Criteria
- Gypsum drywall, unless containing asbestos
- Organic waste

In accordance with the technical assessment report (GHD, 2016), the landfill would receive an average of 32,890 tonnes, or 25,300 cubic metres of waste per year. The landfill is designed with a capacity of approximately 506,000 cubic metres to be consumed over a landfill life of 20 years.

Table 13 identifies the potential impact of this privately run disposal facility on the CSWM service and Plan implementation.

Table 13 Potential Impact on the CSWM Service and Plan Implementation

Impact	Comments	Mitigation Measure
May take the pressure off of the existing residual waste management system and increase the life of the CVWMC Landfill	Can impact CSWM’s long term financial planning of solid waste management facilities in the service area, however the impact is assumed to be minor since the Upland Landfill will only accept C&D waste, land clearing debris, and non-hazardous contaminated soil from the ICI sector.	None required.
Financially undercut the CSWM service	Impact depends on service offerings and tipping fees. The GHD report simply states that the tipping fees will be developed to ensure the commercial success of the proposed operations.	Impact and potential mitigation measures should be reviewed further. The CSWM’s financial model could be used to assess the impact from potentially reduced waste quantities from the ICI sector. Mitigation could involve changing the tipping fee structure to compete.

The current SWMP only identifies four active private disposal facilities that receive wood waste and/or inert construction, demolition and land clearing waste. In reality, this number is probably larger. When the SWMP is due to be updated, there is a need to expand the list to include all operational/permitted landfills in the CSWM service area. These facilities can be listed in a Schedule, which can be updated if minor amendments are needed. If a facility is not listed in the current SWMP and the owners want to start accepting waste materials that are included in CSWM’s SWMP, a major amendment to the SWMP is required. This applies to any facility that is opening or implementing changes to status of a site or facility.

9.3 HAZARDOUS WASTE MANAGEMENT

Waste that is classified or defined as hazardous waste must be managed according to the rules and standards set out by the *Environmental Management Act* and the *Hazardous Waste Regulation*¹⁵. Wastes may be hazardous for many different reasons:

- They are corrosive, ignitable, infectious, reactive and toxic ("acute" hazard characteristics).
- They have the potential to harm human health or the environment in a subtle manner over long periods of time ("chronic" hazards).
- They may range from paints, oils and solvents to acids, heavy-metal-containing sludges and pesticides.

¹⁵ <http://www2.gov.bc.ca/gov/content/environment/waste-management/hazardous-waste>



Disposal Options for Asbestos (Residential and Commercial Sources)

As of October 1, 2017, asbestos and asbestos-containing materials (ACM) from residential and commercial customers are accepted for disposal at the CRWMC. Restrictions will be a 10-bag limit for private residents and disposal by appointment only for commercial haulers.

The only other disposal options for asbestos and ACM from the CSWM service area is self-hauling to the Hartland Landfill or using one of the private disposal providers (refer to Table 14 below).

For asbestos and ACM originating from the CSWM service area, the tipping fee at Hartland Landfill is \$500/tonne, while the tipping fee at CRWMC is \$250/tonne. In 2015, an estimated 200 tonnes of asbestos and ACM were received at Hartland Landfill annually from the CSWM Service Area. However, as a result of the CRWMC accepting these materials for disposal, the quantity sent to Hartland Landfill is likely to decrease.

The Upland Landfill is a privately owned disposal facility for demolition, land clearing and construction materials near Campbell River (refer to Section 10.2). In May 2016, Upland completed a technical assessment report along with a waste discharge application to the MoE in order to obtain an operational certificate to replace the existing permit. The assessment report for the landfill indicates that it will be operated for the disposal of asbestos and ACM from industrial haulers and residents. It is unclear what tipping fee will be placed on asbestos and ACM at this facility.

Disposal Options for Household Hazardous Waste from Residential Sources (Excluding Asbestos)

The Comox Valley and Campbell River Waste Management Centres accept almost all types of HHW from local residents. The following disposal options are available for HHW (excluding asbestos) for residents:

- Sources of HHW material collected within the CSWM Service Area include: Comox Valley and Campbell River Waste Management Centres.
- Collection through the ReGeneration (previously known as Product Care) program at recycling depots in the communities of Cortes Island, Village of Gold River, and Hornby Island.
- HHW round-up collection events in remote communities, including Denman Island, Gold River, Hornby Island, Quadra Island, Sayward Valley, Tahsis and Zeballos.

The CSWM service is reviewing the option of having a HHW depot in the communities of Tahsis and Zeballos for certain HHW materials.

Disposal Options for Hazardous Waste from the ICI Sector

Table 14 summarizes the services provided by local private hazardous waste collection service providers, including where they are dispatched from, what hazardous materials they collect/manage, the disposal/storage facilities they operate and final disposal site for the collected materials. This information was gathered from company websites, and when possible, short interviews with senior operations staff from each service providers.

Table 14 ICI Hazardous Waste Disposal Service Providers in CSWM Area

Company	Primary Dispatch Location(s)	Types of Hazardous Materials Collected	Company Operated Disposal/Storage Facilities	Final Hazardous Waste Disposal Site(s)
Coastal Environmental (CE)	Victoria	All oily and hazardous waste materials.	Solid Waste Recycling Facility, Chemainus. Soil Remediation Facility, Chemainus. Solid Waste Recycling Facility, Duncan (asbestos, creosote and contaminated soils).	Contaminated soils are sent to CE Soil Remediation Facility, or Terrapure in Nanaimo. Paints, asbestos, etc. are shipped to mainland (BC), and sometimes to Alberta, via Hartland transfer station. Leachable lead paint is processed in Vancouver.
H.L. Demolition	Victoria	Asbestos, lead, lead paint, contaminated soils, smoke detectors and a variety of other hazardous materials.	Small bio cells for limited quantity of asbestos bags.	Asbestos is sent to Hartland facility. Lead paint is shipped to Alberta.
Pro-Pacific Hazmat Services	Nanaimo	Asbestos, paint and biohazardous materials.		
Joma Environmental	Victoria	Corrosives/acids/caustics, flammable liquids, oily wastes, toxic wastes, oxidizing or reactive chemicals, compressed gases, water treatment chemicals, oils, grease and glycols, paints, adhesives, fertilizers and contaminated soil.	None. Simply provide consulting/ management services for ICI hazardous waste storage facilities.	Waste is shipped through sub-contractors to Vancouver transfer stations. Most of the hazardous waste shipped to Swan Hill facility in Alberta for incineration.
Heatherington Industries (HI)	Port Alberni	Waste oil, used oil filter, waste antifreeze, waste water, contaminated fuels (gas or diesel), solvents, oily rags/pads, batteries, aerosol cans, grease tubes and waste grease.	Hazardous waste storage facility.	Wastes including waste oil, wastewater, contaminated soils, sludges and waste paint are sent to Terrapure in Nanaimo. Various other contractors are used. Typically HI uses the contractor with the lowest price.



Company	Primary Dispatch Location(s)	Types of Hazardous Materials Collected	Company Operated Disposal/Storage Facilities	Final Hazardous Waste Disposal Site(s)
Terrapure	Nanaimo	Variety of regulated hazardous wastes (Class 2,3,4,5,6,8,9). No biohazardous, radioactive, or explosive materials handled on-site.	On-site storage and transfer facilities. Tank farm for storage of liquids.	Waste is transferred to many different locations including other Terrapure facilities and the Swan Hill facility in Alberta.
HazPro Ltd.	Nanaimo and Victoria	Vermiculite, asbestos and lead paint.	Use covered bins for temporary on-site storage.	Hazardous waste is shipped to Hartland Landfill, and Nanaimo Regional Landfill. Lead Paint is shipped to Alberta.
ReGeneration	Victoria	Apart from residential quantities of light bulbs, paint, solvents, batteries, resins, catalysts, aerosol cans, also accepts waste paints from ICI customers.	N/A	Hartland Landfill and various contractors.
D.A.D.S Homes	Campbell River	Asbestos	None	Asbestos is picked up and shipped to Hartland Landfill by Contain-a-Way (waste transport contractor).
Central Island Disposal (Previously known as Home Solutions Remediation)	Courtenay	Asbestos	None	Asbestos is shipped to Hartland Landfill by waste transport contractors.
Contain-a-way	Parksville	Asbestos	Temporary storage bins	Primarily transport asbestos to Hartland Landfill. Port Alberni facility is also used when this location is closer to pick up area.
Belfor	Victoria, Duncan, Nanaimo, Courtenay	Asbestos, Lead, Contaminated soil, other regulated hazardous wastes	No storage: Subcontract Alpine Group to handle temporary storage and disposal.	Hartland Landfill via Alpine Disposal and Recycling (waste transport contractor).



Company	Primary Dispatch Location(s)	Types of Hazardous Materials Collected	Company Operated Disposal/Storage Facilities	Final Hazardous Waste Disposal Site(s)
Glacier Environmental	Comox Valley, Central and North Island	Asbestos, Lead, Vermiculite	None	Hartland Landfill.
Ripple Rock Restorations & Renovations	Courtenay, Campbell River, Comox, Central and North Island, Remote access communities	Asbestos	None	Hartland Landfill.



Senior operations staff from the different private hazardous waste disposal providers had an opportunity to comment on current hazardous waste management practices in the region. Feedback elements included the need for reporting and monitoring of operators that can enable a level playing field for all operators and may result in increased need for hazardous waste management services. The requirement for tracking managed hazardous waste can prevent "cowboy outfits" that, as long as they are properly zoned, might be storing hazardous waste on their properties rather than disposing of them appropriately. The scale of this potential issue was not part of this review.

Several private disposal providers asked for the CSWM to provide more education to the public to improve industrial/commercial and household hazardous waste management, including asbestos risks and proper management practices.

Illegal Dumping of Hazardous Waste

There have only been very infrequent reports of illegal dumping of hazardous waste materials within the CSWM service area. This may indicate that current services for hazardous waste management and disposal for residents and ICI are sufficient.

Potential New Disposal Sites That Can Accept Hazardous Waste

Table 14 lists a number of disposal facilities currently used by the private hazardous waste collectors. Within the CSWM Service Area, there are three private disposal facilities that may be able to accept asbestos or contaminated soil.

- Giese Holdings - a DLC waste landfill and open burn site near Campbell River.
- Upland Landfill - a DLC waste landfill and open burn site near Campbell River (with an updated permit under review by MoE).
- West Shore Aggregates - a DLC waste landfill located across the road from the entrance to the Campbell River Waste Management Centre.

As highlighted in Section 10.2, Upland is currently seeking to obtain an operational certificate to replace the existing permit. The Upland Landfill is seeking to accept waste materials classified as hazardous waste, such as asbestos-containing material (ACM). The technical assessment report prepared by GHD (2016), which supported the waste discharge application, states that the acceptance of ACM will be completed in accordance with Section 40 of the Hazardous Waste Regulation. It is unclear on how much ACM the Upland Landfill anticipates.

The CSWM's Service Role Regarding Hazardous Waste Management

At this stage, due to lack of available information, it is not possible to determine amounts and types of hazardous waste that leave the CSWM service area every year. This information could be gathered as part of waste stream management licenses (refer to Section 10.4). This information is necessary to evaluate the current demand for hazardous waste collection in the Service Area.

Based on a jurisdictional scan across other regional districts on Vancouver Island, it should be noted that the Regional District of Nanaimo has decided to leave the management of household hazardous waste (i.e. from residential sources) to the private sector. HHW in the Regional District of Nanaimo is managed through several for-profit and non-profit depots where EPR items are accepted, and the RDN does not

provide HHW drop-off programs at its facilities¹⁶. The Capital Regional District offers a collection service for HHW, but not for hazardous waste from the ICI sector. Generally, across BC the trend is for regional districts to leave the management of hazardous waste from the ICI to the private sector.

There is currently no indication that there is a need to expand existing hazardous waste collection services provided by the CSWM to the commercial sector. The CSWM has not recorded a high frequency of illegal dumping of hazardous waste. This would be a first sign that there is a need for a change in service offering in the area. The waste composition data gathered in the fall of 2017 did not show any evidence that hazardous waste is being disposed of in the conventional waste stream. The current level of service in the CSWM area appears sufficient.

9.4 OPTIONS FOR C&D RECYCLING BUSINESS REPORTING

The CSWM Service does not currently have any mechanism for accessing information on C&D waste types and annual quantities diverted from landfill disposal within the Service Area. Information on quantities of all diverted waste materials (not just C&D) is important to have in order to estimate the CSWM's diversion rate. The measurement of the diversion rate is important, as the MoE requires a demonstration of a 70% diversion rate before WTE can be pursued as a part of the solid waste management system.

The CSWM has a number of diversion sources that are not well understood or quantified. The diversion of C&D wastes is one of these. The CSWM can choose to take a regulatory approach and implement waste stream licensing requirements for operating waste management facilities within the CSWM Service Area. This approach has already been successfully implemented in Metro Vancouver, the RDN and the Cowichan Valley Regional District.

Regulatory Approach Using Waste Stream Facility Licensing

The *BC Environmental Management Act* (the Act) grants the authority and responsibility to manage all MSW and recyclables to the province's regional districts. As part of this authority, under Section 24 of the Act, regional districts are responsible for developing and implementing SWMP's that provide long term visions for the management of MSW, including waste diversion and disposal activities.

For the purposes of implementing an approved SWMP, Section 25 of the Act contains provisions for the licensing of solid waste management facilities and haulers by regional districts. This tool can be used by regional districts, if they so choose, to regulate their local solid waste industry by achieving operational and administrative control over facilities and haulers managing recyclable material and municipal solid waste in their region.

The Act allows for the licensing system to establish different prohibitions, conditions, requirements, and exemptions for different classes of sites, operations, activities, waste or recyclables. This means that each license can be case specific. A waste stream management license (WSML) is issued to the owner or operator of a site that accepts and manages municipal solid waste.

Under Metro Vancouver's (MV) *Solid Waste Regulatory Bylaw 181*, licenses are required for all privately operated landfills, transfer stations, material recovery facilities, storage facilities and certain brokers of

¹⁶ http://www.rdn.bc.ca/dms/documents/solid-waste-management-plan-review/options_for_management_of_household_hazardous_waste.pdf

municipal solid waste and recyclable material. The goal of the regulatory system is to ensure proper management of privately operated facilities by specifying operating requirements to protect the environment and public health, to protect the region's land base in accordance with the host municipality's zoning and land use policies, to ensure that regional and municipal facilities and private facilities operate to equivalent standards, and to achieve the objectives of MV's Integrated Solid Waste and Resource Management Plan. As of October 2016, 48 facilities are licensed in MV.

The RDN and the Cowichan Valley Regional District worked in partnership and adopted *Waste Stream Management Licensing Bylaws No. 1386* (RDN) and *2570* (Cowichan Valley RD) in 2004. Under these bylaws, the RDN and the Cowichan Valley RD are authorized to license all private or non-government-operated municipal solid waste diversion and recycling facilities within their respective regions. The bylaws were approved by the Ministry of Environment in 2005.

In the RDN, there are currently 14 facilities covered by the licensing system, including transfer stations, recycling depots, composting facilities and material recovery facilities. Disposal facilities, including landfills and incinerators, are excluded from licensing requirements and continue to be regulated by the province. Currently, there are 8 licensed facilities in the Cowichan Valley RD.

The RDN and Cowichan Valley RD bylaws were developed as a response to concerns by the recycling industry in both regional districts regarding competing businesses that operate with low standards. The photograph shown in Figure 4 below provides one example of an undesirable operation competing with legitimate recycling operations prior to the establishment of a licensing system.



Figure 4 Waste dry wall being “stored” on private land in the Cowichan Valley RD

Based on experience from these three regional districts, bylaws requiring a WSML have the following positive impacts on solid waste management:

- It creates a level set of operational standards for the recycling industry that encourages private sector investment in the solid waste management infrastructure which enhances waste diversion. This was the primary reason why the RDN and Cowichan Valley RD pursued the licensing system.
- It shields taxpayers from the risk and expense related to clean-up of poorly operated or abandoned facilities.
- It improves the quality of data received from private diversion and recycling facilities, as facilities are required to submit monthly material statements to the districts. Improved data

reporting allows a regional district to effectively track progress towards their waste reduction goals.

- It tracks waste leakage out of the Service Area. The CSWM can utilize a WSML bylaw to address the issue and require transfer stations to report on waste quantities handled.
- The licensing system can be operated on a self-financing basis in that license application, amendment and annual administration fees have been established to pay for the regulatory program. In Metro Vancouver, the application fees range from \$500 to \$5,000 depending on the type of facility, with an annual administration fee of \$1,000 for all licensed facilities. In the RDN and Cowichan Valley RD systems, license application fees range from \$100 to \$1,000, depending on the type of facility, with an annual administration fee of \$100 - \$500, depending on the type of facility.

A licensing system would require staffing resources from the CSWM for staff to review applications, inspect facilities and enforce license requirements. The RDN dedicates one Full-time Equivalent (FTE) staff to the bylaw. Currently this operational cost exceeds the revenue generated by the licensing system. However, the RDN reports that the documented diversion attributed to the WSML system has been worth the expense. Nevertheless, as part of their SWMP Review, the RDN is currently reviewing the fee structure contained in their WSML, to determine whether the fees should be adjusted to more accurately reflect costs.

Based on experience from RDN, operational costs can be more adequately covered if differential fees are applied depending on the types of facilities, complexity of operation and controversy around the facility operation. The level of ongoing inspection by the enforcement officer will depend on these factors.

As early as in 1992, prior to the licensing system implementation, the RDN had a system for voluntary reporting of waste quantities by recycling facility operators. Voluntary reporting helped the RDN to develop good relationships with the local private sector operators and helped the region to successfully introduce the WSML bylaw. More accurate data can of course be obtained from a regulatory licensing system.

If the CSWM wants to pursue a WSML system, it needs to be reflected in an update to the existing SWMP. For the next 5 years, it may be more suitable to focus on improved voluntary reporting. By dedicating the responsibility to CSWM staff to start building relationships with private sector operators, it will help to also pave the way for the regulation of solid waste management facilities through a facility licensing program administered by the CSWM Service in the future. Licensing provisions are most effective when they are implemented in association with specific material landfill disposal bans. For the RDN, this was regarded as important to secure private investments into waste diversion facilities such as the organic composting facility and C&D diversion facilities in the Nanaimo region.

Based on current private recycling facilities for C&D materials, a licensing program is only likely to affect a relatively small number of operators. Depending on the nature of waste materials that are accepted by the operator, the program may require licenses by the following operators of C&D recycling facilities:

- Giese Holdings (provided some of the DLC waste is diverted).
- Upland Excavating (provided some of the DLC waste is diverted).
- West Shore Aggregates (provided some of the DLC waste is diverted).
- Pacific Wood Waste for C&D waste diversion.

- Vancouver Island Enterprise for C&D waste diversion.

A recycling facility operator, such as Emterra, would also require a license. Private landfills are permitted by the MoE and would not require a license. Reporting requirements may be part of the operational certificate issued by the MoE, but may not be required by private landfills that have long-standing permits.

9.5 IDENTIFICATION OF STRATEGIES TO IMPROVE FIRST NATIONS LINKAGES

This section identifies practical strategies to improve linkages with First Nations communities. The waste management requirements of First Nations communities at CSWM facilities is currently believed to be adequately met. No current service agreements are in place with the CSWM for collection and disposal.

The following future linkages with First Nations communities should be considered by the CSWM:

- The CSWM is a member of the BC Product Stewardship Council (BPPSC), a body that advocates on behalf of local government for effective product stewardship programs. As a member of BCPSC, the CSWM can encourage BCPSC to invite First Nations to participate on the Council in order to provide more consistency amongst waste diversion service offerings across the Service Area.
- The CSWM may want to confirm that First Nation communities also have an opportunity to provide consultation feedback in relation to Upland Excavating, seeking to obtain an operational certificate to replace the existing permit for its landfill.
- Depending on the outcomes of the WTE assessment, the CSWM can establish a working group made up of CVRD, SRD, staff from member municipalities, and First Nations communities to progress on the assessment of waste management options for reporting to the CSWM Board. Close work with First Nations communities is important to managing residual waste cooperatively.
- The CSWM service is employing a coordinator to address illegal dumping. In the development of the illegal dumping program, the CSWM may want to reach out to a number of stakeholders to better harness the collective resources available in the region. The following stakeholders may also get involved:
 - First Nations
 - Municipalities
 - Back-country user groups (mountain bikers, fishermen, etc.)
 - Forestry companies
 - BC Hydro
 - Ministry of Environment Conservation Officers

10. ASSESSMENT OF OVERALL STRENGTHS AND CHALLENGES TO MEETING PLAN GOALS AND TARGETS

The following is a summary of regional and local solid waste management strengths and challenges identified during the effectiveness review by CVRD staff and by the authors (Morrison Hershfield and Carey McIver and Associates). The list will be discussed and adapted based on input from the CSWM Board.

10.1 STRENGTHS

Some organics diversion programs are already in place in many areas of the CSWM service area, either through yard waste collection or co-mingled food and yard waste collection.

In 2017, the CSWM secured grant funding to design and build a regional organics processing facility. The CVRD is collaborating with the City of Campbell River to move this project forward. The CSWM anticipates that the City of Courtenay and the City of Campbell River will be able to expand its current yard waste collection to include food waste. The capital project involves designing and building a regional organics composting facility in the region and designing and constructing an organics transfer station as required. The capital works will be paid from grant funding and capital reserves. The construction of the regional facility must be completed by 2020, in accordance with the grant funding. The operation and maintenance costs will be funded through tipping fees.

The waste composition study conducted in 2017 by AET Group Inc. looked at inbound waste entering the two regional facilities (CVWMC & CRWMC). The study identified that approximately 17,700 tonnes of organic waste (including yard waste, food waste, and paper tissue/towelling) is currently disposed to landfill at these two facilities. There is potential to capture and manage this organic waste stream at a new processing facility. If all organics were captured, this would increase CSWM's diversion rate from 47% to approximately 62%. Organics diversion is one of the most important waste diversion initiatives outlined in the SWMP and is critical in reducing the disposal rates and improving on the diversion rate of the CSWM Service Area. If all organics and divertable recyclables were captured, the resulting diversion rate would be 73%.

The CSWM has made significant progress on implementing many of the major plan components that were set out in the SWMP 2012. Other major achievements include the upgrades to the Comox Valley and Campbell River Waste Management Centres to address compliance issues and the closure of smaller landfills and transfer to the larger waste management facilities. With five years left on the current Plan, the CSWM can focus on remaining Plan components, such as developing new initiatives for recycling in the multi-family, ICI and C&D sectors.

The CSWM conducted a robust waste composition study in the fall of 2017. With this valuable information, the CSWM can better direct its waste diversion efforts. However, as the study results only represent conditions and characteristics of waste received at the facilities during the auditing period, we recommend the CSWM undertake waste composition studies at regular intervals. The MoE provides no guidance on recommended auditing frequency; however, many other jurisdictions conduct audits with frequencies ranging from annually to every five years.

CSWM's waste management system has positive impacts on local job creation. For example, the CSWM estimates that the construction of Cell 1 has resulted in approximately 20 full-time workers from Vancouver Island, and the construction of the leachate treatment facility is expected to provide approximately nine full-time/part-time workers from Vancouver Island for the duration of the project.

This equates to a total of approximately 5,528 work days of local employment. There will be ongoing employment opportunities with the establishment of the regional organics processing facility.

Over the past five years, the CSWM has implemented several initiatives that resulted in significant environmental improvements, including landfill closures and landfill gas collection. Further improvements will come from the establishment of a leachate treatment facility.

10.2 CHALLENGES

The CSWM has made significant progress on implementing specific aspects of the solid waste management plan, with both limited staffing and financial resources available. Much of the work done over the past five years has involved upgrading existing facilities to address compliance issues, investigating options for optimizing parts of the solid waste system (e.g. remote community waste management, regional organics, staffing), improving overall financing of the solid waste system and moving toward a regional organics diversion solution. A number of challenges have been identified by either CSWM staff or by the authors. The challenges that the CSWM Service may want to address include:

Accurate Recording of Disposal and Diversion Quantities

The current scale software program used at the CSWM facilities is not configured to provide the necessary data required to analyze customer demand and diversion program performance. For example, the material type listing does not differentiate between ICI and household waste. There are currently some loads from municipal garbage collection that contain both ICI and residential waste. For example, MSW collected by contract is from the City of Courtenay, Town of Comox and Village of Cumberland residential curbside pickup. In addition to this, the ICI sector pays taxes to their municipality for a certain amount of pickups. At the Waste Management Centres, this will be coded under MSW by contract. If ICI customers have greater quantities than the allowable municipal pickups, it is charged individually to the company/hauler and coded under ICI at the Waste Management Centres.

It is important to better understand the sources of the waste accepted at the CSWM facilities in order to direct future waste minimization efforts. Better recording can be achieved if MSW can be separated by the following categories: Household MSW (municipal collection), ICI waste, ICI and residential mix (for municipal collections servicing the ICI sector), self-haul (household and small ICI). The use of more accurate codes can improve the measurement of program performance. Better coding will also enable waste composition studies to be conducted in greater detail on a source/sector level.

The disposal rate per capita should be the primary performance measure for CSWM. The diversion rate (%) is only a best estimate using available information. The CSWM can introduce waste stream licensing for all waste management facilities in the Region, which can include reporting requirements for diverted quantities. The use of a diversion rate as a performance measure, together with the disposal rate per capita, is justified in this situation. It is important to continue to report as per MoE's municipal solid waste disposal calculator requirements. The CSWM may want to express concern to the MoE regarding the lack of consistency between regional districts in measuring of diversion rates and encourage the development of guidelines that address how to accurately calculate and track diversion rates for the purpose of performance measurement and solid waste management planning.

The MoE established a policy in 2010 that regional districts must plan to achieve at least 70% waste diversion through the first 3Rs (reduce, reuse and recycle) prior to considering the 4th R of "recover" (e.g. waste-to-energy facilities). The CSWM may need to demonstrate that it has established the

necessary solid waste management system for the 3Rs (including organics diversion initiatives) and policy mechanisms necessary to encourage the use of such system (e.g. via disposal bans, waste stream licensing provisions). Morrison Hershfield encourages the CSWM to request further guidance on disposal and diversion reporting from the MoE to establish standardized reporting across all regional districts. As part of AVICC, the CSWM has in particular noted the lack of consistency in tracking of C&D waste across the regions.

Financial Sustainability of Waste Management Services

The CSWM Service should continually reassess the financial sustainability for the entire waste management system and the long-term financial performance of the system. Many regional districts face similar challenges:

- Revenues from landfill tipping fees are shrinking due to lower volumes of waste being landfilled (success of diversion programs).
- Diversion programs and education require increasing resources.
- There is a resistance by taxpayers to any further tax increases.
- Tipping fees cannot be increased indefinitely without waste flowing out of the system, resulting in a loss of control for responsible waste management and lost revenue.

Revisiting the financial model on an annual basis can help with assessment of revenues, costs and potential shortfalls and determining the impacts of increasing diversion, adding new programs/services and determining how the overall system can be financed. The CSWM is encouraged to also review tipping fees of surrounding regional districts to ensure that the local tipping fees set by the CSWM are similar in order to reduce waste imports.

The CSWM has initiated a review of the financial model; however, the findings were not available at the time of this effectiveness review.

Improving Disposal and Diversion Performance

The CSWM Service has currently not met its targeted waste disposal rate and diversion rates. The SWMP 2012 included a target of 70% diversion rate, which equates to a reduction in the per capita disposal rate from 610 kilograms per capita in 2012 to 380 kilograms per capita by 2022. The CSWM Service is at 570 kg/capita based on 2016 figures. This disposal rate is the second highest when comparing to the other seven regional districts that make up the AVICC (refer to section 3.2). There are many opportunities for the CSWM service to improve its performance, primarily by focusing on:

- Paying more attention to diversion activities, e.g., focus on ICI waste and food waste diversion, as well as coordinating communication and education initiatives.
- Enforcing disposal bans on materials that can be diverted (including EPR materials).
- Waste stream licensing to encourage private sector investment in diversion infrastructure and obtain better data on waste and recyclables collected within the CSWM Service area.
- Increasing organic waste diversion when the regional organics processing facility is established. The opening of a regional organics composting facility will be a big step forward toward the overall diversion target.

The CSWM Service may want to establish a position that is exclusively focused on waste diversion. Establishing this position would demonstrate that the CSWM Service is committed to waste diversion. This position would be responsible for developing new policies and programs related to ICI and food waste diversion including building relationships with the private sector stakeholder to obtain more accurate waste diversion data, as well as coordinating communication and education initiatives to ensure that they are targeted to the appropriate sectors and programs.

The grant approval that allows the opening of a regional organics composting facility will be a big step forward toward the overall diversion target.

The CSWM may want to encourage the improvement of all the EPR programs provincially, for example through the BC Product Stewardship Council.

Waste Leakage to and from the Service Area

Waste leakage from the CSWM Service area may be a concern for the CSWM, depending on future tipping fees. Neighbouring communities (Cowichan Valley and Powell River) are currently shipping waste out of area, and it is unclear whether the CSWM Service area is a net importer or exporter of waste. The disposal rate would not be accurate if waste leakage is significant.

This review has identified (refer to Section 11.4) that the CSWM can utilize a waste stream management license bylaw to address the issue and require transfer stations to report on waste quantities handled.

Diverting Used Mattresses and Bulky Furniture

Used mattresses and furniture are currently not recyclable at the CSWM waste centres and are disposed to landfill. Mattresses and bulky furniture make up a significant part of illegally dumped materials. There may be an opportunity to collaborate with a neighbouring regional district to send used mattresses for mattress recycling in Vancouver. The mattress recycling program is currently being reviewed for the CVWMC and CRWMC. In a recent study undertaken by Morrison Hershfield on behalf of Metro Vancouver, mattress recycling has shown to create jobs, divert materials that are difficult to manage at disposal facilities, save landfill space, reduce GHG emissions and save energy through recycling.

11. CONCLUSIONS AND RECOMMENDATIONS

Most of the initiatives outlined in the SWMP 2012 are either in progress or have been implemented. CSWM has made significant progress on implementing the major plan components that were set out in the SWMP 2012. Major achievements include the implementation of the pilot organics diversion program, upgrades to the Comox Valley and Campbell River Waste Management Centres to address compliance issues, and the closure of smaller landfills and transfer to the larger waste management facilities. With five years left on the current Plan, the CSWM can focus on remaining Plan components, such as developing new initiatives for recycling in the multi-family, ICI and C&D sectors. For example, multi-family and ICI buildings are not yet required across the Service area to implement a recycling collection service. The need for mandatory recycling can be re-evaluated in light of the waste composition results.

The CSWM should continue to review the financial model on an annual basis to assess revenues, costs and potential shortfalls and to determine the impacts of increasing diversion, add new programs/services, and determine how the overall system can be financed.

Based on the effectiveness review, the CSWM should consider the following recommendations for revisions to the SWMP:

- If the CSWM wants to pursue a WSML system, it needs to be reflected in an update to the existing SWMP. For the next 5 years, it may be more suitable to focus on improved voluntary reporting.
- The next update to the SWMP should include the inclusion of taxation as a funding source, provided that the CSWM wishes to continue.
- The current SWMP only identifies four active private disposal facilities that receive wood waste and/or inert construction, demolition and land clearing waste. In reality, this number is probably higher. When the SWMP is due to be updated, there is a need to expand the list to include all operational/permitted landfills in the CSWM service area. These facilities can be listed in a Schedule that can be updated if minor amendments are needed. If a facility is not listed in the current SWMP and the owner wants to start accepting waste materials that are included in CSWM's SWMP, a major amendment to the SWMP is required. This applies to any facility that is opening or implementing changes to status of a site or facility.

The MoE recommends that regional districts renew their solid waste management plans every 10 years (in this case before 2023). It may also be necessary to amend the Plan before this time if there are significant changes, for example with the inclusion of a WTE facility in the service area or the opening of a new waste management facility that manages wastes currently covered by the existing SWMP.

Based on the effectiveness review, there is no need to amend the existing Plan before 2023, unless significant changes are proposed.

12. REFERENCES

Compliance Monitoring Reports by GHD:

Elliott, Thomas and Ferraro, Gregory D., 2016. 2016 Operations and Monitoring Report, Tahsis Waste Management Centre, prepared for Comox Strathcona Waste Management.

Elliott, Thomas and Ferraro, Gregory D., 2016. 2016 Operations and Monitoring Report, Gold River Waste Management Centre, prepared for Comox Strathcona Waste Management.

Elliott, Thomas and Ferraro, Gregory D., 2016. 2016 Operations and Monitoring Report, Zeballos Waste Management Centre, prepared for Comox Strathcona Waste Management.

Dyck, Michaela and Ferraro, Gregory D., 2016. 2016 Operations and Monitoring Report, Campbell River Waste Management Centre, prepared for Comox Strathcona Waste Management.

Dyck, Michaela and Ferraro, Gregory D., 2016. 2016 Operations and Monitoring Report, Comox Valley Waste Management Centre, prepared for Comox Strathcona Waste Management.

Other References:

AET Group Inc, 2017. 2017 Comox Strathcona Waste Management Waste Composition Study, on behalf of Comox Valley Regional District (November 29, 2017)

GHD, 2017. Design, Operations, and Closure Plan Upland Landfill, Campbell River, British Columbia, on behalf of Upland Excavating Ltd.

GHD, 2016. Technical Assessment Report, Waste Discharge Application for Upland Landfill, Campbell River, British Columbia, on behalf of Upland Excavating Ltd.

GHD, 2017. Operations and Monitoring Report, prepared for Comox Strathcona Waste Management.

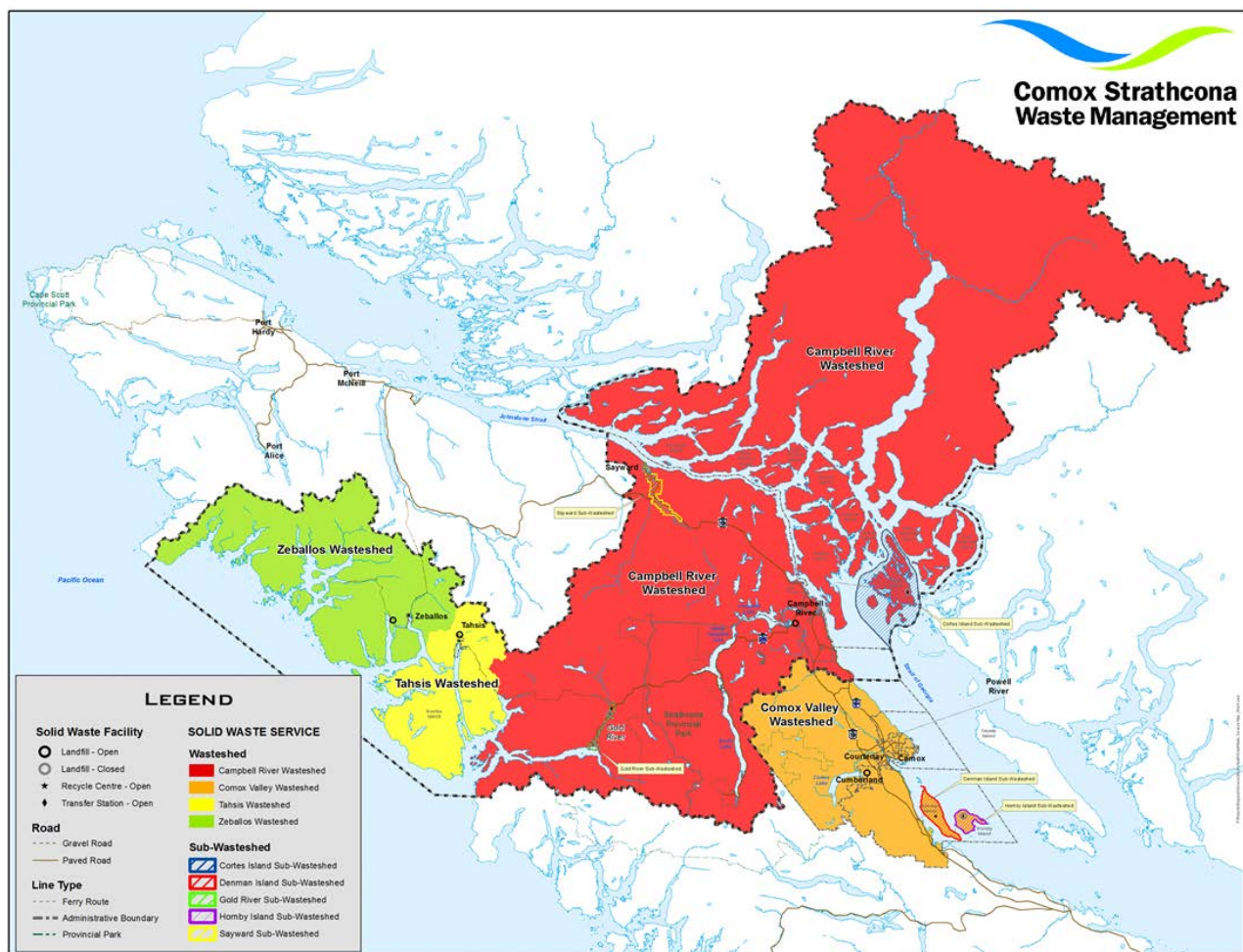
**APPENDIX A:
Plan Area Information**



PLAN AREA

The CVRD covers approximately 1,725 km², and the electoral boundaries include the Town of Comox, the City of Courtenay, the Village of Cumberland, Electoral Area 'A' (Baynes Sound – Denman and Hornby Islands), Electoral Area 'B' (Lazo North), and Electoral Area 'C' (Puntledge-Black Creek). The SRD covers approximately 20,000 km². The electoral boundaries of the SRD include the City of Campbell River, the Village of Gold River, the Village of Sayward, the Village of Tahsis, the Village of Zeballos, Electoral Area 'A' (Sayward – Kyuquot/Nootka), Electoral Area 'B' (Cortes Island), Electoral Area 'C' (Discovery Islands – Mainland Inlets), and Electoral Area 'D' (Oyster Bay – Buttle Lake).

In addition, there are 14 First Nations with reserve lands located in the Plan area¹⁷. Figure 1 shows the wastesheds serviced by the CSWM. Each wasteshed indicates the geographical areas served by each of the CSWM waste management centres. The four waste sheds are sometimes also referred to as the southern and northern waste sheds.



Appendix Figure 1 - CSWM Wasteshed Area

¹⁷ TRI. First Nation Consultation Final Report. 2012