APPENDIX A

Making a difference...together

Environmental Resource Management

2019 Progress Report

ORGANIZATIONAL OVERVIEW

The Capital Regional District (CRD) delivers regional, sub-regional and local services to 13 municipalities and three electoral areas on southern Vancouver Island and the Gulf Islands.

Governed by a 24-member Board of Directors, the CRD works collaboratively with First Nations and all levels of government to enable sustainable growth, foster community well-being, and develop cost-effective infrastructure while continuing to provide core services to residents throughout the region.

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Overview and Governance

SOLID WASTE DISPOSAL

The CRD became responsible for solid waste disposal for the region in 1973 when, at the request of the CRD Board, the Province of British Columbia established solid waste disposal as a regional function of the CRD.

In 1975, the CRD acquired Hartland Landfill, which had been operating as a private facility since the 1950s. The facility continued to be managed by a private contractor until 1985, when the CRD assumed direct operation of the site.

In 2008, the privately owned and operated Highwest Landfill was added to the CRD's solid waste management plan. The facility is located in the District of Highlands and primarily manages construction and demolition material.

SOLID WASTE MANAGEMENT PLAN

All regional districts must have a Solid Waste Management Plan approved by the Ministry of Environment & Climate Change Strategy (the ministry). The original plan for the CRD was approved by the Minister of Environment in 1989. There have been two subsequent revisions to the original plan plus eight amendments.

In 2019, work continued on the development of a new plan for the region. Public consultation on proposed guiding principles, goals, strategies and a new waste reduction target took place during October and November.

SOLID WASTE COLLECTION

Collection of residential and commercial garbage and kitchen scraps is conducted by the private sector, with the exception of single family dwelling service offered by six of the region's municipalities.

The private sector also collects recycling from multi-family buildings and commercial buildings.

The CRD provides region-wide residential recycling service through a combination of single family dwelling curbside collection and depot collection programs under contract to Recycle BC.

ENVIRONMENTAL RESOURCE MANAGEMENT

Environmental Resource Management's (ERM) mission is to efficiently and effectively manage the region's solid waste resources in an environmentally, socially and economically responsible manner.

The ERM division is responsible for municipal solid waste management in the capital region, including waste reduction, recycling programs and operation of Hartland Landfill.

The division reports to the Parks & Environment Committee, which also acts as the steering committee for the development of the new solid waste management plan.

Communications, Outreach and Education Programs

A number of communications, education and outreach programs are used by environmental educators to support the 5R hierarchy (reduce, reuse, recycyle, recovery, residuals management) and promote resident awareness and participation in waste reduction and disposal services, including.

- Curriculum-linked educational workshops and tours for students from Kindergarten to Grade 12
- Seasonal, research-based public education campaigns and instructive materials
- Active media relations to support public awareness of solid waste programs and opportunities
- Timely and educational social media content

EDUCATIONAL WORKSHOPS & TOURS

Environmental education is of paramount importance to the CRD's waste reduction strategies.

Programs taking place at Hartland Landfill and the Hartland Learning Centre allow for place-based learning, providing participants with an interactive experience to create awareness, impart knowledge and inspire behavioural change in our region. An outreach and community presence, as well as the Infoline, increase educational and informational opportunities and allow for interactions with a wider variety of audiences. Education and outreach occurs through many programs and initiatives.

3Rs School Programs

The 3Rs school programs are free interpretive programs and tours offered to Kindergarten to Grade 12 students in the region.

Program topics such as That's Not Garbage!, 3Rs Unwrapped and Digging Deeper challenge students to explore our habits and behaviours surrounding waste and discuss ways to generate less waste by practicing the first of the 5Rs (reduce, reuse and recycle). Classes that visit the Hartland Learning Centre for their programs are also offered the opportunity for a behind-the-scenes tour of the landfill to see where their garbage goes and what is involved in operating a landfill.

In 2019, we delivered 97 school programs to 2,354 participants:

- **71 programs at Hartland (1,774 participants)**
- **26 in-school programs (580 participants)**

3Rs Community Programs

These programs are an opportunity for community groups and organizations to learn more about waste management in the region. Groups come to the Hartland Learning Centre for interactive presentations and a landfill tour or request a CRD speaker to come to them. In 2019, community programming involved tours and presentations at Hartland, as well as informative booths and displays set up at community events.

In 2019, we delivered 21 community programs to 511 participants.

Technical Tours

Technical tours of Hartland Landfill are offered to groups from industry associations, colleges, universities and government staff.

In 2019, we delivered 15 technical tours of Hartland to 280 participants.

Public 3Rs Programs

In 2019, public 3Rs programs were introduced to offer residents not associated with a school or organized group, the opportunity to sign up and tour Hartland Landfill.

Residents could register for programs on eight dates. In 2019, both adult-oriented and family-oriented public programs were offered. The adult programs included a presentation at the Hartland Learning Centre followed by a behind the scenes tour of the landfill to give residents the opportunity to learn how Hartland operates, how waste is managed in the region and what diversion opportunities are available. The family orientated program included a presentation and discussion surrounding food waste, a workshop where participants made their own beeswax food wraps and a behind the scenes tour of the landfill.

In 2019, we delivered eight public 3Rs programs at Hartland Landfill for 146 participants.

COMMUNITY OUTREACH AND EVENTS

Waste management and recycling is a popular and in-demand topic for CRD residents.

In order to create opportunities for residents to ask questions and learn, displays were set up at 12 fairs, festivals, community gatherings and other community events or locations.

Booths and displays often focus on ways to reduce and divert waste, proper sorting techniques for recyclable materials or more specific topics such as how to prepare demolition waste and dispose of asbestos.

MYRECYCLOPEDIA.CA

Myrecyclopedia.ca contains a comprehensive online listing of items — from aerosol containers to zinc — and includes the environmental story behind each item, local recycling listings and tips on how to reduce and reuse in our daily lives. This tool was developed to encourage sustainable practices and to reinforce the 3Rs. There were 257,682 web visits in 2019.

READY, SET, SORT!

Ready, Set, Sort! is an online waste sorting game where residents can test their knowledge about local recycling opportunities. The game includes 72 items, six bins and five levels of play and can be accessed through Myrecyclopedia.ca. In 2019, there were 6,202 game plays, with the most common misunderstood depot items being plastic shopping bags, books and foam packaging.

PUBLIC EDUCATION CAMPAIGNS

In 2019, the CRD developed and implemented a number of seasonal, multi-medium public education campaigns to promote and provide information in the following areas:

END MARKETS FOR RECYCLABLE MATERIALS

SAFE RENOVATION WASTE DISPOSAL

ILLEGAL DUMPING PREVENTION

ABANDONED BOAT REPORTING AND PREVENTION

HOUSEHOLD HAZARDOUS WASTE DISPOSAL

AVOIDABLE FOOD WASTE REDUCTION

HOLIDAY SEASON WASTE REDUCTION

REUSE ITEMS TO REDUCE WASTE (REPAIRING AND DONATING)

INFOLINE

The Infoline is an essential part of education and outreach programs. This service responds to waste reduction, waste management, recycling and general Hartland Landfill inquiries.

An automated voice messaging service (250.360.3030) is available 24 hours a day and inquiries are responded to within 24 hours on weekdays. Waste and recycling information can also be found at www.crd.bc.ca/waste or by emailing infoline@crd.bc.ca.

COMPOST EDUCATION CENTRE

The Compost Education Centre encourages environmental stewardship and provides residents with climate resiliency tools and skills needed to compost, reduce waste, grow their own food and conserve soil and water.

The centre supports the CRD kitchen scraps landfill ban through programming that emphasizes accessible education around food waste diversion, both on and off-site, as well as promoting backyard composting. Through a contract with the CRD, the centre offers presentations, workshops, and educational demonstrations at on-site gardens and throughout the community.

In 2019, the centre delivered 199 school programs to 4,860 preschool to Grade 12 students, and ran 89 community workshops and learning events on topics including soil contamination, growing food, native plants and local ecosystems and composting.

The centre communicated with 521,919 residents online, by phone or in person and 14,522 residents visited the demonstration site or participated in an educational community event. In this year, the centre focused on increasing its capacity to better reach underserved rural regions and municipalities without curbside pickup in the capital region.

In 2019, the centre also directed the fourth annual Healing City Soils Program. The program helps analyze the health of the region's soils and create a virtual soil map of the region, highlighting areas where heavy metals may need to be addressed before growing food. This work is done through a collaborative partnership with Royal Roads University.

In 2019, the Infoline received 20,298 calls and 2,401 emails

You can contact us at:

automated voice messaging (250.360.3030)

www.crd.bc.ca/waste

infoline@crd.bc.ca

In 2019, the Compost Education Centre celebrated 27 years of responding to 1,895,377 residents inquiries

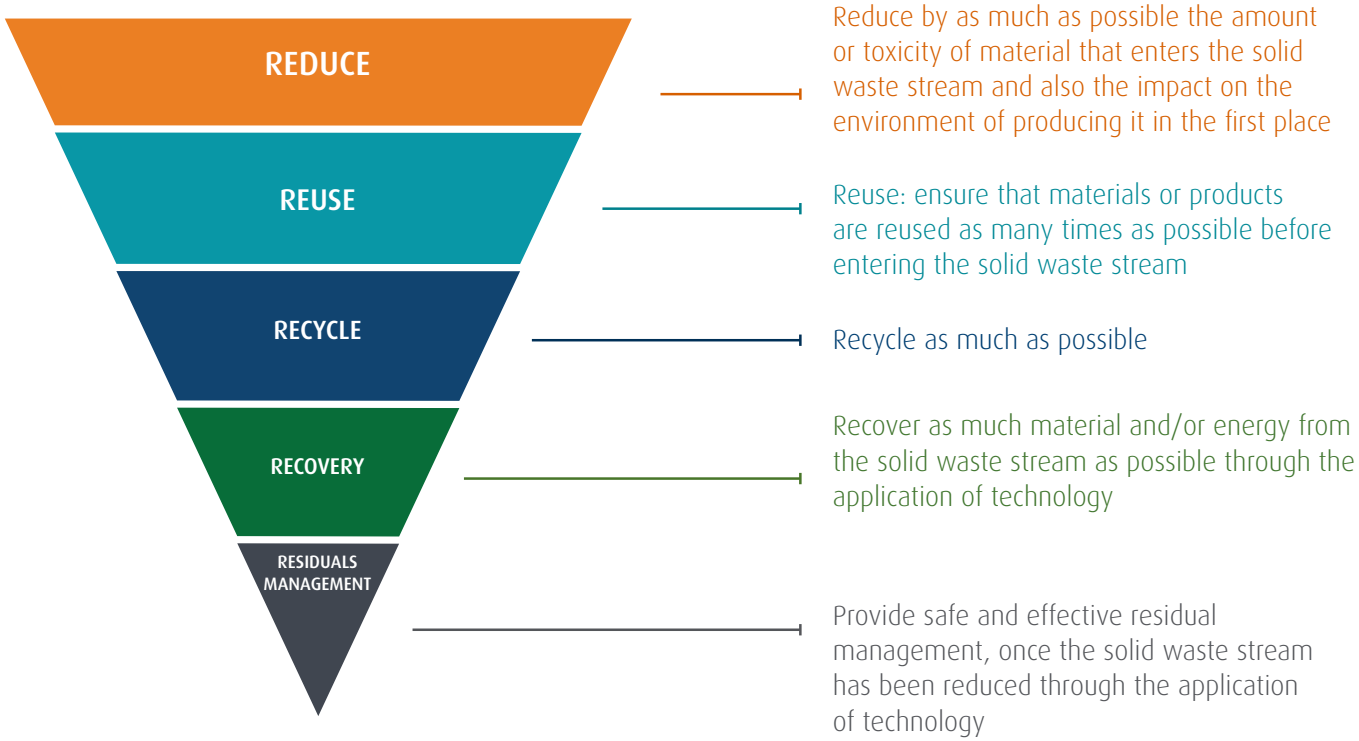
14,522 residents visited the Compost Education Centre and 521,919 residents communicated with the centre online, by phone or in person

The 5R Hierarchy

The CRD views waste as a commodity and seeks the highest and best use for these resources by applying the 5R hierarchy of reduce, reuse, recycle, resource recovery and residual management.

Services range from planning and policy development, bylaw and contract administration to landfill operations. The goal is to extend the life of Hartland Landfill by minimizing waste disposal and maximizing diversion opportunities.

5R Pollution Prevention Hierarchy



Reduce and Reuse

DIVERSION FUNDING FOR NON PROFIT ORGANIZATIONS

Since 1992, the CRD has provided funding to non-profit organizations involved in recycling clothing and used household goods. The funding assists with their garbage disposal costs at Hartland, in recognition that some donated used goods are unusable and destined for the landfill. Ten organizations participated in the program in 2019.

HARTLAND REUSABLE MATERIALS PROGRAM

The CRD partners with five organizations for the management of donated items received in the Hartland depot. Goods such as textiles, books and bicycles are redistributed through a variety of networks operated by these non-profit associations.

Recycle

CURBSIDE RECYCLING

Under agreement with Recycle BC, the CRD provided 123,629 single family dwellings with curbside recycling service for packaging and paper products in 2019. The CRD curbside program is a successful three-stream recycling model, which ensures the highest quality and value for marketing of the material.

Residents are able to sign up for collection reminders and service alerts via text, email, voicemail or Twitter. To date, 65,659 reminders have been created.

Since the program's inception in 1989, over 482,000 tonnes of recyclables have been collected.

123,629 single family dwellings with curbside recycling service

65,659 curbside collection reminders have been created

482,000 tonnes of recyclables have been collected since 1989

80 items from 28 product categories are accepted for recycling

HARTLAND DEPOT

The public drop-off depot at Hartland receives garbage, recyclables and household hazardous waste. Over 80 items from 28 product categories are accepted for recycling. This area is intended for residential quantities and limits vehicle size to 5,500 kg gross vehicle weight.

2019 depot fees:

- Extended producer responsibility products: free
- Household hazardous waste: free
- Rimmed tires: $6 per drop-off, maximum five tires
- Business recycling: $26
- Yard and garden material: $59/tonne
- Mattresses and box springs: $110/tonne plus a $10 bin fee
- Garbage: $110/tonne plus a $10 bin fee

GULF ISLANDS DEPOTS

Residents on Salt Spring Island and the Southern Gulf Islands are provided recycling services through drop-off programs set up at depots in their communities.

The CRD, under agreement with Recycle BC, partners with local on-island non-profit associations for recycling services for packaging and paper products at these depots.

In addition to receiving packaging and paper products, most depots offer additional services such as scrap metal and electronics recycling.

PORT RENFREW TRANSFER STATION

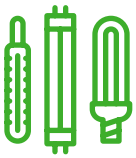
Under a local service funded by the community of Port Renfrew, residents and businesses have access to a transfer station for drop off of general refuse, kitchen scraps and recyclables.

EXTENDED PRODUCER RESPONSIBILITY

British Columbia's industry-led product stewardship programs require producers of designated products to take extended producer responsibility for the life-cycle management of their products, including collection and recycling. The BC Recycling Regulation, under authority of the *Environmental Management Act*, sets out the requirements for product stewardship in BC. The CRD supports industry-led product stewardship with participation in the following provincial programs:

Beverage Containers (Refundable)

Refundable glass, plastic, aluminum, metal and polycoated beverage containers are accepted at the Hartland depot and electoral area recycling depots. Beverage bags and pouches are not included in CRD programs. Refundable beverage containers are also accepted at participating retail stores and private depots.



Electronics, Electrical Products, Batteries and Lighting Products

Since 2014, the CRD has partnered with seven stewardship agencies for the collection of a wide range of electrical items at the Hartland depot:

- Encorp Pacific (computers, monitors, printers, TVs, audio visual equipment, CDs, VHS tapes)
- ElectroRecycle (small appliances, power tools, sewing machines, exercise equipment)
- Call2Recycle (batteries and mobile phones)
- LightRecycle (residential fluorescent lamps and CFL bulbs and lighting fixtures)
- Switch the 'Stat (thermostats)
- AlarmRecycle (smoke detectors)
- Outdoor Power Equipment (mowers, blowers, clippers, chainsaws)

Lead-Acid Batteries

Lead-acid batteries have been accepted for recycling at the Hartland depot since 1992, shortly after the BC Lead Acid Battery Collection program was introduced. This first generation program transitioned in 2012 to being managed under the BC Recycling Regulation. Batteries are broken down at smelters into lead, plastic and acid.

Paints, Solvents, Flammable Liquids, Gasoline and Pesticides

In 1994, the CRD began working with the Product Care Association to provide the region with waste paint collection at the Hartland depot. Since then, the program has expanded to include solvents, flammable liquids, gasoline and pesticides (paint plus) and a paint exchange.

Product Care Association depots in the region:

- 1 paint plus with paint exchange (Hartland depot)
- 3 paint plus
- 2 paint only with paint exchange
- 5 paint only

See myrecyclopedia.ca for a full list of locations.

Pharmaceuticals

The Medications Return Program, is promoted regionally through the CRD Infoline, website and regional source control program. The CRD works in partnership with the Medications Return Program and Island Health to raise awareness about safe and proper disposal of medications. Through 2019, the CRD continues to have one of the highest medication return rates per capita amongst regional districts in the province.

Packaging and Paper Products

In 2011, the BC Recycling Regulation was amended to add packaging and paper products from residential generators. The amendment shifted the financial responsibility for managing these materials to producers starting in 2014. Packaging and paper products are managed through a combination of residential curbside collection and depot drop off, which are provided locally by both the CRD and the private sector.

In 2019, 15,269 tonnes of packaging and paper products were collected through these CRD programs:

- Curbside Blue Box Program - 13,555 tonnes
- Gulf Island Recycling Depots - 874 tonnes
- Hartland Depot - 812 tonnes
- Port Renfrew Transfer Station - 27 tonnes

Tires

Tires have been accepted at the Hartland depot since it opened in 1992, in conjunction with the province's Financial Incentives to Recycle Scrap Tires ("FIRST") program. In 2007, this provincial initiative was replaced with a product stewardship program under the BC Recycling Regulation managed by Tire Stewardship BC (TSBC). TSBC, in partnership with the Bicycle Trade Association of Canada and the local biking community, also offer a voluntary program for the recycling of tires and tubes through bike retailers. Collection of bicycle tires and tubes at the Hartland depot began in 2011.

Used Lubricating Oil, Filters and Containers

The BC Used Oil Management Association manages the product stewardship program that provides for the collection and recycling of used oil, oil filters, antifreeze and containers. The program strives to ensure every drop of used oil and antifreeze, as well as all filters and containers, are brought to a collection facility to be properly recycled.

ORGANICS MANAGEMENT

Regional Kitchen Scraps Strategy

In January 2015, a landfill ban on kitchen scraps was implemented, saving a valuable resource, conserving landfill space and reducing greenhouse gas emissions.

Kitchen scraps are typically managed in one of two ways: onsite digestion or collection for transportation to composting facilities in the Cowichan Valley Regional District and on the lower mainland. Establishment of in-region kitchen scraps processing capacity is being explored.

Compost Facilities Bylaw

The CRD Board adopted the regional composting bylaw in December 2005. The bylaw regulates the operation of composting facilities to protect public health and the environment. In 2019, there were no licensed facilities under the bylaw.

Yard and Garden Material Landfill Restriction

In 2006, a yard and garden material landfill ban came into effect. A number of private facilities in the area accept the region's yard and garden material.

In 2019, 1,142 tonnes of source-separated yard and garden material was received at Hartland where it was ground and beneficially used on-site. The landfill ban excludes invasive, infectious and noxious plants which are managed at Hartland as garbage through a rate of $59/tonne in an effort to reduce their proliferation.

HOUSEHOLD HAZARDOUS WASTE

The Hartland depot offers residents one-stop drop-off service for virtually all types of household hazardous waste and is a leading program of its kind in British Columbia. The material is accepted in residential quantities only at no charge for recycling (where feasible) or disposal at a hazardous waste management facility.

Hartland Public Drop-off Depot

Materials collected at Hartland Landfill's recycling depot.

MATERIAL TYPE (TONNES)	
Antifreeze	11.670
Appliances	294.910
Batteries	42.340
Books	9.560
Containers (metal, plastic, paper)	66.170
Cooking oil	5.410
Electronics and electrical items	357.050
Fibres (paper, cardboard)	659.640
Foam packaging	25.700
Fire extinguishers	2.840
Food waste	14,467.680
Glass (bottles, jars)	31.660
Household hazardous waste	67.390
Light bulbs, tubes and ballasts	10.360
Mattresses	271.080
Metals	1,085.120
Motor oil, filters and containers	84.850
Paint, solvents and pesticides	224.010
Plastic (bags, overwrap)	16.780
Plastic (other flexible plastics)	13.550
Propane tanks	21.800
Refundable containers	10.920
Reusable goods	20.010
Tires	87.290
Yard and garden waste	1,142.120
TOTAL FOR 2019	19,029.910

Recovery

HARTLAND LANDFILL GAS CAPTURE AND UTILIZATION

Landfill gas is produced from decomposing garbage. This gas is mainly made up of carbon dioxide and methane. Methane is an energy source, but is also a greenhouse gas (GHG). It is flammable and explosive in certain concentrations, which is why it needs to be controlled.

Gas is collected at Hartland using a network of wells and pipes installed in the early 1990s. Between 1991 and 2003, the gas collected was burned using a flare to reduce GHGs. In 2003, a landfill gas-to-electricity plant was built next to the flare station to utilize the methane in the landfill gas to produce electricity. The electricity produced is fed into the existing BC Hydro distribution system on site. The facility produces close to 1.6 megawatts of green power — enough electricity to supply about 1,600 homes.

In 2012, a site-specific landfill gas management plan was approved, which detailed a strategy for capturing landfill gas and meeting collection targets set by the ministry. The plan includes installation, operation and maintenance of collection infrastructure and routine reporting. As a result, landfill gas collection has increased significantly and GHGs have been reduced by approximately 50% since 2011.

Collection infrastructure continues to be installed in accordance with the plan.

In 2019, collection efficiency was 66%, compared to a target of 75%, and has remained largely consistent for the past three years. In 2018, three different landfill gas models were run to better assess current and future gas generation and utilization potential. Collection efficiency varied between 64–76%, depending on the model. To support improved accuracy in landfill gas generation modelling and collection efficiency reporting, field-level landfill gas quantification is planned for 2020.

FUTURE OF GAS UTILIZATION

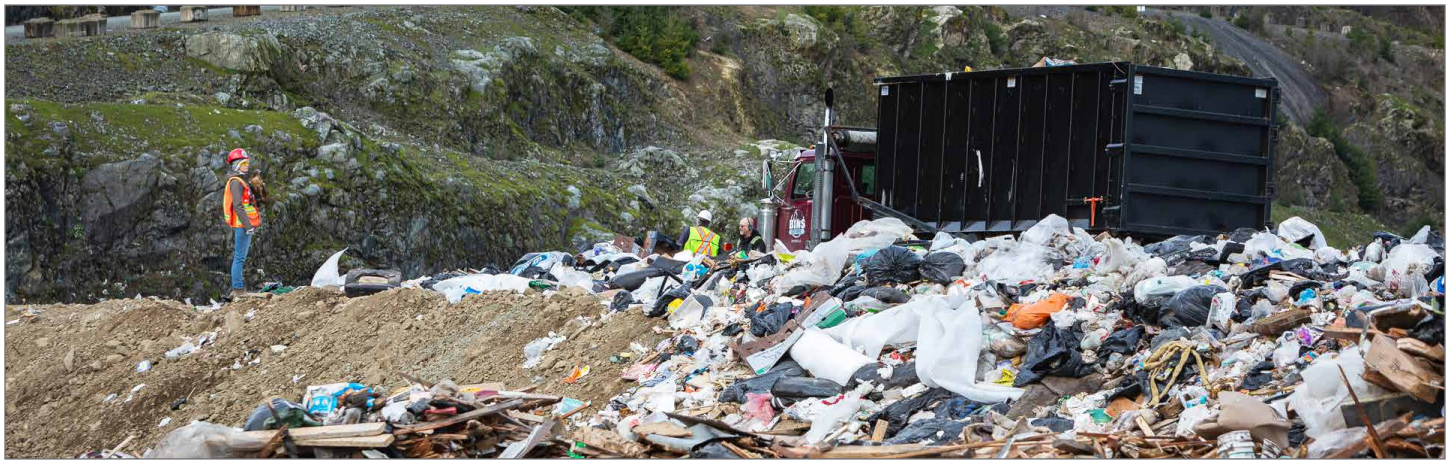
The volume of landfill gas collected at Hartland has exceeded the capacity of the current landfill gas utilization plant, which produces clean electricity. The equipment is also reaching its end of life. As a result, CRD has evaluated two enhanced alternatives: upgrading landfill gas to renewable natural gas (a carbon neutral form of biogas) for sale to FortisBC or expanding the capacity of the current plant to produce more electricity. Maximizing landfill gas management can have both environmental and financial benefit for the community. It can also foster a greater circular economy, using waste to generate energy. A decision on the future of landfill gas utilization will be made in 2020.

Residuals Management

Hartland is a multi-purpose site which, in addition to landfill services for general refuse and controlled waste, provides drop off for recycling, stewardship items, compostables and household hazardous waste.

Hartland has received the Silver Landfill Management Excellence Award from the Solid Waste Association of North America, as well as awards for leadership and innovation in gas utilization and best practices for household hazardous waste collection.

The CRD has also received awards for safety initiatives, including the prestigious National Award for Best Safety Week Program in Canada, in which Hartland Landfill played a major role.



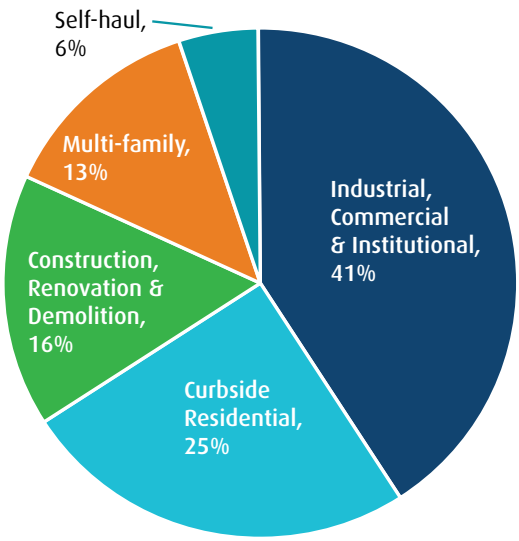
LANDFILLING

The site operates under a Design, Operations and Closure Plan, in accordance with an Operational Certificate issued by the ministry, as well as the BC Landfill Criteria for Municipal Solid Waste, and the CRD's solid waste management plan. There is also a provincial authorization in place for asbestos management. Municipal solid waste is typically landfilled using the advanced terracing method. This technique enables the management of surface runoff and leachate flow, as well as control of long-term settlement. It consists of advancing the filling area with vehicular access provided atop the preceding day's refuse.

A landfill compactor is used to grade and compress refuse while maintaining a desired slope at a constant width. Hartland's compaction rate exceeds 950 kg/m^3 and all refuse is covered daily with synthetic tarps and aggregate quarried on-site to cover the side slopes and vehicle access areas.

Controlled waste, such as sewage sludge, condemned food and animal carcasses is landfilled in trenches dug in completed waste lifts and covered daily with chipped wood waste, aggregate or clay to reduce odours. Asbestos is landfilled in segregated areas of the site and is covered daily with aggregate or soil.

SECTORS CONTRIBUTING TO WASTE DISPOSAL



TOTAL REFUSE BY TYPE (tonnes)

TYPE OF WASTE	2018	2019	% CHANGE
General refuse	146,431	145,402	-1%
Controlled waste	10,417	11,512	11%
Asbestos containing material	3,094	3,813	23%
TOTAL	159,942	160,727	0%

LANDFILL DISPOSAL RATES

Landfill tipping fees provide a financial incentive to reduce the quantity of solid waste being brought to the landfill for disposal. The tipping fee structure for 2019 included:

- $110/tonne for general refuse
- $157 to $500/tonne for controlled waste
- $254/tonne for bulky waste

LANDFILL MATERIAL RESTRICTIONS

Landfill restrictions have been part of the CRD waste diversion strategy since 1991 and are only implemented when viable and sustainable recycling alternatives exist.

Recyclable materials banned from disposal include:

- 1991: drywall
- 1993: corrugated cardboard, white goods, tires, directories
- 1995: scrap metal, aggregate, concrete, asphalt, rubble, clean soil
- 1998: paper fibres
- 2006: yard and garden material
- 2011: extended producer responsibility products

CRUISE SHIP WASTE

In 2019, Hartland Landfill received approximately 2,100 tonnes of cruise ship waste, representing about 1.3% of all solid waste landfilled for the year. This is an increase over the previous year.

CRD staff have been in discussions with the Greater Victoria Harbour Authority and Tymac Launch Service Limited (Tymac), the solid waste contractor, to ensure cruise ship waste diversion is increased in 2020. Tymac has developed comprehensive waste-handling guidelines for cruise ship staff to use for managing waste when they are in the port of Victoria. The guidelines include procedures for diverting recyclable materials, managing hazardous waste and segregating banned items.

In Canada, solid waste from cruise ships is managed according to the International Waste Directive under the authority of the Canada Border Service Agency and the Canadian Food Inspection Agency. At Hartland Landfill, international waste is currently charged at the controlled waste fee of $157 per tonne, not the general refuse fee of $110 per tonne.

CRUISE SHIP WASTE

YEAR	SHIPS	LOW RISK (tonnes)	HIGH RISK (tonnes)	TOTAL (tonnes)
2016	224	255	22	278
2017	239	279	84	763
2018	243	295	9	304
2019	256	1,468	613	2,082

CONTROLLED AND DEMOLITION WASTES

Landfilling of certain types of wastes creates a potential nuisance, health and safety concerns for staff, or environmental concerns beyond those expected from regular household refuse. Wastes such as asbestos, demolition wastes, animal fecal wastes, or deceased animals require special handling to protect the health and safety of employees and to minimize nuisance, odours, and scavenging by birds.

There are four regulated waste types at Hartland:

ASBESTOS WASTE

CONTROLLED WASTE

CLEAN DEMOLITION WASTE (commercial)

RENOVATION WASTE (residential)

The risks associated with these regulated wastes vary and each type is managed differently. These wastes require permits and usually an appointment for disposal. The number of permits issued annually has been increasing since 2013. This is attributed to population growth, a strong economy, and recent permitting requirements for demolition wastes.

BYLAW ENFORCEMENT

CRD Bylaw 3881 (Hartland Landfill Tipping Fee and Regulation Bylaw) regulates activities at the Hartland site. CRD bylaw enforcement officers and landfill staff ensure Hartland customers adhere to site regulations.

In 2019, 76 written warnings and 320 enforcement tickets were issued. The majority of enforcement tickets were in relation to the deposit of recyclable material (46%), extended producer responsibility products (19%), kitchen scraps (18%) and prohibited waste (9%), which comprised 83% of the tickets levied.

SAFETY AND LANDFILL FIRES

Landfill fires happen periodically at Hartland. Typically this occurs as a result of improper disposal of household hazardous waste, such as chemicals and product stewardship items like electronics with lithium-ion batteries. Staff and local emergency services personnel respond to fire incidents at the active face following an established fire safety plan.

LANDFILL CAPITAL WORKS

Each year, the CRD invests approximately $3 million in capital works that cover rock excavation and crushing, leachate and gas management infrastructure, environmental controls, roads and site improvements. In 1997, Phase 1 of the landfill site was closed and the filling of Phase 2 (Heal Basin) was initiated. It is expected that Phase 2 will continue to receive landfill materials until about 2047, at which time it will have reached its current design capacity.

In 2019, a new master filling plan was finalized, including analysis and design to better optimize site capacity; understand aggregate removal and stockpile mass balances; plan progressive closures and storm water diversion; maximize gas and leachate collection systems; and to evaluate construction and compaction methods to achieve lifespan goals.

Engineering staff achievements for 2018 include:

- project management, supervision, and direction for Hartland Landfilling Operations' heavy equipment services contract
- completed the filling of 163 m lift and shaping the south slope before starting a 167 m lift
- annual installation of new combined gas/leachate collection infrastructure in the Phase 2 Cell 3 159 m and 163 m lifts
- design and construction of a new aggregate stockpile storage area adjacent to the northern extent of the landfilling footprint boundary road and perforated pipe underdrain
- finished constructing new foundations for scale pits and building at Hartland North and underground utility services
- constructed new gravel pad for wood waste as well as yard and garden materials, then expanded storage area used after grinding operation
- repaired leaking water main to truck wheel wash (to avoid a costly replacement)

SITE RECLAMATION

Since the Phase 1 closure, significant efforts have been made towards site rehabilitation.

A long-standing vision for Hartland Landfill is to restore the land to a condition that will blend in naturally with the surrounding forest. Planting began in 2004 and includes Douglas Fir, Big Leaf Maple and Red Alder, as well as ocean spray, Indian plum and mock orange (all of which are native to the area).

Cell 1 final closure design was completed in 2010, which included a final cover complete with a new wetland sedimentation pond, in addition to gas, leachate and road upgrades.

Over 22,000 trees and bushes have been planted over Phase 1 of Hartland Landfill. Annual invasive species removal projects are conducted in these reclaimed areas to encourage native plant species. An additional 3,500 to 4,000 poplar and fir trees will be planted in 2020 over Phase 2 side slope areas.

LEACHATE MANAGEMENT

Leachate is a liquid that is produced when precipitation comes into contact with decomposing refuse. To minimize the leachate generated on site, impermeable covers are installed over completed landfill areas to divert clean surface water away from becoming leachate.

In 2018, extension of a temporary closure system on the North/East Face of Phase 2 Cell 2 was constructed using a linear, low-density polyethylene tarpaulin cover system. This temporary closure reduces the total leachate generation area of the landfill.

ENVIRONMENTAL MONITORING

Environmental science officers at Hartland Landfill employ a number of control measures to prevent or reduce potential effects on groundwater, surface water and air. Through over 40 years of engineered controls, groundwater and surface water quality at Hartland Landfill has continually improved. An environmental monitoring, assessment and management program is conducted in accordance with ministry requirements. The monitoring program measures water quality at and near the landfill and assesses the effectiveness of control measures.

Groundwater quality monitoring data obtained in 2019 was similar to previous years and indicated that landfill leachate continues to be effectively contained and controlled on site. Leachate quality monitoring confirmed that leachate discharged from the site was in compliance with CRD Bylaw 2922 (Sewer Use Bylaw), which regulates discharges to the sanitary sewer. Surface water monitoring in 2019 indicated that nearby surface water bodies, Tod Creek, Durrance Creek, Durrance Lake, and Killarney Lake, are not impacted by leachate.

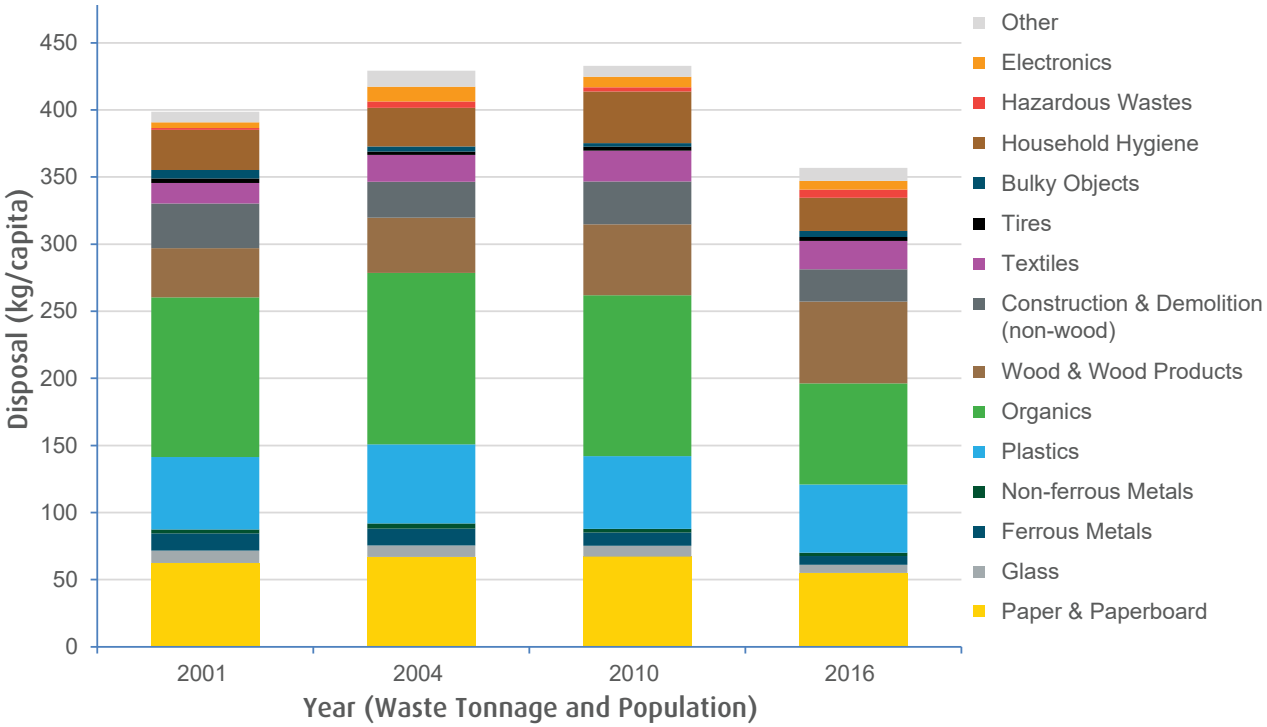
Landfill gas monitoring confirmed that the landfill gas collection system worked effectively to control emissions. Landfill gas infrastructure continues to be installed as part of a long-term gas management plan.

WASTE STREAM ANALYSIS

Since 1990, the CRD has commissioned six studies to assess the composition of waste being landfilled at Hartland. These studies provide valuable benchmark data and analysis for evaluating the success of existing solid waste programs and planning future initiatives. The most recent analysis took place in 2016. The results indicate a broad regional trend towards decreased per capita waste generation.

Per capita organic waste generation dropped by 37.5%, confirming the successful launch of the 2015 kitchen scraps ban. Per capita paper disposal decreased by 18% and plastics by 5%, while wood and wood products increased by 15%, likely due to more construction activities in the region. All other materials remained relatively consistent compared to the previous study in 2010.

Solid Waste Stream Composition Study Results



Community Support Programs

COMMUNITY CLEAN-UP FUNDING

Since 1997, the CRD's Community Clean-up Program has been supporting non-profit groups that make visible environmental improvements to their community through organized clean-ups

Funding provided supports:

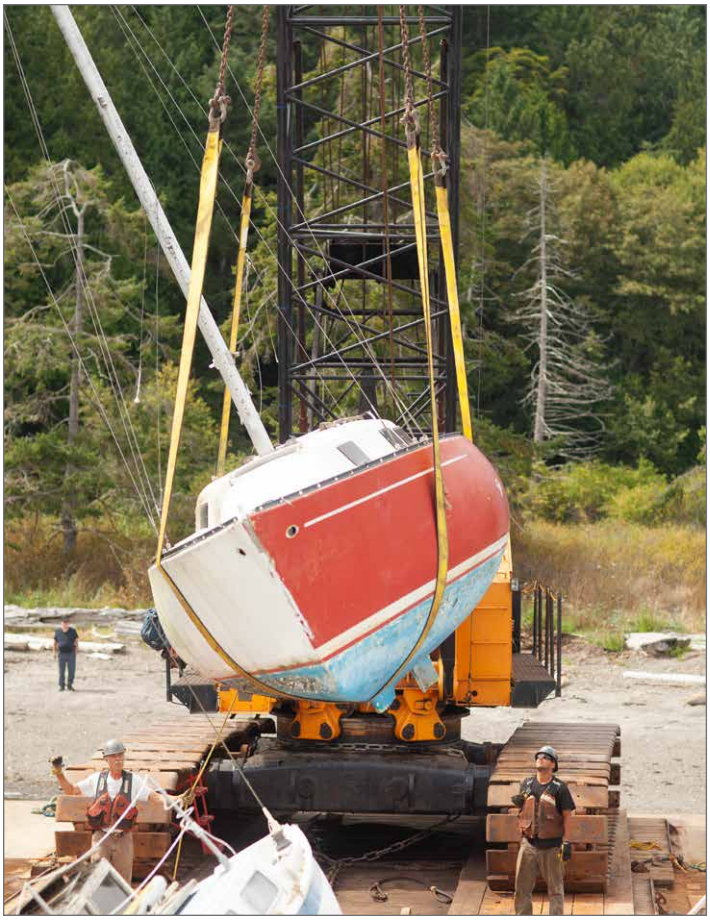
- Collection, processing and marketing of recyclables recovered during clean-up
- Container rental for transportation and disposal of non-recyclable material
- Supplies, such as rubber gloves and collection bags

In 2019, the CRD provided funding to nine community groups.

ABANDONED BOAT PROGRAM

In 2019, the CRD used funds received through the Transport Canada Abandoned Boat Program to work with a community partner, the Dead Boats Disposal Society, to assess and remove approximately 70 boats from the region's harbours.

The federal funding covered 100% of the assessments costs, and 75% of the removal and disposal costs for approved vessels. The CRD provided 25% of the required funding for removal and disposal costs through the ERM Sustainability Reserve Fund.



The boats were primarily from three harbours on Salt Spring Island, Port Browning on Pender Island, Montague Harbour on Galiano Island, Sooke Harbour and Cadboro Bay. The Dead Boats Disposal Society contracted Salish Sea Industries to complete the removal work. The total weight of derelict boats disposed of at Hartland Landfill was 76 tonnes.

The CRD also received $66,700 in federal funding for education and awareness, which was used to launch and promote a public awareness campaign asking people to report abandoned and boats to the CRD Infoline. Radio, print and social media ads were used, as well as ads on the back of transit buses. It was a successful campaign with over 120 reports of abandoned boats received.

MARINE DEBRIS PROGRAM

The CRD provided funding for municipalities to dispose of marine debris (wharves, docks, flotation, fishing gear, etc.) that was not covered by the Abandoned Boat funding. In 2019, 4.45 tonnes of debris was disposed of at the landfill through this program.

Financial Management

All costs associated with solid waste disposal and diversion programs in the capital region are funded through tipping and user fee revenues at Hartland Landfill, collection contract revenues, sale of electricity and sale of recyclables.

A sustainable financial business model is essential for the provision of solid waste services.

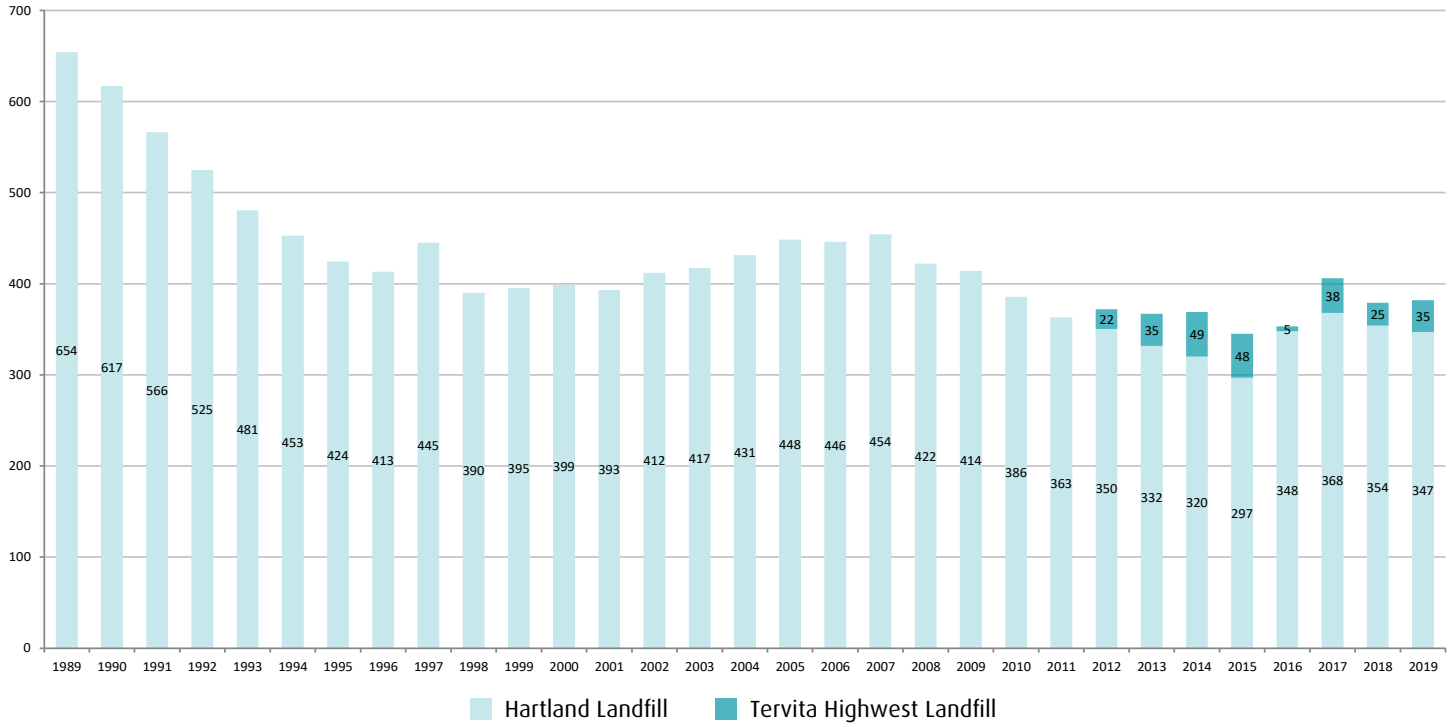
This form of financing has practical limits as diversion increases and landfill volumes decline.

Long-term financial sustainability of the CRD solid waste function will form a critical part of the new solid waste management plan.

REVENUES	
Tipping fees	$18,718,566
Extended producer responsibility programs	$6,186,704
Recycling program revenues	$2,059,177
Power plant	$536,639
Permits, fines and miscellaneous	$145,464
From reserve	-
TOTAL FOR 2019	**$27,646,550**
COSTS	
Landfill operations	$6,322,070
Curbside recycling	$5,967,681
Hartland diversion programs	$4,519,716
Closure and post-closure fund	$920,000
Power plant costs	$885,179
Electoral Area recycling programs	$639,818
Planning	$551,842
Leachate	$506,812
Debt charges	$439,623
Capital spending	$324,000
Equipment and vehicle fund	$283,000
Community support programs	$239,737
Sustainability reserve	$6,047,072
TOTAL FOR 2019	**$27,646,550**

Waste Disposal Data

CRD Disposal Rate (Kg/Capita)



Year	Population	Hartland Landfill			Tervita Highwest Landfill	Disposal Rate (kg/ person)
		Received	Beneficial Use	Landfilled		
2012	368,935	129,279	n/a	129,279	7,880	372
2013	371,265	123,210	n/a	123,210	13,025	367
2014	372,463	120,942	-1,636	119,306	18,000	369
2015	377,810	114,476	-2,034	112,442	18,000	345
2016	382,645	134,167	-971	133,196	2,056	353
2017	392,046	145,285	-917	144,368	15,000	407
2018	413,406	148,551	-2,120	146,431	10,500	380
2019	418,511	146,544	-1,142	145,402	7,875	382

PER CAPITA DISPOSAL

In 2012, the Province of British Columbia began using per capita disposal rates as the standard solid waste metric and is targeting 350 kg/capita by 2020.

Based on the provincial government's calculation method, the disposal rate for the capital region was 382 kg/capita in 2019.

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Capital Regional District
625 Fisgard Street
Victoria, BC V8W 2S6