



solid waste management plan



Beyond Recycling

final draft

Solid Waste Management Plan

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Executive Summary

In British Columbia, regional districts are mandated by the Provincial *Waste Management Act* to develop Solid Waste Management Plans that are long term visions of how each regional district would like to manage their solid wastes, including waste diversion and disposal activities. The Regional District of Nanaimo (RDN) prepared their first Solid Waste Management Plan in 1988 and amended that plan in 1996 to include a “3Rs Plan”. This Solid Waste Management Plan update addresses both waste diversion and residual waste management and will serve to guide solid waste management related activities and policy development in the RDN over the coming years.

This updated plan has three main components:

1. An update of the 3Rs Plan, evolving it into a Zero Waste Plan;
2. The Stage Three Residual Waste Management Plan; and
3. A Waste Stream Management Licensing Bylaw.

Zero Waste Plan

In 2002 the RDN adopted “zero” as their waste diversion target, meaning that the RDN will continuously strive to reduce the amount of waste requiring disposal. The following is a list of the programs included in the Zero Waste Plan:

Ongoing Programs

- Compost Education Program
- School Education Program
- Zero Waste Promotion and Education
- Illegal Dumping Program
- Yard Waste Composting
- Recycling at RDN Disposal Facilities
- Residential Curbside Garbage and Recycling

Included in 2004 Budget

- Expanded Disposal Bans
- Waste Composition Study
- Curbside Organics Collection Study
- WSML Technical Assistance

New Programs (Implementation 2005-2007)

- Single Family Organics Collection Pilot
- Construction/Demolition Waste Market Study
- User Pay Review
- RDN Internal Zero Waste Policy
- Single Family Organics Collection

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The cost to implement the Zero Waste Plan is estimated to range from \$2.4 million in 2004 (primarily for existing programs) to \$2.9 million in 2009. The cost increase can be contributed chiefly to the addition of the curbside organics collection program. The Zero Waste Plan is to be implemented with the RDN's existing solid waste staff complement. As needed, research, studies and some services will be contracted out. Fully implemented, the Zero Waste Plan will increase the waste diversion rate to roughly 75%.

Residual Waste Management Plan

The waste that cannot be eliminated or diverted through composting or recycling is referred to as "residual waste," and ultimately requires disposal. The Residual Waste Management Plan addresses the long-term disposal needs of the region and aims to minimize social, environmental and financial impacts and risks. The Residual Waste Management Plan contains the following major features:

- The existing residual waste collection system will be maintained in its current configuration;
- Continued use of the Church Road Transfer Station (CRTS) to service the northern portion of the Regional District;
- Export of the waste received at CRTS to the Wastech landfill in Cache Creek. As the current waste export contract with the Greater Vancouver Regional District (GVRD) expires at the end of 2007, a review of alternative waste export options will be completed by 2006;
- Continued use of the Regional Landfill to service the southern portion of the regional district and receive waste that cannot be exported to the Wastech landfill. The capacity of the landfill will be optimized through the construction of a geogrid toe berm on the south side of the landfill, thereby extending the life of the landfill by 7 to 10 years (roughly 2012);
- The RDN will continue to promote the use of existing Provincial and private stewardship programs for the disposal of household hazardous wastes. Additionally, the RDN will encourage new stewardship programs for other hazardous components of the municipal solid waste stream, such as electronic goods, dry cell batteries and rechargeable batteries;
- Discontinuation of the stump burn site located in the north end of Nanaimo once a Waste Stream Management License is issued for processing land clearing waste;
- The acquisition of a site for a transfer station to support full waste export or an alternative disposal technology;
- Researching new and emerging residual waste management technologies that could reduce the RDN's reliance on landfilling and waste export; and
- Continued dialogue with other Vancouver Island regional districts to establish cooperative strategies for the management of solid waste. It is anticipated that if any emerging residual waste management technology has merit for the RDN, it would likely be implemented in conjunction with other Vancouver Island regional districts.

All of the elements of the Residual Waste Management Plan, with the exception of the geogrid toe berm at the Regional Landfill, will be funded within the existing annual solid waste

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management budget. The expenditures associated with construction of the toe berm will be funded from the solid waste reserve. No additional staff will be required to implement the Residual Waste Management Plan. As required, consultants and contractors will be hired to undertake research, studies and construction projects.

Waste Stream Management Licensing Bylaw

The final component of the updated Solid Waste Management Plan is the Waste Stream Management Licensing Bylaw. This bylaw involves licensing private and non-government municipal solid waste management and recycling facilities within the district and penalties for contraventions to the bylaw. All facilities (operations or properties) that handle municipal solid waste such as transfer stations, recycling depots, composting facilities, and material recovery facilities are to be included in the licensing system.

Plan Implementation and Approvals

The implementation of the updated Plan will begin in 2004, with all elements of the Plan anticipated to be in place by 2007. Cost recovery mechanisms to fund the Plan's implementation include user rates, tipping fees, taxation, sponsorship and grants.

A draft of this plan will be subject to public consultation in May 2004. Input from the consultation process will be incorporated into the final version of the plan which will be presented to the Regional Board for their approval. Once approved by the Board, it will be submitted to the BC Minister of Water, Land and Air Protection for final approval.

1. Background

In British Columbia, Regional Districts are mandated by the Provincial *Waste Management Act* to develop Solid Waste Management Plans that are long term visions of how each regional district would like to manage their solid wastes, including waste diversion and disposal activities. These Plans are updated on a regular basis to ensure that the Plan reflects the current needs of the regional district, as well as current market conditions, technologies and regulations.

The Regional District of Nanaimo (RDN) has prepared their first Solid Waste Management Plan in 1988 and amended that plan in 1996. The history of the planning process is discussed further in Section 2.0, “Plan History”. This draft document represents the most recent amendment of the RDN’s Solid Waste Management Plan and once approved by the Province, it will become the RDN’s new plan and serve to guide solid waste management related activities and policy development in the RDN.

◆ Guiding Principles

The guiding principles for the Solid Waste Management Plan are:

1. The consumption of material and energy resources is set at a level that is ecologically sustainable.
2. The regional solid waste stream is reduced to the greatest extent possible, in accordance with the hierarchy of reduce, reuse, and recycle, and consistent with local resources and the nature of the regional solid waste stream.
3. The goal of environmental policy is to not exceed the capacity of the environment to accept waste and the strategies for achieving that goal cautiously anticipate the environment’s capacity.
4. Individuals and firms are enabled to make environmentally sound choices about consumption of resources and generation of waste through provision of appropriate information, including user-pay and market-based incentives, wherever possible.
5. Reduction policies and strategies are developed through public consultation in a cooperative manner between government, private enterprise and community stakeholders. This may entail more flexibility in existing procedures and the setting precedents. The cost effectiveness of any strategy will be based on full accounting of costs and benefits, both monetary and non-monetary.
6. The strategies and policies promote community development whenever possible.

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7. All parties must have equal access to relevant information and the opportunity to participate effectively throughout the process.
8. Openness and trust between stakeholders are the keys to a successful process.

2. Plan History

The Province approved the RDN's original Solid Waste Management Plan (SWMP) in 1988. The main elements of this plan were a transfer station, a resource recovery facility and a sanitary landfill to manage the residuals from the facility (estimated to be 20% of the waste stream). The resource recovery plant was never built due to the inability of the facility's proponent to secure financing. Consequently, the RDN's new landfill was receiving 100% of the waste stream and was filling up much faster than anticipated at its inception. As a result, the RDN began to amend their solid waste management plan in 1992. This section describes the evolution of the RDN's solid waste management plan since 1992.

◆ Plan Amendments

The Provincial Guidelines for Solid Waste Management Plans recommends that the planning process occur in three stages. The RDN has attempted to follow the guidelines to the greatest extent possible to ensure that the intent of the guidelines – a thorough, integrated solid waste plan that has been developed with stakeholder and public input – is realized.

i. Stage One

In 1992, the RDN Board began to amend the existing plan to:

- recognize “reduction” in the creation of waste as the priority in solid waste management;
- reflect the Region's growth in population;
- identify disposal options to handle residual waste not diverted through reduction, reuse and recycling programs; and
- recognize the Province's goal of 50% waste reduction.

The Stage One report was developed in 1992 as part of a technical review of the 1988 plan. The Stage One document, entitled “Technical Report: Solid Waste Management Plan Review”, reviewed the existing solid waste management system, identified a number of waste reduction, recycling and composting options, recommended options to reduce solid waste generation, and identified a pressing need to develop solid waste disposal alternatives.

From 1992 to 1996, a number of this report's recommendations were implemented including user pay garbage collection, curbside collection of recyclable materials and a backyard composter distribution program. As a result, waste diversion increased in the RDN from roughly 7% in 1991 to 39% in 1996.

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ii. Stage Two

Stage Two began in 1994 and involved the formation of a solid waste advisory committee (comprised of local stakeholders and technical experts), the hiring of consultants to assist with the technical studies and a public outreach process to ensure that the public was informed of the planning process and had the opportunity to provide input.

Early in Stage Two, it was decided to split the plan amendment process into two components: a waste diversion planning exercise to determine the best approach for meeting the 50% waste diversion objectives; and a residual management plan for managing the waste remaining after waste reduction efforts.

3Rs Plan

The Stage Two waste diversion planning exercise was completed in June 1996. From that exercise the RDN's *3Rs Plan* was developed and subject to an extensive public consultation process. This plan amendment was completed in August 1996 and approved by the Minister of Environment, Lands and Parks in April 1997. Included in the package sent to the Minister for approval were:

- Stage One Report (*Technical Report: Solid Waste Management Plan Review*) that represents the Stage One of both the waste diversion and the residual waste management planning exercise;
- Stage Two Technical Memoranda of the Waste Diversion Planning Exercise:
 - Solid Waste Quantities and Composition;
 - Existing Solid Waste Management System;
 - 3Rs Alternatives (Long List); and
 - Shortlisted Alternatives/Scenarios.
- Stage Two Report: 3Rs Plan; and
- 3Rs Plan Public Consultation Report.

The *3Rs Plan* contained programs and policy initiatives to reduce the RDN's solid waste requiring disposal by approximately 70%. Implementation of the plan has been on-going. However, two major elements of the plan, a privately built and operated composting facility for source-separated organics and a privately built and operated construction and demolition waste recycling facility have not been built.¹ As a result, the RDN's waste diversion rate in 2002 was 56%.

Stage Two Residual Waste Management Plan

The waste that cannot be eliminated or diverted through composting or recycling is referred to as "residual waste," and ultimately requires disposal through landfilling. The RDN focused on

¹ A privately built and operated composting facility is expected to be operational in Nanaimo in 2004. The impact of this facility on waste diversion will not be measurable until 2005.

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developing the Residual Waste Management Plan to address the long-term disposal needs of the region upon completion of the 3Rs Plan.

The objectives of the residual waste management plan are to develop a system that maximizes waste diversion and minimizes social, environmental and financial impacts and risks. The residual waste planning exercise had two major components: a review of *processing technologies* that can further reduce the volume of residual waste requiring disposal and a review of *disposal options* for any remaining waste.

Figure 2-1 provides a schematic diagram of the process showing the evolution of the two components. Processing technologies that were considered during the planning process were incineration, energy-from-waste, pyrolysis, vitrification, and municipal solid waste composting. Of these options, only MSW composting was determined to be worthy of further consideration.

The review of disposal options considered siting a new landfill, mining the existing landfill and waste export. Of these options, siting a new landfill and waste export were determined to be worthy of further consideration.

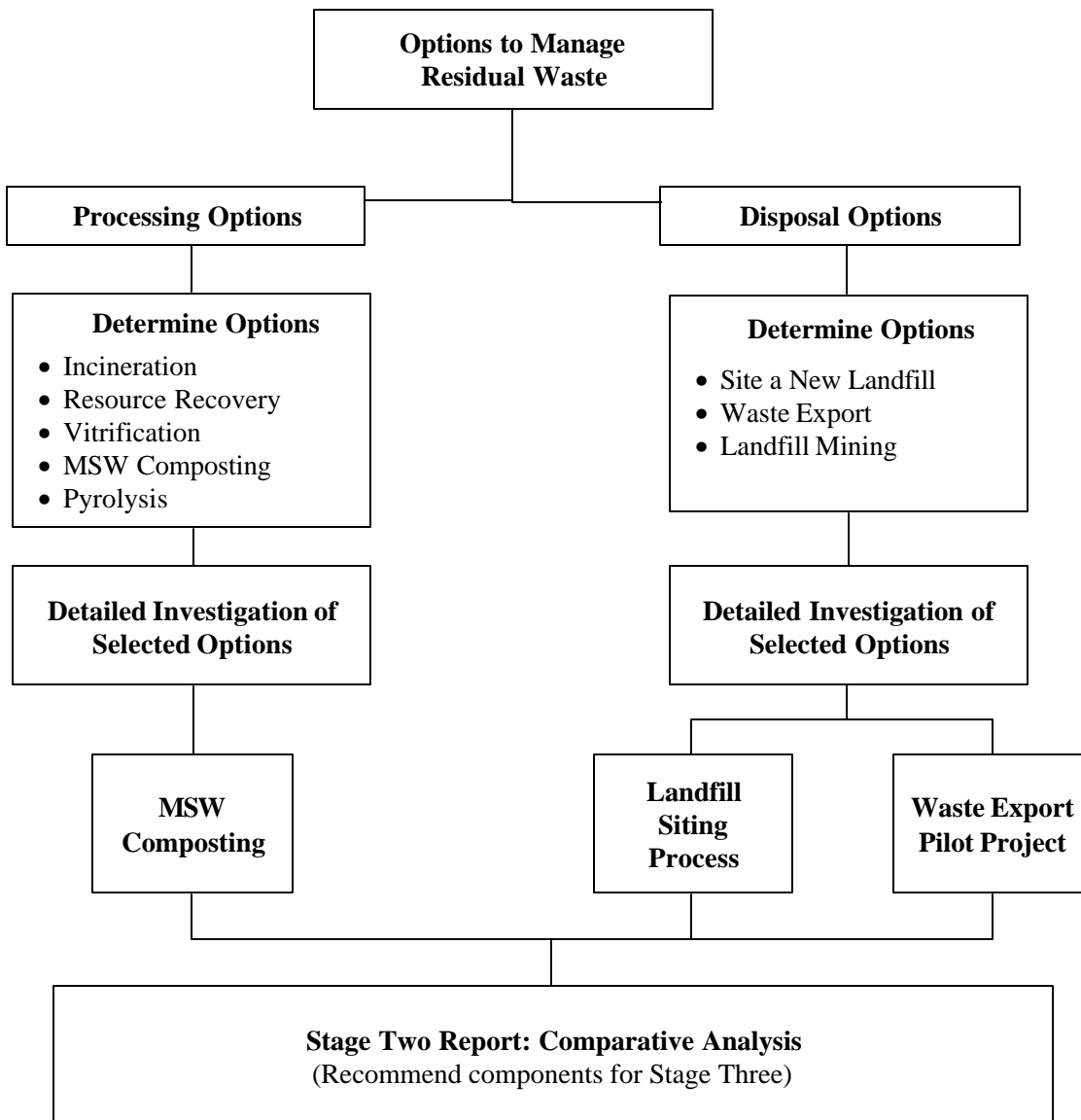
MSW composting, landfill siting and waste export underwent an extensive technical and public review. At the RDN Board meeting on September 14, 1999, the following recommendations were approved as part of the residual waste management planning exercise. These recommendations concluded the Stage Two plan amendment process:

1. That, barring exceptional circumstances, a landfill not be further considered as a residual waste management option at this time;
2. That MSW composting not be further considered as a residual waste management option at this time;
3. That waste export be considered as the only viable residual waste management option at this time and that discussion be initiated with the GVRD and other out-of-region landfill operators to obtain a long-term contract to export the region's waste stream;

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Figure 2-1 Stages One and Two of the Residual Waste Management Planning Process

1.



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4. That the region enter into discussions with the short-listed source separated composting vendors for the development of a privately owned and operated facility;
5. That inter-regional solid waste management initiatives be further explored;
6. That a common framework amongst regional districts regulating the operation of composting facilities be adopted;
7. That commercial organics be banned from disposal once appropriate composting facilities are in place; and
8. That the RDN undertake a pilot residential organic waste collection program to assess the viability and applicability of source-separated organics collection.

iii. **Stage Three**

The third and final stage of the planning process brings the waste diversion and the residuals management planning processes together into one Solid Waste Management Plan for the RDN. This plan has three main components:

1. An update of the 3Rs Plan, evolving it into a Zero Waste Plan;
2. The Stage Three Residual Waste Management Plan; and
3. Waste Stream Management Licensing, which will influence both the diversion and residual management activities in the RDN.

Each of these components is described in detail in the remainder of this document.

◆ **Participants in the Planning Process**

Many groups participated in the planning process; these were:

- Ministry of Water, Land and Air Protection provided advice and direction to the RDN in regard to the planning process and the plan's options.
- Regional Board reviewed, commented and approved documents that resulted from the planning process, and provided direction to staff and consultants.
- RDN staff coordinated the planning process, participated directly in the development of technical reports and conducted the stakeholder and public consultation processes.

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- Consultants undertook technical studies, advised RDN staff and participated in the consultation processes.
- Regional Waste Advisory Committee (RWAC), formerly the Solid Waste Advisory Committee, comprised of stakeholders from as broad a range of interests as possible (including environmental groups, citizen advocacy groups, local businesses and waste management companies) was responsible for reviewing information associated with solid waste management and the planning process, and provided input to staff and the Board. RWAC also assisted by informing their constituents about the planning process and the implications of decisions made during the process.
- The general public became informed of solid waste management issues and the planning process, and provided input to the Board and the project team.

3. Plan Area

The Regional District of Nanaimo covers an area of approximately 207,000 hectares on the southeast coast of Vancouver Island. The Regional District of Nanaimo includes four incorporated municipalities and eight unincorporated electoral areas. A map of the RDN is provided as Figure 3-1.

The four municipalities in the region are the City of Nanaimo, the District of Lantzville, the City of Parksville, and the Town of Qualicum Beach. The eight electoral areas in the region are:

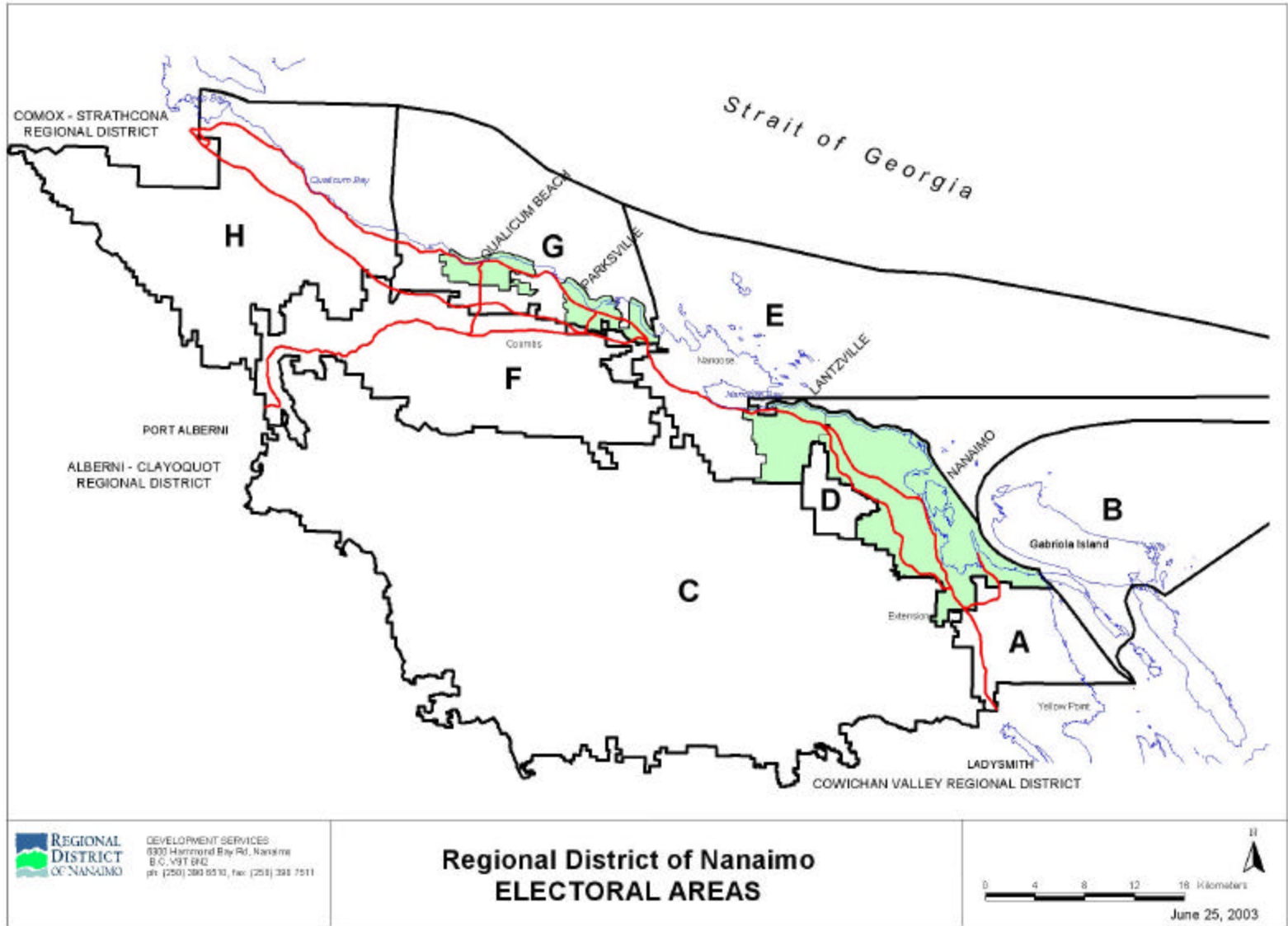
- A: Cedar, South Wellington and Cassidy;
- B: Gabriola, Decourcy and Mudge Islands;
- C: Extension, Nanaimo Lakes;
- D: East Wellington, Pleasant Valley;
- E: Nanoose Bay;
- F: Coombs, Hilliers, Errington;
- G: French Creek, San Pareil; and
- H: Bowser, Qualicum Bay.

Six Indian Reserves are also located within the region:

- Nanaimo 1, 2, 3 & 4 (Snuneymuxw First Nation);
- Nanoose (Nanoose First Nation); and
- Qualicum (Qualicum First Nation).

As shown in Table 3-1, approximately, thirty percent of the residents in the RDN live in electoral areas and seventy percent of the residents live in municipalities.

Figure 3-1 Map of the RDN



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Table 3-1 Population by Area

Area Population, 2001	
Electoral Area A	6,423
Electoral Area B	3,522
Electoral Area C	929
Electoral Area D	1,118
Electoral Area E	4,820
Electoral Area F	5,546
Electoral Area G	7,041
Electoral Area H	3,108
Sub-Total	32,507
City of Nanaimo	73,000
District of Lantzville	3,538
City of Parksville	10,323
Town of Qualicum Beach	6,921
Sub-Total	93,782
Nanaimo Indian Reserve 1	238
Nanaimo Indian Reserve 2	20
Nanaimo Indian Reserve 3	33
Nanaimo Indian Reserve 4	158
Nanoose Indian Reserve	207
Qualicum Indian Reserve	71
Sub-Total	727
Total Population (RDN)	127,016

Source: Statistics Canada, www.statscan.ca (2001 Census).

Population Growth

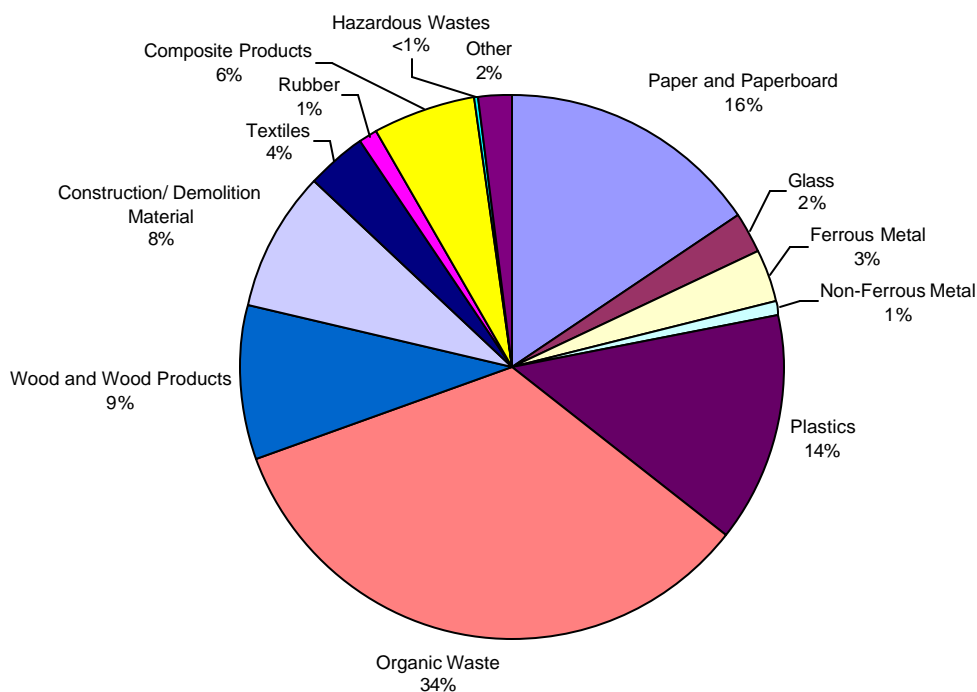
The population of the region increased from 77,624 residents in 1981 to 127,016 residents in 2001. This means the population in the region increased 64% during that time, at a rate of approximately 3% per year, on average. The population of the region is projected to increase to 215,241 by 2026 (BC Statistics, www.bcstats.gov.bc.ca). This represents a 69% increase in population in the region between 2001 and 2026, at a rate of approximately 2.8% per year, on average. BC Statistics estimates that the 2003 population of the RDN was 134,475.

4. Waste Stream Characterization

◆ Composition

The composition of the RDN waste stream is estimated based upon a 2001 waste composition study conducted in the Capital Regional District.² The CRD has similar solid waste management policies and programs, landfill tipping fees and climate to the RDN, hence the data from their study provides a good indication of the composition of the waste disposed in the RDN. The composition, shown in Figure 4-1, indicates that the largest components disposed, by weight, are organic waste (34%), paper products (16%), plastic (14%), construction/demolition waste (8%) and wood (9%).

Figure 4-1 Waste Composition Pie Chart



² Sperling Hansen Associates. 2002.

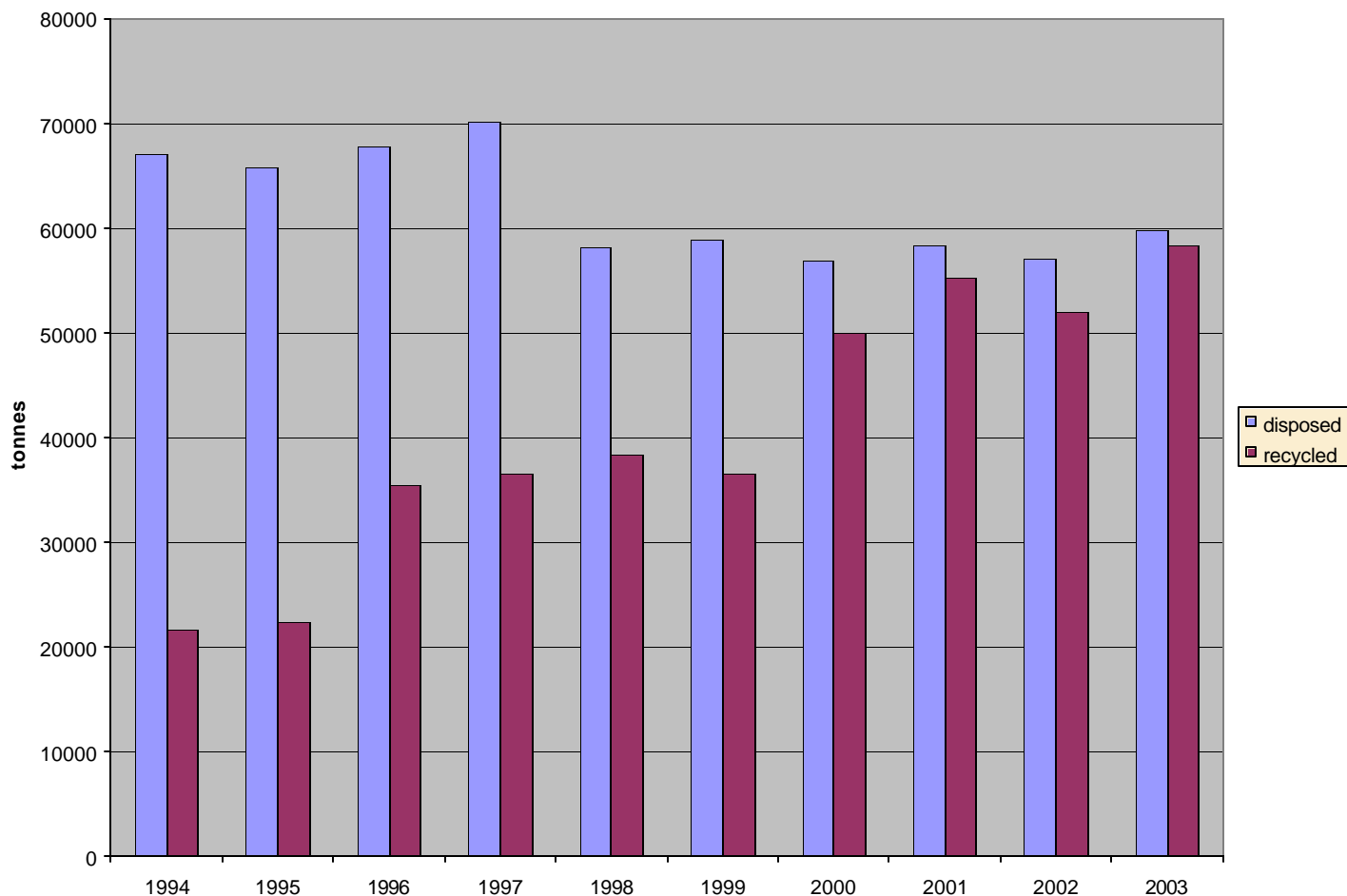
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◆ Quantities

In 2003, the RDN disposed of 59,750 tonnes of waste, recycled 58,300 tonnes of waste materials and diverted an additional 9,100 tonnes of materials through reduction and reuse programs, thereby achieving a diversion rate of 57%³.

Figure 4-2 shows the quantity of waste disposed and recycled in the RDN from 1994 to 2003.

Figure 4-2. Quantity of Waste Disposed and Recycled



³ Diversion rate refers to the amount of materials diverted from landfill through recycling, reuse and reduction activities. Recycling rate refers to the amount of materials diverted from landfill through recycling and centralized composting.

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◆ **Generators**

Of the 59,750 tonnes of waste disposed in 2003, approximately 44% was from the residential sector (primarily single family homes), 47% was from the commercial sector (including multi-family residential buildings) and 9% was from the construction and demolition sector.

◆ **Diversion**

Table 4-1 provides detail on how recycling and composting contributed to the diversion rate from 1999 to 2003. The diversion rate reflects the reported amount of materials recycled and composted and an estimate of the waste reduction achieved through the backyard composting program and the user-pay (one can limit) residential garage collection program.

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Table 4-1 RDN Waste Diversion 1998-2003

<i>Disposal</i>	<i>1998 Tonnes</i>	<i>1999 Tonnes</i>	<i>2000 Tonnes</i>	<i>2001 Tonnes</i>	<i>2002 Tonnes</i>	<i>2003 Tonnes</i>
Municipal Solid Waste	51,041	50,382	48,995	52,154	51,778	54,901
Construction/Demo Waste	6,815	8,237	6,552	5,258	4,853	4,545
Controlled Waste	201	266	1,213	902	449	299
Total Disposed (in landfill)	60,055	58,885	56,895	58,314	57,080	59,745
<i>Diversion</i>						
Public Sector Recycling	9,932	9,459	9,160	9,078	11,120	9,595
Private Sector Recycling	23,221	22,748	30,054	33,866	29,079	37,682
Non-Profit Recycling	115	285	107	115	297	463
Yard Waste Composting	5,094	4,034	6,483	7,728	7,276	6,295
Biosolids Composting			4,191	4,478	4,200	4,283
Subtotal of Recycling	38,362	36,526	49,995	55,265	51,972	58,318
Reduction and Reuse Programs	5,376	7,718	7,390	8,129	8,709	9,186
Total Diverted (Recycling + Reduction + Reuse)	43,738	44,244	57,385	63,394	60,681	67,504
<i>Generation</i>						
Total Disposed (in landfill)	58,057	58,885	56,895	58,314	57,080	59,745
Total Recycled	58,057	36,526	49,995	55,265	51,972	58,318
Total Generated (Disposed + Recycled)	96,419	95,411	106,890	113,579	109,052	118,063
Recycling Rate (Total Recycled/Total Generated)	40%	38%	47%	49%	48%	49%
Total Diverted	43,738	44,244	57,385	63,394	60,681	67,504
Diversion Rate (Total Diversion/Total Generated)	45%	43%	54%	56%	56%	57%
Per Capita Disposal Rate (kg/day)	1.22 kg/day	1.23 kg/day	1.19 kg/day	1.21 kg/day	1.17 kg/day	1.21kg/day

5. Existing Solid Waste Management System

This section describes the RDN's existing solid waste management system, including: collection, transfer and disposal; reduction and reuse programs; residential recycling; ICI recycling; composting; DLC waste management; promotion and education; and policies and regulations.

◆ Waste Collection, Transfer and Disposal

Single family residential waste collection within the RDN is either controlled through jurisdictional contracts with haulers or provided by municipal crews. The RDN (including the City of Parksville) currently contracts out their single family garbage collection service. The City of Nanaimo, the Town of Qualicum Beach and the District of Lantzville provide municipal collection for their residences. Yard waste is not allowed in the residential waste collection program.

ICI and multifamily garbage collection within the RDN is unregulated, with multiple haulers providing service throughout much of the Regional District. A full range of garbage collection services are offered, including can, cart, container and drop-box collection. The City of Nanaimo and Town of Qualicum Beach provide municipally-operated garbage collection to some small ICI generators under its single family collection program.

Collected waste is delivered to one of the RDN disposal facilities: the Church Road Transfer Station or the Regional Landfill. The Church Road Transfer Station services the northern portion of the Regional District, including Parksville and Qualicum Beach (also referred to as School District 69). Waste delivered to the Church Road Transfer Station is dumped on a covered tipping floor, packed into transfer trailers and exported to the Cache Creek landfill under contract with the GVRD. In 2003, 15,825 tonnes of MSW were received at the transfer station in addition to 4,282 tonnes of recyclables and yard waste, and 1,409 tonnes of C/D waste. The MSW was exported to Cache Creek via a contract with the Greater Vancouver Regional District. The CD waste was transferred to the RDN's Regional Landfill. The recyclables were picked up by local recycling companies.

The Regional Landfill is located east of Highway 1 in the southern part of the City of Nanaimo. The Regional Landfill is the only solid waste landfill within the RDN. Waste is delivered directly by haulers, municipal trucks and self-haulers servicing the southern portion of the regional district (also referred to as School District 68). In 2003, 40,111 tonnes of MSW were landfilled at the Regional Landfill. The landfill also received:

- 4,543 tonnes of CD waste which was chipped and used on-site (for road building, etc.) or landfilled (including CD waste transferred from CRTS);

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- 134 tonnes of “special wastes” such as asbestos which was landfilled;
- 165 tonnes of contaminated soil that was landfilled;
- 2,841 tonnes of recyclables that were picked up by various recycling companies; and
- 3,941 tonnes of yard waste which was sent to a composting facility.

The Regional Landfill is a fully engineered facility with a liner system, leachate collection, gas collection, storm water management, bird control and daily cover. The Regional Landfill includes a drop-box transfer area to divert small self-haul vehicles away from the working face of the landfill and a recycling drop-off area. This facility is described further in the Residual Waste Management section of this document.

◆ **Reduction and Reuse Programs**

Reduction and reuse programs are activities that remove materials before they enter the formal recycling and disposal systems. In this sense, materials managed through reduction and reuse activities are never “generated” and are not directly recorded by solid waste tracking systems. The level of reduction and reuse activity is directly reflected through decreased per-capita waste generation (disposal + recycling quantities). A number of reduction and reuse programs are in effect within the RDN.

The RDN distributed 16,500 composters for distribution to the public between 1993 and 2002. Distribution of backyard composters was discontinued in 2003 since most local hardware stores and garden centres were also selling composters. The RDN continues to provide seminars and educational materials (brochures and web-based information) related to reducing yard and organic waste generation.

The RDN has a zero waste school education program that is delivered to local primary schools through contract.

The two waste management non-profit organizations in the RDN, Gabriola Island Recycling Organization (GIRO) and the Nanaimo Recycling Exchange (NRE), provide a significant level of reuse and reduction education and activity. There are also many reuse operations include thrift and reuse stores operated by private businesses and charities in the RDN. These operations provide a large degree of waste diversion and serve to decrease the per-capita waste generation within the RDN.

◆ Residential Recycling

There are two types of residential recycling programs in the RDN: curbside collection and depot-based. All single family residences (e.g. residences with can-based garbage collection) within the RDN have access to curbside collection through the City of Nanaimo's two-bag collection program and the RDN's blue box, two bag collection program. Both of these programs contract out the collection and processing of recyclables. Some multifamily buildings have on-site recycling services provided by private contractors. Multifamily recycling is not part of either the City of Nanaimo or the RDN curbside collection programs.

Several recycling depots accepting a variety of materials are also available to the public. Depots are operated by the RDN at their waste management facilities, by the City of Nanaimo at their works yard, GIRO, NRE and several private operators (mainly at bottle depots).

Curbside collection and drop-off programs within the RDN collected a total of 10,000 tonnes of recyclables in 2003. Most of this material was collected curbside, with a lesser amount collected through depots.

◆ Industrial, Commercial and Institutional (ICI) Recycling

Most of the haulers providing ICI garbage collection also offer a parallel cardboard or multi-material recycling collection service to assist their customers to comply with the RDN's disposal bans. Private recyclers also offer the collection of a number of recyclables, including cardboard, paper, tires and metals. There are also collection services provided for commercial volumes of recyclable special wastes including motor oil, oil filters and antifreeze; however these materials are not considered solid waste and are not accounted for in the RDN's solid waste tracking system or planning exercise.

Of the estimated 58,000 total tonnes of recyclables were handled in 2002, 38,000 tonnes (65%) are considered to be ICI in origin.

The amount of material independently recycled by generators within the RDN is unknown. Major ICI generators often have sufficient quantities of recyclable materials to bypass commercial collection services and ship directly to out-of-region markets. In addition, some retail distribution systems incorporate a back haul system for recycling certain materials.

For example, many chain retail stores bale cardboard and ship bales back to distribution centers in returning trucks. Truckload quantities are then consolidated at the distribution center and brokered to markets. Other large industrial operators (e.g. mills, heavy equipment manufacturers) generate large quantities of specialty metals and may grade and ship scrap directly to markets. Materials managed in this way by generators are not included in the waste

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flow quantities described above, since these materials would not otherwise enter the waste stream and are not handled by the local collection and processing infrastructure. Nevertheless, the quantity of materials directly shipped by generators may be substantial.

◆ Composting

The RDN operates yard waste drop-off sites at the Regional Landfill and the Church Road Transfer Station. In 2003, approximately 6,300 tonnes of yard waste were received by RDN facilities. The tipping fee charged for yard waste dropped off at the RDN's solid waste facilities is half the rate charged for municipal solid waste. The collected material is shipped to private composting operations under contract to the RDN.

The City of Parksville and the Town of Qualicum Beach provide curbside chipping and removal of branches twice a year for residents. One privately operated but RDN funded depot for yard waste is located in Nanaimo.

Yard waste can also be burned in most areas of the RDN, with the exception of the City of Nanaimo and the Town of Qualicum Beach. In the City of Parksville and Electoral Area G (French Creek), burning of yard waste is limited to specific dates in the spring and fall.

Since 1998, the RDN has been composting biosolids that were previously buried at the Regional Landfill. At present, the composting of biosolids is done at private facilities under contract to the RDN.

◆ Landclearing Waste

With the exception of the incorporated areas and Electoral Area G (French Creek), burning of landclearing waste is allowed, subject to the requirements of the Provincial *Open Burning Smoke Control Regulation*. In areas where burning is not allowed, landclearing waste is usually chipped on site, with chips either spread on-site or shipped directly to markets. Large stumps, however, are not generally chipped, so they must be removed for disposal. There is one private burn site in the RDN for the burning of stumps located in an old quarry near the north end of Nanaimo which is discussed in the Residual Waste Management Plan (Section 7.4). There is at least one location in the RDN where stumps are stockpiled on private property.

◆ Construction and Demolition Waste

Construction and demolition (CD) waste is received by several facilities in the RDN.

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It is received at the RDN's transfer station, where it is stockpiled and regularly shipped to the RDN's landfill (it is not exported). CD waste is also received directly at the landfill. All of the CD waste at the landfill is chipped and used on site. In 2003, 4,545 tonnes of CD waste were received at the RDN's solid waste facilities.

CD wood waste is also received by a number of private operators that chip the material for use as hog fuel by Vancouver Island pulp mills, or store the material with the intention of making hog fuel. Gypsum is received by a private operator in Nanaimo who transports the material to New West Gypsum for recycling. Gypsum is also received at the RDN transfer station and then transferred to the private operator in Nanaimo. There are also private operations that receive and recycle asphalt and concrete. The tonnage of CD waste managed by these private operations is unknown.

There are also a number of private and non-profit operations specializing in CD waste re-use. Reusable structural lumber, windows, doors and other fixtures are sold on a retail basis.

◆ Permitted Waste Disposal Sites

All disposal permits in the RDN are under the jurisdiction of the BC Ministry of Water, Land and Air Protection. In addition to the RDN landfill, there are three private waste disposal permits in the RDN:

- *Doumont Road wood burn site (MWLAP file AR-11311 issued 1992)*

This facility operates under a temporary permit issued by the provincial government in cooperation with the RDN, as this facility was intended to be the sole burn facility for land clearing waste in the RDN. The site is an inactive quarry, and its use as a burn site is permitted under its current land use zoning.

For environmental and human health reasons, the RDN will eliminate the burning of all wood waste that is in the municipal solid waste stream. However, at present, there are no other viable options or facilities to manage large stumps in the RDN. Consequently, the Doumont Rd. site will be retained as a landclearing waste burn facility, but the permit status will be maintained as temporary. It is the intention of the RDN to encourage, through Waste Stream Management Licensing and other mechanisms, the implementation of better methods to manage landclearing waste. Potential investors will be informed that once a viable alternative to manage landclearing waste is in place, licensed and operational, this site will be decommissioned and the RDN will recommend cancellation of the provincial permit.

- *J. Milner Trucking Ltd. Landfill (Permit PR-06009 issued 1981) and Lussier and Son Contracting Ltd. landfill (Permit PR-07604 issued 1987)*

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These permits allow the disposal of wood waste by private operators. Although these sites are currently inactive, they do not meet the provincial landfill criteria and do not have the proper land use zoning designation to allow waste disposal activities. The sites will need to be brought up to provincial standards and be rezoned if the permits are to be maintained. Currently, there are no zoning designations in the RDN land use planning area (the electoral areas) that allow waste disposal. To achieve a rezoning, each owner of the permits would require an amendment to the applicable RDN Official Community Plan, creation of a zoning designation that would allow disposal activities and a rezoning of the specific parcel on which the disposal activity is to take place. The owner of these permits have been informed of the technical and zoning requirements and have been given a deadline (May 31, 2004) by which an engineering report must be submitted and a rezoning application commenced if these permits are to be maintained. Endorsement of these permits by the RDN is conditional on successful completion of rezoning and compliance with all current technical requirements for landfills as regulated by the Province of BC. If all requirements have not been met within one year of implementation of this plan the RDN will recommend to the MWLAP that these permits be cancelled.

◆ Closed Landfills

There are two closed landfills in the RDN: the Parksville Landfill and the Qualicum Beach Landfill. These sites are the responsibility of their respective municipality, however the RDN contributes to the monitoring costs of the Qualicum Beach site.

◆ Waste Management Facilities on First Nations' Land

Waste disposal facilities on First Nations' land are regulated by the federal Indian Reserve Waste Disposal Regulations. Currently, there are no federally authorized waste management facilities on First Nations land within the RDN.

While facilities on First Nations' land cannot be regulated by the RDN the Waste Stream Management Licensing bylaw will regulate any municipal solid waste material that may be deposited on First Nations' land. Generators and haulers of waste that is deposited on First Nations' land will be subject to the illegal dumping provisions of the Waste Stream Management Licensing bylaw.

◆ Promotion and Education

The RDN and the City of Nanaimo produce most of the solid waste management promotion and education materials provided in the Regional District.

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The objectives of the RDN program are to:

- educate all generators about the solid waste management priorities of the Regional District;
- promote participation in waste diversion programs;
- promote the “Zero Waste” concept;
- encourage proper participation in garbage and recycling collection programs; and
- encourage compliance with Regional District materials bans.

Education activities include: staffing at public events and speaking engagements; mall displays; articles in the Regional newsletter “Regional Perspectives”; the region-wide “Zero Waste” newsletter; a zero waste school education program; garbage and recycling program newsletter; a zero waste directory; a garbage and recycling program brochure (for RDN contract areas); brochures for various waste diversion programs (backyard composting, grasscycling, disposal bans, etc.); and a web site featuring a recycling database, zero waste tool kit and program information.

The non-profit recycling societies (GIRO and NRE) also expend a fair amount of their resources on public education. Waste haulers also provide a baseline level of information for their customers, but this information is specific to the services being offered by the hauler and generally addresses container placement requirements, compliance with disposal bans and preparation of recyclable materials for collection.

1.1 Policies and Regulations

Four main policies influence the RDN solid waste management system: the user-pay system; variable tipping fees; disposal and collection bans; and open burning restrictions. In addition, there are provincial product stewardship programs that significantly influence the management of specific waste materials generated in the RDN. Each of these local and provincial policies is discussed below:

User Pay

Both the RDN and the City of Nanaimo have user pay curbside garbage collection programs. All households have a one can per week limit on waste volume. Separate tags that presently cost \$2.00 each are required to set out additional cans. The vast majority of homes set out one can of waste or less per week.

Variable Tipping Fees

The RDN has differential tipping fees for various classifications of materials. The base tipping fee for municipal solid waste is currently \$95.00 per tonne. Loads containing banned materials are charged a rate double the regular fee. To encourage source-separation, yard waste and recyclable materials are charged half of the regular tipping fee.

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Material Disposal Bans

In 1991, the RDN established a landfill ban for gypsum (drywall). A ban on the disposal of uncontaminated cardboard followed in 1993. In 1997, recyclable paper, metal and tires were banned. The disposal bans are enforced at the Regional Landfill and at the Church Road Transfer Station. Vehicles that dump banned materials at RDN disposal facilities are assessed a 100 percent surcharge on the entire load. Disposal site staff monitor the tipping floor (at the transfer station) and working face (at the landfill) to provide enforcement for the disposal bans. Collection staff monitor waste collected at curbside to ensure compliance with collection bans. Yard waste is banned from curbside collection.

Burning Bans

Most developed areas of the RDN have burning restrictions for landclearing waste, construction/demolition debris and yard waste. In most developed areas, burning of these wastes is prohibited year-round, but in some areas yard waste can be burned only during a limited time frame annually (usually a small window of time is given in the spring and fall). In undeveloped areas, burning of landclearing waste and yard waste is generally allowed, provided any local fire restrictions and the BC Open Burning Smoke Control regulation are being met. With restrictions in place, generators of these materials must find alternative disposal options and are encouraged to select options such as composting, re-use (of construction/demolition materials) or recycling.

Provincial Initiatives

BC has implemented several product stewardship programs over the past decade. Product stewardship is defined as a management system based on industry and consumers taking life-cycle responsibility for the products they produce and use. As a result, the materials covered under a stewardship program are less likely to enter the RDN's waste management system. There are province-wide stewardship programs currently in place for:

- Lead-acid batteries
- Used motor oil
- Paint
- Pesticides
- Solvents
- Passenger and light truck tires
- Medications
- Fuel
- Beverage containers (with the exception of containers for milk and milk substitutes)

The RDN has actively encouraged the Province and product manufacturers to undertake stewardship initiatives and continues to promote the expansion of stewardship initiatives.

6. Zero Waste Plan

In April 2003, the RDN reviewed the implementation status of their 1996 *3Rs Plan* as a first step in updating this component of the Solid Waste Management Plan. Most of the programs and policies in the 3Rs Plan were implemented and the diversion rate in the RDN increased from 45% in 1998 to 57% in 2003. This increased diversion came about despite the fact that two major elements of the plan, an in-vessel composting facility and a construction/demolition waste recycling facility were not constructed.

In 2002 the RDN adopted “zero” as their waste diversion target, meaning that the RDN will continuously strive to reduce the amount of waste requiring disposal. In addition, Policy 4H of the RDN’s Regional Growth Strategy (adopted June 2003) states: *The RDN agrees to pursue a solid waste management approach that concentrates on creating less waste, with the ultimate long term goal of eliminating the need for waste disposal (i.e. a “Zero Waste” approach).* To reflect this new goal, the updated 3Rs Plan is called the *Zero Waste Plan*. The Zero Waste Plan outlines how the RDN plans to continue reducing the quantity of waste disposed.

The Zero Waste Plan was developed by undertaking the following steps:

- (I) review the existing 3Rs Plan to identify what elements of that plan should be retained and carried forward to become part of the Zero Waste Plan;
- (II) identify new waste reduction opportunities by:
 - reviewing waste diversion initiatives undertaken in other North American jurisdictions that are considered “leading edge”;
 - interviewing waste management coordinators in BC and across Canada; and
 - brainstorming RDN-unique ideas;
- (III) develop a menu of components for possible inclusion in the Zero Waste Plan using the initiatives identified in the first two steps;
- (IV) present the menu of possible components to the Regional Waste Advisory Committee (RWAC) to obtain their feedback; and
- (V) develop a draft Zero Waste Plan based upon RWAC’s and staff input.

This section briefly describes each component of the Zero Waste Plan. The components are organized into two sections:

1. **Ongoing Programs** –programs that were part of the 1996 3Rs plan, were implemented and continue to operate, including programs identified in the annual budget for 2004;
2. **New Programs** – programs that have new diversion potential that will be implemented in 2005 to 2007 upon adoption of this Solid Waste Management Plan.

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All costs are presented in 2004 dollars.

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◆ **On-Going Programs 2004**

Program	Budget
<p>Compost Education Program</p> <p>The Zero Waste compost education program has several components, including:</p> <ul style="list-style-type: none"> • enhance, maintain and promote demonstration gardens; • promote usage of the yard waste management educational materials available on the RDN’s website; • conduct spring and fall seminars on composting, grasscycling, zero waste landscaping, natural garden and lawn care, etc. Partnering with local garden centres that sell backyard composters and native plants will be explored. 	<p>\$5,000</p>
<p>School Education Program</p> <p>Continue contracting out design and delivery of a primary school program that focuses on the concept of zero waste.</p>	<p>\$15,000</p>
<p>Zero Waste Promotion and Education</p> <p>The Zero Waste Promotion and Education program contains the following elements:</p> <ul style="list-style-type: none"> • Continue and enhance current zero waste information initiatives including the web site, newsletters and participation in community events. • Maintain funding to the Recycling Council of BC for operation of the hotline. Promote the hotline to RDN residents and businesses. • Continue annual financial support to Recycling Council of BC for their ICI waste exchange service. Promote this service to RDN businesses and institutions. • Maintain and print the Zero Waste (recycling) directory and the online directory on the RDN web site and ensure data is up to date through annual reviews of the listings. Promote directory and reuse awareness, particularly with customers that bring reusable goods to RDN disposal. • Continue television advertising on Shaw Cable. • Promote to all sectors the availability of Zero Waste tools, particularly those available on the web such as the Recycling Directory, Zero Waste Business Tool Kit, Zero Waste Landscaping Tips, and Composting Information. Additional tools will be accessed from other jurisdictions and, with permission, modified for use in the RDN. 	<p>\$58,500</p>

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Program	Budget
<p>Illegal Dumping Program</p> <p>The Illegal Dumping Program includes surveillance and enforcements activities as well as on-going clean-up of illegal dumping sites and free disposal (tipping fees are waived) for community clean-up events. To encourage community clean-ups, groups that undertake these activities will be recognized in the RDN newsletter or other media.</p>	<p>\$63,000</p>
<p>Expanded Disposal Bans</p> <p>International Composting Corporation (ICC) opened their private composting facility in Nanaimo in April 2004. Consequently, in accordance with RDN Board policy, organic waste from commercial generators (e.g. grocery stores, institutions, and restaurants) will be banned at the Regional Landfill and Church Road Transfer Station in the fall of 2004.</p> <p>Implementation of the ban would involve a “ramp up” period of increasing enforcement starting with advanced notice of upcoming ban, then notices (rather than financial penalties) for the first months of the bans implementation, and eventually implementing financial penalties that are double the tipping fees for loads containing banned materials.</p> <p>In addition, yard waste and products covered under province-wide stewardship programs will also be banned, as opportunities to divert these materials are readily available in the RDN.</p>	<p>\$24,000</p>
<p>Waste Composition Study</p> <p>Conduct a waste composition study to estimate the quantity of recyclable materials remaining in the waste stream and the source of those materials (residential, ICI or DLC). This study will assist in focusing waste diversion programs and policies where they will have the greatest impact.</p>	<p>\$25,000</p>
<p>Waste Stream Management Licensing Technical Assistance</p> <p>To support the implementation of the Waste Stream Management Licensing Bylaw (which is ultimately intended to enhance diversion in the RDN), technical assistance will be required on an annual basis to prepare site specific operating plans and requirements</p>	<p>\$15,000</p>

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Program	Budget
<p>Curbside Food and Yard Waste Collection Study</p> <p>Organic waste collection could divert food waste, non-recyclable paper products and other organic waste materials in addition to providing yard waste removal service to residents in the RDN curbside collection service area. Based on a 2002 CRD waste composition study, approximately 45% of the residential waste stream is compostable. In the RDN, if only half of the residential-based organic waste is diverted through an organics collection program, 5,600 tonnes of waste would be diverted from the landfill annually. This study will research collection methods and successes in other North American jurisdictions</p>	<p>\$10,000</p>
<p>Yard Waste Composting at RDN Disposal Facilities</p> <p>To ensure an on-going opportunity to dispose of yard waste, the RDN will continue to accept source-separated yard waste at the landfill and transfer station. The drop-offs are for self-haul customers (small loads). Yard waste is transferred to private composting facilities. The tipping fee at the RDN facilities is based on the market cost of composting. Drop-off opportunities are promoted by RDN and municipalities. (Note: The cost associated with this program is directly related to volumes received at the RDN’s facilities.)</p>	<p>\$268,000</p>
<p>Recycling at RDN Disposal Facilities</p> <p>The RDN provides the opportunity for self-haul customers at the disposal facilities to recycle batteries, appliances, propane tanks, fluorescent light tubes, scrap metal, tires, gypsum (at CRTS), cardboard, paper, glass, and metal and plastic food and beverage containers.</p>	<p>\$161,500</p>
<p>Residential Curbside Garbage and Recycling Collection</p> <p>Continue with residential garbage and recycling collection programs including strict can limits and comprehensive range of recyclable materials including rigid plastic containers. Provide service to approximately 23,000 households.</p>	<p>\$1,766,970</p>

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◆ **New Programs 2005 - 2007**

2005	Budget
<p>Single Family Organics Collection Pilot</p> <p>Design and conduct a pilot organics collection program. Conduct pre and post surveys with participants and measure actual diversion. This pilot would address the feasibility of organics collection for some or all of the residents on the curbside collection program and help to refine the final program design.</p>	\$82,000
<p>C/D Market Study</p> <p>Conduct an analysis of the local market capacity for wood waste and construction/demolition wastes to determine the viability of a ban on all or a portion of this waste.</p> <p>In the event that a private sector C/D processing facility is established, licensed and operational by 2005 the C/D market study will not be done.</p>	\$10,000
2006	Budget
<p>User Pay Review</p> <p>Before tendering next curbside contract, re-assess feasibility of going to full user pay or a subscription-based system for garbage collection. A full user pay program would provide users with a financial incentive to further reduce waste and reward those households that already have achieved significant waste reduction. If viable, a “pay-as-you-throw” request for proposal or tender would be designed for the new curbside waste collection contract (scheduled to begin in 2007).</p>	\$20,000
<p>RDN Internal Zero Waste Policy</p> <p>Using existing municipal models, develop an internal Zero Waste Policy to ensure that the environmental impact of RDN purchasing and operations of the RDN is minimized. Environmental purchasing policies developed by other municipalities, such as the City of Richmond, will be used as a template.</p>	\$4,000

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2007	Budget
<p>Single Family Organics Collection Program</p> <p>Based on the results of the curbside yard and food waste collection study undertaken in 2004 as well as the pilot collection project undertaken in 2005, a full single family curbside collection program could be implemented in 2007 based on the results of the tender process undertaken in 2006.</p> <p>The costs presented for full program implementation are rough estimates of a household organic waste collection program (food waste and soiled paper). Yard waste collection is not included at this time since not all households may require this service. The types of organic wastes collected, collection method and frequency, and composting facility tipping fees have not yet been defined. This cost estimate includes only the households serviced by the RDN although it is assumed that the City of Nanaimo will also consider implementing a similar program if it is found to be cost-effective.</p>	<p>Start-up costs (one-time): \$97,000</p> <p>On-going annual costs: \$460,000</p>

◆ **Zero Waste Plan Summary**

i. **Diversion Potential**

The diversion potential of the Zero Waste Plan ranges from an *additional* diversion of 4% in 2004 to an additional 41% in 2009, as shown in Table 6-1. Although many of the programs listed in the plan do not contribute directly to diversion, they are believed to be essential to supporting existing and planned zero waste initiatives and without them the diversion potential of the other programs could not be realized. Upon full implementation, the RDN could achieve an *overall* diversion rate of 76%.

Table 6-1 Zero Waste Plan New Diversion Potential

Year	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)
New Programs						
Expanded Disposal Bans	4	13	24	31	34	34
Waste Composition Study						
Construction/Demo Waste Market Study						
Single Family Organics Collection				5	5	5
User Pay Review						
RDN Internal Zero Waste Policy						
New Diversion (based on 2003 baseline)	4	13	24	38	39	39
Total Cumulative Diversion (based on 2003 baseline of 57%)	59	63	68	75	76	76

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ii. Costs

Table 6-2 shows the annual cost for the Zero Waste Plan from 2004 to 2009.

Table 6-2. Zero Waste Plan Costs

Year	2004	2005	2006	2007	2008	2009
Ongoing Programs						
Residential Curbside Garbage and Recycling Collection*	\$ 1,766,970	\$ 1,802,309	\$ 1,838,356	\$ 1,875,123	\$ 1,912,625	\$ 1,950,878
Illegal Dumping Program	\$ 63,000	\$ 63,000	\$ 63,000	\$ 63,000	\$ 63,000	\$ 63,000
Recycling at RDN Disposal Facilities	\$ 161,500	\$ 161,500	\$ 161,500	\$ 161,500	\$ 161,500	\$ 161,500
Yard Waste Composting	\$ 268,000	\$ 165,000	\$ 165,000	\$ 165,000	\$ 165,000	\$ 165,000
Zero Waste Promotion and Education	\$ 58,500	\$ 58,500	\$ 58,500	\$ 58,500	\$ 58,500	\$ 58,500
School Education Program	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000
Compost Education Program	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
New Programs						
Expanded Disposal Bans	\$ 24,000	\$ 500	\$ 500	\$ 500	\$ 500	\$ 500
Centralized Composting Facility	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Waste Composition Study	\$ 25,000	\$ -	\$ -	\$ -	\$ -	\$ -
Curbside Organics Collection Study	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ -
Single Family Organics Collection Pilot	\$ -	\$ 82,000	\$ -	\$ -	\$ -	\$ -
Single Family Organics Collection	\$ -	\$ -	\$ -	\$ 557,000	\$ 460,000	\$ 460,000
WSML Technical Assistance	\$ 15,000	\$ 10,000	\$ 10,000	\$ 5,000	\$ 5,000	\$ 5,000
CD Waste Market Study	\$ -	\$ 10,000	\$ -	\$ -	\$ -	\$ -
User Pay Review	\$ -	\$ -	\$ 10,000	\$ -	\$ -	\$ -
RDN Internal Zero Waste Policy	\$ -	\$ -	\$ 4,000	\$ -	\$ -	\$ -
Total Cost per Year	\$ 2,411,970	\$ 2,372,809	\$ 2,330,856	\$ 2,905,623	\$ 2,846,125	\$ 2,884,378

* based on 2% estimated annual contract cost increase

iii. Staffing

The Zero Waste Plan is to be implemented with the RDN’s existing solid waste staff complement. As needed, research, studies and some services will be contracted out.

7. Residual Waste Management Plan

The waste that cannot be eliminated or diverted through composting or recycling is referred to as “residual waste,” and ultimately requires disposal. The Residual Waste Management Plan addresses the long-term disposal needs of the region and aims to minimize social, environmental and financial impacts and risks.

The Stage One and Two history of the residual waste management planning process is presented in Section 2, “Plan History,” of this report. At the completion of Stage Two of the residual waste planning process in 1999, the Board chose waste export as the best option at that time to provide long-term disposal capacity. This option required the construction of a new transfer station and identification of a site for emergency back-up and for disposal of waste that was not accepted at export sites. In 2000, the Board decided to reserve this back-up capacity at the existing landfill. Allowing for this reserve, a new transfer station would need to be operational in 2007.

A transfer station siting study was undertaken in 2000 to identify sites that were suitable for a new south-end transfer station. This proved a difficult task given the shortage of industrially zoned land in the area. Three sites were identified and the estimated cost to purchase the land and construct the transfer station was between \$4.4 million and \$5.6 million. Direction was received from the Board in December 2000 to purchase one of identified properties once the site was re-zoned for industrial use.

The identified site was eventually rezoned in 2002. However, at the April 2002 Board meeting, staff raised concerns over the financial sustainability of waste export. From 1999 to 2002, projected waste export system costs had increased from \$115 to \$140 per tonne, which would require a significant increase in taxes and/or tipping fees. As a result the Board directed staff to investigate (1) methods to reduce waste export costs such as privatizing all or a portion of the solid waste function; and, (2) the costs and benefits of optimizing the capacity of the existing landfill.

This investigation concluded that a full waste export system would be cost constraining and that other alternatives should be investigated. Consequently, in August 2003, the Board passed the following motions:

- 1. That as a short term measure the Board support the option to optimize the capacity of the existing landfill by constructing a geogrid toe berm on the south and southeast sides of the landfill and continuing the current arrangement for partial export;*
- 2. That the Board direct staff to regularly review waste export options prior to future export contract renewals;*

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3. *That the Board direct staff to include capacity optimization at the existing landfill in the public consultation for the Stage 3 SWMP amendment process;*
4. *That the Board direct staff to prepare a strategy to secure a suitable transfer station site;*
5. *That the Board direct staff to continue to review emerging residual waste management technologies and discuss potential cooperative strategies with adjacent regional districts, and that the Board reconsider regional solid waste disposal options no later than December 31, 2006.*

With this direction from the Board, the Residual Waste Management Plan was prepared. The Plan contains the following major features:

- Maintaining the current system of residual waste collection;
- Maintaining the current system of residual waste disposal which involves both waste export and landfilling at the Regional Landfill;
- Household hazardous waste management;
- Landclearing waste disposal; and
- Long-term residual waste management planning.

◆ **Collection**

The existing residual waste collection system will be maintained in its current configuration as described in Section 5.1

◆ **Disposal**

The disposal system involves:

- Continued use of the Church Road Transfer Station (CRTS) to service the northern portion of the regional district;
- Export of the waste received at CRTS to the Wastech landfill in Cache Creek under contract with the GVRD; and
- Continued use of the Regional Landfill to service the southern portion of the regional district and receive waste that cannot be exported to the Wastech landfill.

This system includes all of the necessary elements to effectively manage the RDN's municipal solid waste for the next 10 years. Additional municipal solid waste disposal facilities are not required with the exception of a landclearing waste disposal facility as described in Section 7.4.

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i. Church Road Transfer Station

CRTS will continue to receive municipal solid waste generated in the northern municipalities of Parksville, Qualicum Beach and Lantzville, and Electoral Areas E, F, G and H. Special wastes such as contaminated soil and asbestos cannot be delivered to CRTS and must be delivered directly to the Regional Landfill.

All waste received at the facility, with the exception of CD waste, recyclables and yard waste, will be transferred out of the RDN to the Wastech Landfill in Cache Creek under contract with the GVRD until the contract expires in December 2007. The CD waste will continue to be transferred to the RDN's Regional Landfill. Recyclables and yard waste will be picked up and recycled/composted by local contractors.

CRTS charges variable tipping fees based on a regional charge rate and enforces regional disposal bans.

ii. Waste Export

Waste export from CRTS will be continued. The current contract is with the Greater Vancouver Sewerage and Drainage District (GVS&DD) to export up to 17,000 tonnes of RDN municipal solid waste to the Wastech Landfill in Cache Creek annually. This contract expires December 31, 2007. By 2006, a review of alternative waste export options will be complete. In particular, export sites on Vancouver Island will be sought with the intention of minimizing transportation requirements.

Waste export is the preferred disposal option once the Regional Landfill's capacity is exhausted. Under a full-export system, a contingency plan must be in place in case the export option becomes temporarily unavailable. This "back up capacity" will be reserved at the Regional Landfill once the RDN has gone fully to waste export for its disposal needs.

iii. Regional Landfill

Municipal solid waste generated in the City of Nanaimo and Electoral Areas A, B, C and D will be delivered directly to the Regional Landfill. The landfill will also receive recyclable materials, yard waste, CD waste, and some types of "special" wastes that require specific handling procedures (contaminated soil, asbestos, animal carcasses, etc.). The landfill will continue to receive waste from CRTS that cannot be exported, such as CD waste. The operating details of the landfill are included in the Landfill Operational Certificate which is issued to the RDN by the Provincial government (Ministry of Water, Land and Air Protection). A copy of the Landfill Operational Certificate can be found in Appendix A.

Solid Waste Management Plan

Recyclables and yard waste will be picked up and recycled/composted by local contractors. CD waste will be ground and reused on site or landfilled.

The landfill charges variable tipping fees based on a regional charge rate and enforces regional disposal bans.

Increasing the Landfill's Capacity

The capacity of the landfill will be optimized through the construction of a geogrid toe berm on the south side of the landfill. The Phase One toe berm will be constructed in 2004, extending the life of the landfill by 7 to 10 years, depending on population growth rates and the effectiveness of the Zero Waste Plan (roughly 2012). This projection includes continuation of export of waste from the Church Road Transfer Station.

Closure and Maintenance

The RDN is responsible for operating and maintaining the environmental control infrastructure at the landfill site for a minimum post-closure period of 25 years. This is because the landfill does not stop producing leachate and landfill gas once the site is closed. Staff have begun a closure plan to address the long-term operation and maintenance of the leachate and landfill gas collection systems and the on-going monitoring of groundwater, surface water, landfill gas, erosion, slope stability and settlement. This plan will be completed by December 2004 and reviewed regularly as part of the updating the Solid Waste Management Plan.

Post-Closure Planning

In 2002, the RDN contracted a study to consider suitable end-uses for the landfill site after closure. Based on the technical limitations of the site, the desire to create a community amenity and the recreation needs of the City of Nanaimo and the RDN, the consultants recommended an urban or wilderness park or combination thereof as the best post-closure option for this site. The RDN will undertake community and technical consultation to determine community acceptability of this option, design considerations and appropriate timing for implementing post-closure use.

◆ **Household Hazardous Waste**

The RDN will continue to promote the use of existing Provincial and private stewardship programs for the disposal of household hazardous wastes. Additionally, the RDN will encourage new stewardship programs for other hazardous components of the municipal solid waste stream, such as electronic goods, dry cell batteries and rechargeable batteries.

◆ **Landclearing Waste**

Landclearing waste refers to tree trunks, branches and stumps generated from the clearing of land. Where this waste cannot be burned on-site, a disposal option is required. In general, tree trunks are sold for their wood value and branches are chipped and spread on-site. The stumps, however, cannot be chipped on-site and must be transported to a disposal or processing facility.

At present, there are no processing facilities for stumps in the RDN and only one disposal option. The disposal facility is a burn site located in the north end of Nanaimo. Although the RDN does not want to encourage burning of stumps, this facility is well-situated in an old quarry away from dense populations. This facility operates under a temporary permit issued by the provincial government in cooperation with the RDN.

For environmental and human health reasons, the RDN will eliminate the burning of all wood waste that is in the municipal solid waste stream. However, at present, there are no other viable options or facilities to manage large stumps in the RDN. Consequently, the Doumont Rd. site will be retained as a landclearing waste burn facility, but the permit status will be maintained as temporary. It is the intention of the RDN to encourage, through Waste Stream Management Licensing and other mechanisms, the implementation of better methods to manage landclearing waste. Potential investors will be informed that once a viable alternative to manage landclearing waste is in place, licensed and operational, this site will be decommissioned and the RDN will recommend cancellation of the provincial permit. A six-month notice of the permit cancellation will be provided to the operator, landowner and other stakeholders, such as landclearing waste generators and haulers.

◆ Long Term Residual Waste Management

Although this plan specifically addresses the programs, policies and infrastructure requirements for the next five years, there is an on-going planning process for managing solid waste in the long-term that affects the selection of short-term options today. For the RDN, long-term planning includes:

- Siting a new transfer station (to support full waste export);
- Researching new and emerging technologies;
- Phase Two toe berm construction; and
- Cooperative strategies with other Vancouver Island regional districts.

i. Aquisition of a Transfer Station Site

Once the capacity of the Regional Landfill is exhausted, waste export is the preferred disposal option for the RDN's residual solid waste. This option will require that a transfer station be built to service the southern portion of the Regional District. A siting process was initiated in 2000 and three preferred sites have been identified. Acquisition of a site is on-going.

ii. Phase Two Toe Berm Construction

A second phase of toe berm construction at the Regional Landfill to gain additional capacity (estimated to be an additional ten years) is possible if an alternative residual waste disposal option is not identified. This toe berm would be constructed on the southeast side of the landfill.

iii. Emerging Technologies

During the time frame of this Solid Waste Management Plan, technologies will be advanced and the economic viability of residual waste processing and disposal may change. A review of emerging waste management technologies that may further reduce waste disposal needs and/or provide an alternative to landfilling all of the residual waste will be completed by 2006. Should a technology be identified for the RDN, it may impact upon the need or location for a new transfer station or the need for the Phase Two toe berm construction.

iv. Cooperative Strategies

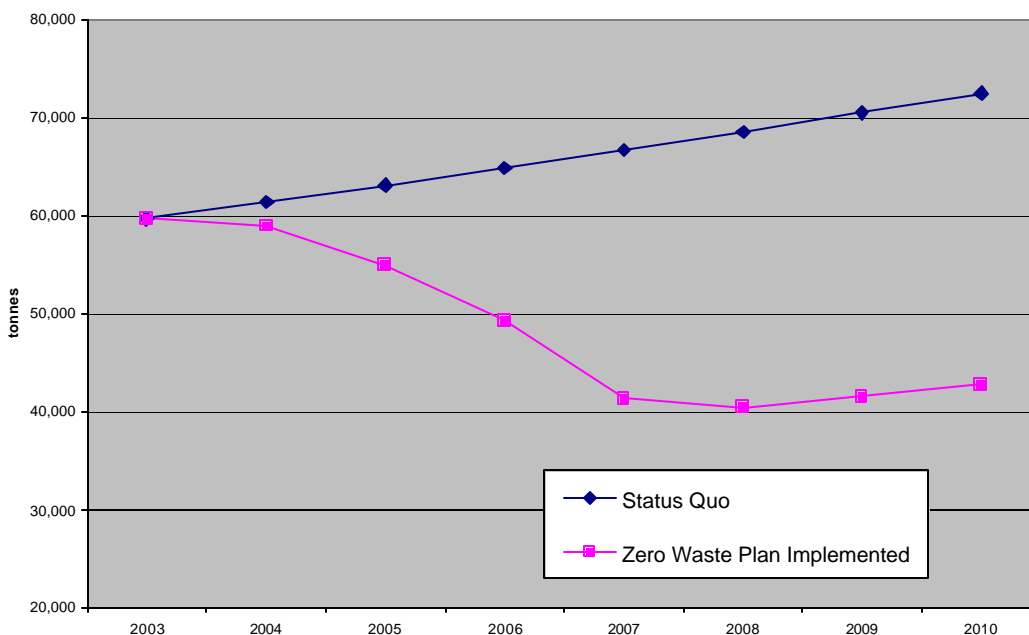
Discussions with adjacent regional districts to identify potential cooperative strategies for waste management system improvements have been on-going for a number of years and will continue. It is anticipated that if any emerging residual waste management technology has merit for the RDN, it would likely be implemented in conjunction with other Vancouver Island regional districts.

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◆ **Residual Waste Management Plan Summary**

The quantity of residual waste generated over the life of the Solid Waste Management Plan is primarily dependent on the growth of the population and the success of Zero Waste Plan’s implementation. Figure 7-1 shows the difference in residual waste quantities if there is no additional waste diversion (status quo) and if the Zero Waste Plan is fully implemented.

Figure 7-1 Projection of Residual Waste



The future quantities of residual waste are also influenced by economic growth in the Region, new product stewardship programs, and the unanticipated development of private waste management facilities in the area. Therefore the residual waste projections should be considered rough estimates.

i. Budget Implications

All of the elements of the Residual Waste Management Plan, with the exception of the geogrid toe berm at the Regional Landfill, will be funded within the existing annual solid waste management budget. The expenditures associated with construction of the toe berm will be funded through solid waste reserves.

Solid Waste Management Plan

Staffing Implications

No additional staff will be required to implement the Residual Waste Management Plan. As required, consultants and contractors will be hired to undertake research, studies and construction projects.

8. Waste Stream Management Licensing

The RDN has experienced difficulty in trying to expand the level and range of recycling opportunities in the RDN due to concerns by the waste management industry that their investment into new areas of recycling (e.g. construction wood waste recycling, organic waste recycling) may be undercut by “businesses” that operate with less than ideal standards but for which there is minimal authority to prevent their operation. Establishing and enforcing appropriate standards of operation would allow waste managers who have a genuine interest in establishing a reputable business within the RDN borders to proceed with a greater degree of certainty than exists at present. The RDN has developed a Waste Stream Management Licensing bylaw that will:

- set a high standard of operation for the local waste management industry;
- create a level playing field for industry (to protect the good operators from low standard, “fly by night” operators);
- minimize risk and costs to the taxpayers for clean-up of poorly operated facilities, abandoned facilities and abandoned municipal solid waste and recyclable material (illegal dumping);
- assist in waste tracking and progress of the Solid Waste Management Plan and waste diversion;
- protect and enhance the existing waste diversion rate; and
- set a consistent level of environmental and community protection throughout the RDN to reduce the incentive to move to less regulated areas of the RDN and outside the RDN.

This bylaw involves licensing private and non-government municipal solid waste management and recycling facilities within the district and penalties for contraventions to the bylaw, including illegal dumping. All facilities (operations or properties) that handle municipal solid waste in whole or part are to be included in the licensing system with the exception of those listed in Table 8-1. This means that transfer stations, recycling depots, composting facilities and material recovery facilities will be subject to the licensing system.

Table 8-1 Facilities Excluded from Licensing Requirements

- Disposal facilities such as landfill and incinerators (these facilities will remain under the regulatory jurisdiction of the Province)
- Soil manufacturing facilities (unless they are composting MSW-based materials on-site)
- private on-site depots (such as the centralized recycling areas used by office buildings and mall tenants)
- Stewardship program depots
- Reuse businesses
- Concrete and asphalt recycling operations and auto wreckers since the material handled by these operations has not traditionally been handled as MSW
- Municipally owned facilities including the Church Road Transfer Station

Solid Waste Management Plan

There are license application and annual administration fees associated with the licensing system. These fees are intended to cover most of the staff costs associated with maintaining the licensing system. In addition, a licensee must provide the regional district with a performance security that can be utilized in the case of default of the license's requirements or abandonment of facility and materials. The amount of security to be posted by the licensee is dependent of the type and quantity of material to be handled at the facility.

This bylaw was developed in conjunction with the Cowichan Valley Regional District to develop a consistent approach to waste facility licensing in the Central Vancouver Island area. A copy of the draft bylaw is included as Appendix B. It is based on a similar bylaw currently in place within the Greater Vancouver Regional District (including proposed amendments to the GVRD bylaw), as well as existing and proposed bylaws for the Capital Regional District. Extensive input was obtained from a variety of stakeholders during the development of the bylaw and it will be included in the public consultation process associated with this Solid Waste Management Plan.

This bylaw requires approval of the BC Minister of Water, Land and Air Protection before it can be implemented. It is anticipated that implementation will occur in 2004 or 2005.

9. Solid Waste Management Plan Implementation

◆ Implementation Schedule

The implementation of the Plan will begin in 2004, with all elements of the Plan anticipated to be in place by 2007. The implementation schedule is as follows:

2004	<ul style="list-style-type: none"> • On-going programs • Expand disposal bans to include commercial organic waste, yard waste and materials covered under stewardship programs • Waste composition study • Compost education program • Implement Waste Stream Management Licensing Bylaw • Curbside food and yard waste collection study • Construct Phase 1 of geogrid toe berm at Regional Landfill
2005	<ul style="list-style-type: none"> • On-going programs • Wood waste and construction/demolition waste market analysis • Curbside food and yard waste collection pilot project
2006	<ul style="list-style-type: none"> • On-going programs • Review user pay options for curbside garbage collection program • RDN Internal Zero Waste Policy
2007	<ul style="list-style-type: none"> • On-going programs • Begin single family organics collection program
2008	<ul style="list-style-type: none"> • On-going programs
2009	<ul style="list-style-type: none"> • On-going programs

◆ Plan Financing and Staffing

Cost recovery mechanisms that will be utilized to fund the Plan’s implementation include user rates, tipping fees, taxation, sponsorship and grants.

The RDN generally funds waste management programs on a user pay basis to the greatest extent possible. In this manner, the users of the service are responsible for paying for the true costs of the service and costs are typically recovered through a fee-for-service. For many programs listed in this Plan, the whole of the RDN benefits and there is no identifiable user – this includes programs such as the Illegal Dumping Program. For programs of universal benefit, costs may be covered through a more general mechanism such as a tax requisition.

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Where appropriate, opportunities for sponsorship and grants will be utilized to assist in the funding of programs.

No new staff will be required to implement the Plan. Some components of the plan will continue to be contracted out, such as the curbside garbage and recycling and the school education program. Most research components of the Plan will be undertaken by consultants, such as the waste composition study and the wood waste market analysis. Additionally, consultative assistance will be brought in for design and engineering components such as the construction of the geogrid toe berm.

◆ Plan Monitoring And Evaluation

There are two committees and one working group associated with the Solid Waste Management Plan and its components:

- The Regional Waste Advisory Committee;
- The Landfill Site Liaison Committee; and
- The Waste Stream Management Licensing Working Group.

i. Regional Waste Advisory Committee

The Regional Waste Advisory Committee (RWAC) will be both an advisory committee and a monitoring committee.

As an *advisory* committee, RWAC:

- provides recommendations to the Board regarding programs and policies relating to solid and liquid waste management;
- liaises between their constituents and the RDN; providing feedback to the RDN and increasing awareness of environmental services issues amongst their constituency;
- participates on smaller ad-hoc committees dealing with specific issues or tasks;
- provides advice and feedback on consultation activities with the general public;
- provides input and feedback on technical reports and other documents prepared for the committee's information;
- strives to keep abreast of solid and liquid waste management issues both locally and in a broader context.

As a *monitoring* committee, RWAC:

- reviews and becomes familiar with the RDN's SWMP and LWMP;
- reviews and becomes familiar with the existing solid and liquid waste management system in the RDN;

Solid Waste Management Plan

- identifies tools and techniques to be employed in the monitoring and evaluation of the SWMP and LWMP and their implementation;
- monitors the implementation of the SWMP and LWMP;
- annually reports on the effectiveness of the SWMP/LWMP at achieving objective;
- makes recommendations to increase the effectiveness of the SWMP/LWMP;
- review and makes recommendations on RWAC's advisory and monitoring role.

The RWAC functions as both a technical committee and community committee. Its broad-based membership consists of 18 representatives:

2 members	Business Community
2 members	Environment Community
2 members	General Public (1 north, 1 south)
1 member	Waste Management – private sector
1 member	Waste Management – non-profit
4 members	RDN Board
3 members	Municipal staff (Nanaimo, Parksville and Qualicum)
1 member	Ministry of Water, Land and Air Protection
1 member	Environment Canada
1 member	Central Vancouver Island Health Unit
1 member	Landfill Site Liaison Committee Chair (proposed)

Members are selected by the Board through an application process and serve on the committee for a 3-year term. In general there are 4-6 meetings per year of the committee with the provision for workshops or other presentations at the committee's discretion

Committee recommendations to the RDN Board will be made by consensus whenever possible. If necessary, votes may be taken and minority reports may be submitted to the Board in addition to the majority opinion. The meetings will be open to the public, however non-REAC members will not have speaking or voting privileges. Delegations that wish to address the committee must seek approval from the committee through a written request. Acceptance of a delegate's request to speak to the committee will be at the discretion of the committee.

The chair is one of the RDN Board members appointed to the Committee in order to provide a direct link between the advisory committee and the Board.

ii. Landfill Site Liaison Committee

A landfill site liaison committee was set up in October 2003 to provide regular and effective communication between the RDN and the adjacent community on the operation of the Regional Landfill. The mandate of the committee is to:

Solid Waste Management Plan

- provide input to RDN staff on landfill impacts and operational modifications to minimize the impact of landfill operations on local residents;
- provide input to the annual operating and monitoring report required under the Operational Certificate issued by the Ministry of Water Land and Air Protection;
- provide input to annual budget and long-term capital plans to help establish priorities;
- provide input into the development and on-going implementation of the closure/post-closure plan; and
- suggest additional strategies for minimizing the landfill stigma on local residents.

The committee consists of six members. Members are appointed by the Board. Membership representation is as follows:

- 3 members Residents that live near or adjacent to the Regional Landfill
- 1 member Mayco Mix (Industrial Property Owner adjacent to landfill)
- 1 member Nanaimo First Nation
- 1 member City of Nanaimo (Planning and/or Parks and Recreation Department)
- 1 member Ministry of Water Land and Air Protection

The liaison committee meets approximately four times per year at the Regional Landfill. Additional meetings may be scheduled to address special issues as requested by the committee.

iii. Waste Stream Management Licensing Working Group

A Working Group will be set up to assist in the implementation of the Waste Stream Management Licensing Bylaw and provide feedback on its effectiveness for two years after its implementation. This committee, made up of 3-5 solid waste management stakeholders, will provide on-going feedback to the RDN on implementation and operational issues associated with this new bylaw. The intent of the working group is to identify and resolve bylaw-related concerns and issues early and promptly, in addition to monitoring the effectiveness of the bylaw in achieving its stated objectives. The working group will work closely with RDN solid waste and bylaw enforcement staff. This will not be a formal committee of the Board, but a temporary working group set up for the initiation of the bylaw. If possible, this working group will also include representatives of the Cowichan Valley Regional District stakeholders and staff.

Solid Waste Management Plan

◆ Plan Flexibility

Due to changing circumstances and priorities, all major components of the Plan will be reviewed for appropriateness before implementation. This will generally occur on an annual basis when the RDN's 5-year budget for Solid Waste Management Services is reviewed. The Plan's implementation schedule will be flexible enough to reflect the variability in:

- Availability of technology
- Financial priorities and available funding; and
- Availability of staff and contractors.

10. Approvals

This Plan will be subject to public consultation in advance of its approval by the Regional Board. Upon receiving Board approval, it will be submitted to the BC Minister of Water, Land and Air Protection for approval.

Appendices

Appendix A

Operational Certificate for RDN Landfill



MINISTRY OF WATER, LAND
AND AIR PROTECTION

Vancouver Island Region
Environmental Protection
2080-A Labieux Road
Nanaimo, British Columbia
V9T 6J9
Telephone: (250) 751-3100
Fax: (250) 751-3103

OPERATIONAL CERTIFICATE
MR-01714

Under the Provisions of the Waste Management Act

Regional District of Nanaimo
6300 Hammond Bay Road
Nanaimo, British Columbia
V9T 6N2

is authorised to manage recyclable material and waste from the Regional District of Nanaimo and environs at the regional landfill located on Cedar Road in Nanaimo, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Waste Management Act* and may result in prosecution.

1. MANAGEMENT OF WASTE AND RECYCLABLE MATERIAL

1.1. Sanitary Landfill

- 1.1.1. This subsection applies to the discharge of waste to a sanitary landfill.
- 1.1.2. Waste may be discharged to the operating engineered landfill approximately located as shown on attached Site Plan A. The discharge or storage of waste on the closed landfill is prohibited.
- 1.1.3. The characteristics of the discharge must be municipal solid waste as defined under the *Waste Management Act* and other wastes as approved in writing by the Regional Waste Manager.
- 1.1.4. The authorised works are an operating engineered landfill, a closed landfill, and related appurtenances approximately located as shown on attached Site Plan A.
- 1.1.5. The authorised works must be complete and in operation on and from the date of this operational certificate.

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Assistant Regional Waste Manager

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1.2. Leachate

- 1.2.1. This subsection applies to the management of leachate from the landfill.
- 1.2.2. The characteristics of the surface water and groundwater at the property boundary must not exceed concentrations set in the *British Columbia Approved Water Quality Guidelines (Criteria)* and *A Compendium of Working Water Quality Guidelines for British Columbia*. Where natural background water quality concentrations exceed the aforementioned guidelines, characteristics of the surface water and groundwater at the property boundary must not exceed background concentrations.
- 1.2.3. The authorized works are leachate collection works, lift stations and related appurtenances.
- 1.2.4. Leachate must be collected and conveyed to the municipal sewage treatment system.
- 1.2.5. The authorized works must be complete and in operation on and from the date of this operational certificate.

1.3. Landfill Gas

- 1.3.1. This subsection applies to the management of landfill gas from the landfill.
- 1.3.2. Landfill gas must be managed in accordance with sections 4.2 and 6.4 of the *Landfill Criteria for Municipal Solid Waste*.

1.4. Location of authorised facilities

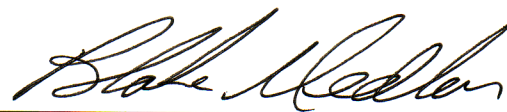
The location of the facilities for the management of recyclable material and waste to which this operational certificate is applicable is Lot A, Plan 49841 and Lot 1, Plan 48020, Nanaimo Land District, approximately located as shown on attached Site Plan A.

2. GENERAL REQUIREMENTS

2.1. Entrance facilities

- 2.1.1. The authorised facilities are signs, weigh scales, recyclable material and waste drop-off and storage facilities and related appurtenances.
- 2.1.2. The authorised facilities must be complete and in operation on and from the date of this operational certificate.

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Assistant Regional Waste Manager

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2.2. Qualified Professionals

All facilities and information, including works, plans, assessments, investigations, surveys, programs and reports, must be certified by qualified professionals.

2.3. Plans

- 2.3.1. Site development (fill), operating, and leachate management plans must be submitted to the Regional Waste Manager by April 30, 2004. A closure and post-closure plan, and a stormwater management plan, must be submitted to the Regional Waste Manager by December 31, 2004.
- 2.3.2. The plans must address, but not be limited to, each of the subsections in the *Landfill Criteria for Municipal Solid Waste* including performance, siting, design, operational and closure and post-closure criteria.
- 2.3.3. The facilities must be developed, operated and closed in accordance with the plans.
- 2.3.4. The plans must be kept up to date. Updated plans must be immediately submitted to the Regional Waste Manager.

2.4. Additional Facilities or Works

The Regional Waste Manager may require investigations, surveys, and the construction of additional facilities or works including, but not limited to, additional leachate and wildlife management facilities. The Regional Waste Manager may also amend the requirements of any of the information required by this operational certificate including plans, programs, assessments and reports.

3. MONITORING AND REPORTING

3.1. Monitoring Program

- 3.1.1. A monitoring program must be developed to identify any impacts to the environment and public health from the landfill.
- 3.1.2. The monitoring program must address, but not be limited to, subsections 4.1, 4.2 and 7.15 of the *Landfill Criteria for Municipal Solid Waste* and the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*.
- 3.1.3. Monitoring must be conducted in accordance with the monitoring program.



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Assistant Regional Waste Manager

3.2. Annual Operating and Monitoring Report

- 3.2.1. An annual operating and monitoring report for the preceding 12 month period from January 1 to December 31 must be submitted to the Regional Waste Manager by March 31 of each year.
- 3.2.2. The report must include:
- An executive summary;
 - Tonnage of each type of waste discharged to the landfill for the year;
 - Remaining site life and capacity;
 - Review of the preceding year of operation, plans for the next year and any new information or proposed changes relating to the facilities and plans;
 - Comparison of the monitoring data with the performance criteria in section 4 of the *Landfill Criteria for Municipal Solid Waste* and the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*, interpretation of the monitoring data, identification and interpretation of irregularities and trends, recommendations, and any proposed changes to the monitoring program.

4. SITE CLOSURE

4.1. Closure and Post-Closure Fund

A closure and post-closure financial security trust fund must be built up over time. The closure and post-closure fund must ultimately meet or exceed the estimated closure and post-closure costs plus a reasonable contingency for any remediation that may be required.

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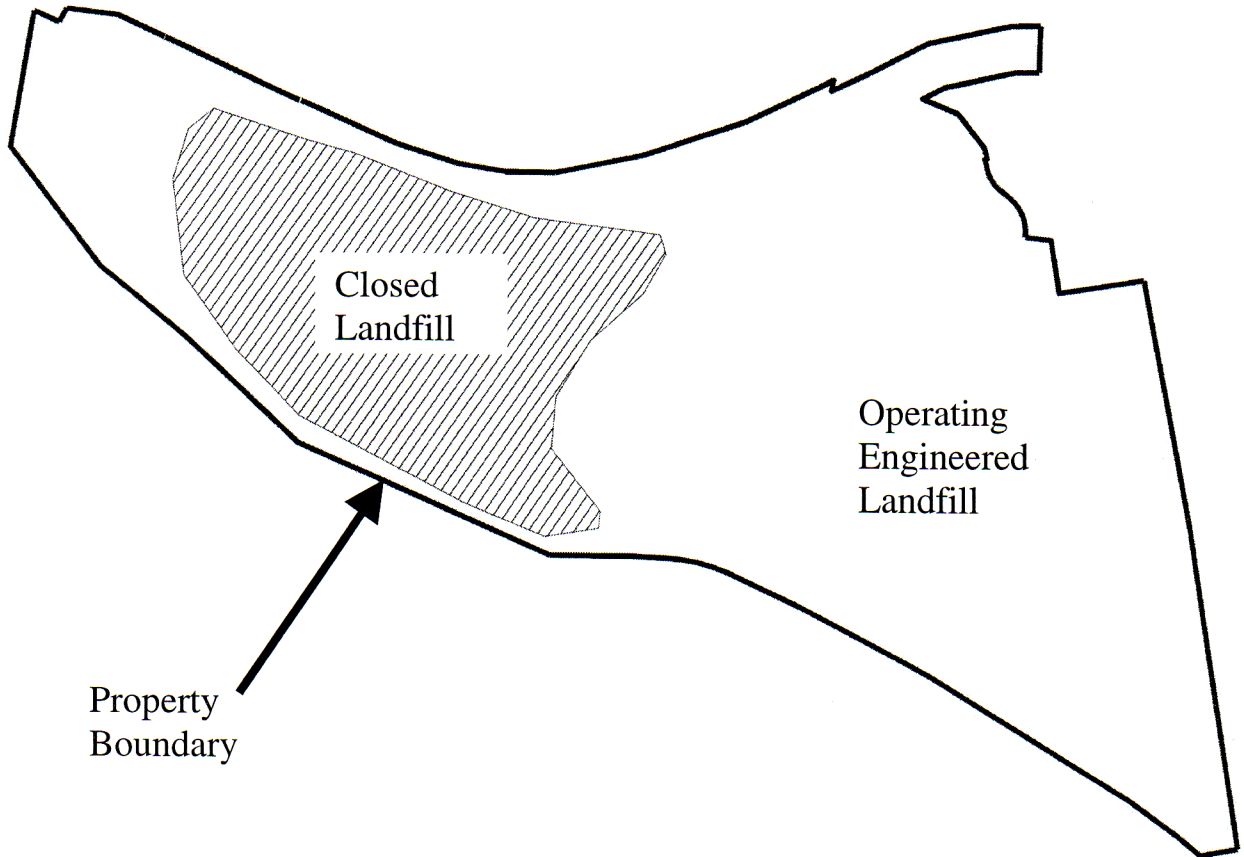
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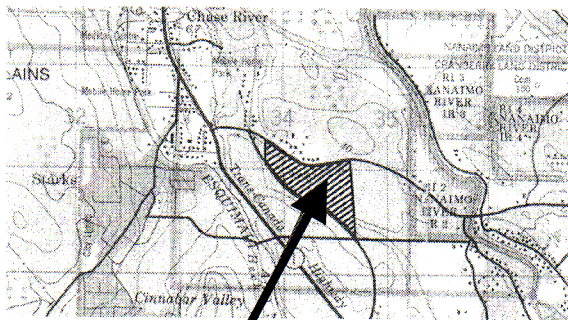
SITE PLAN A



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Location Map



Regional Landfill on Cedar Road

Scale: Not to Scale

Operational Certificate: MR-01714

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Vancouver Island Region