APPENDIX H -- HARTLAND CAPITAL DEVELOPMENT PLAN

EXECUTIVE SUMMARY

INTRODUCTION

At present, Hartland Landfill is in an exciting and dynamic state of transition. The Capital Projects Group is preparing to close the Phase I landfill area. Also, they are constructing numerous leachate control systems for Phase II. The landfill operations group is preparing to shift landfill operations to the Phase II landfill in the spring of 1996, once Phase I is filled to approved capacity. As well, a partnership initiative is being pursued actively with the private sector to implement a food waste composting facility at the Hartland North Site.

PURPOSE

The purpose of the Capital Works Development Plan is to integrate all of the previous reports and findings into one cohesive Master Plan for Hartland.

Linkage of Previous Studies: To date, the Capital Projects Group and various specialist consultants have completed design memoranda for most of the major facilities including the leachate collection system for Phase II, the final cover system for Phase I, the Phase I gas collection system and the in-vessel food waste composting system. However, the individual reports have not been linked into an overall development strategy that recognizes the important scheduling and performance inter-relationships between the various operating facilities and environmental control components. One of the key objectives of this Capital Works Development Plan was to provide continuity and linkage to those reports.

All Composting at North Site: At the start of this study it was recognized by CRD that a number of new facilities would be required in order to achieve a significant reduction in the amount of waste that is being landfilled. However, the actual facility locations for the new facilities had not been established. Also, with the construction of Willis Point Road a second possible access corridor was established. A comprehensive siting and traffic study was conducted that included travel time analyses, capital and operating cost evaluations and an overall cost-benefit impact analysis using a decision matrix.

The results suggest that the most efficient means of operating Hartland will be realized if the new in-vessel composting facility is located on the eastern or lower knoll, the yard and garden windrow facility remains on the existing north site compost pad, and all other waste receiving facilities remain at their existing locations.

Of seven different access options considered, it was determined that continuing to access all existing facilities via Hartland Avenue, except the in-vessel and windrow composting facilities which would be accessed from Willis Point Road, was the most effective access

option in terms of cost and efficiency. If the CRD chooses to develop a quarry at Hartland, crushed aggregate from the rock quarry would also be transported to markets via Willis Point Road.

Eliminating Congestion at South Scales: Over the past three years, line-ups have formed from time to time, resulting in substantial delays to commercial waste haulers and the public. Diverting all composting traffic to the north site will reduce this problem; however, the reduction in traffic flow will be more than offset by increased heavy traffic hauling construction materials to the site.

To eliminate the congestion problem, this report recommends that small vehicle traffic bound for the small vehicle bin area and/or the recycling facility be diverted around the south scales via a new access road, and that those vehicles bypassing the scale be charged a tipping fee based on volume rather than weight.

Upgrading Temporary Recycling Facility: For the most part, existing waste receiving and processing facilities are working very well and no major upgrades are considered necessary. The one exception is the existing temporary recycling facility. An improved conceptual design for an expanded 14 bay recycling facility is proposed.

Controlling Leachate Generation: Quantities of leachate and clean water run-off have been monitored in the Phase II expansion area since January 1993. Results and subsequent analysis of the flow data indicate that there appears to be more leachate generation in the winter, and less in the summer than originally anticipated during sizing studies for the leachate lagoon. The main reason for the difference is that capping of the Phase I landfill with a quality intermediate clay cover has significantly increased run-off from the Phase I area. Instead of infiltrating into the landfill to seep out slowly weeks to months later (a process we call the "sponge effect"), the run-off now flows at surface, mixing with leachate from break outs, to produce large quantities of dilute leachate in the old lagoon during and shortly after major storms.

Phase I / Phase II Transition Area: Operation of the leachate management system during the winter of 1994-95 has established that the existing leachate management system is not capable of handling all precipitation that falls into the Phase I catchment and run-off from the Phase II catchment. Clean water from the Phase II area had to be pumped into Heal Creek instead of discharged through the micro-tunnel.

To minimize the amount of leachate generation at Hartland, this report recommends that CRD proceed to commence landfilling in the bottom of the Phase II Basin only after the Phase I landfill is fully capped in the summer of 1997. The Phase I Landfill will be completed in the spring of 1996. In order to maintain the Phase II basin uncontaminated during the transition we have developed the Phase I / Phase II Transition Cell concept. The

transition cell will be located on top of the existing yard waste receiving pad on the west side of Heal Basin. This cell will provide approximately 350,000 m^3 of capacity, enough for approximately 25 months of refuse disposal.

Upgrading Leachate Pipeline Capacity to 40 L/s: Subject to agreement with Saanich, upgrading the pipeline capacity to 40 L/s from 25 L/s will likely be required in order to compensate for the loss of sponge effect. More detailed monitoring of leachate and clean water flows during the winters of 1995-96 and 1996-97 should be conducted before the final decision regarding the capacity upgrade is made.

Upgrading the Phase II Diversion Systems: Substantial quantities of clean surface run-off are still being captured in the Phase II Basin. Also, during wet periods of the year, some leachate is overflowing into the Phase II basin from the west face of Phase I.

To minimize the amount of clean water being captured installation of a pump station is recommended to lift the water presently captured by the lower diversion ditch system located at the 130 m level, the future toe of Cell 1. Also, installation of a new leachate collector is recommended to convey the leachate collecting on the west face of Phase I by gravity into the old leachate lagoon..

Leachate Collection and Closure at the South Face: Improving the leachate control system at the south end of Phase I is an urgent priority. Since completing the final grading of the south face, numerous leachate break-outs have developed. The leachate is accumulating in the ditch above the south face toe berm. The collection of leachate is resulting in odour problems at the south site. As well, during wet weather, the collection ditch overflows into Killarney Creek. To correct this problem, this development plan recommends construction of a leachate collector along the south face in the early summer of 1995, followed by full closure of the south face later in the year.

Scheduling of Phase I Closure: To minimize the impact on the community and to take full advantage of free clay that is being transported to the site, this plan recommends the following closure schedule:

- South Phase of Phase I in summer, 1995.
- North and East Face of Phase I in summer, 1996.
- Crest of Phase I in summer, 1997.
- Phase I/Phase II Transition Area in summer, 1998.

Construction Materials Management Plan: Large quantities of construction materials, will be used at Hartland over the next four years to construct the Phase I final cover, the Phase II leachate collection system and to provide daily and intermediate cover for landfill operations. The required quantities of each product are summarized below assuming that a

composite final cover comprised of 300 mm of clay overlain by a geomembrane will be utilized on the top of Phase 1. If a 1,000 mm thick compacted clay cover is ultimately selected instead, then a total of 300,000 m^3 of compacted clay will be required.

Underdrain Rock	(150 x 75 mm crush)	28,000 m^3
Drainage Blanket Rock	(75 x 25 mm crush)	148,000 m
Graded Filter Product	(minus 25 mm crush)	75,000 m^3
Clay	(imported)	205,000 m^3
Subsoil	(imported mineral soil)	53,000 m^3
Top Soil	(peat from Heal Basin)	53,000 m^3
Total		562,000 m^3

To ensure that adequate quantities of materials will be available at the start of each major contract and sufficiently large storage areas are available, a detailed Construction Materials Management Plan has been prepared in Chapter 11 of this report.

Capital Works Cost Estimates: The total capital construction cost required to construct all planned facilities is $12 million. This amount does not include any funding for construction of the In-Vessel Food Waste Compost Facility since it is assumed that the development of the In-Vessel Facility will be funded by the private sector. Engineering, contingencies, taxes, and CRD by-law costs are not included.

Also, the capital cost projections do not include any funding for construction of an on-site leachate treatment facility. Whether this facility is needed will be established only after Phase II becomes operational and the chemical composition of the resulting leachate becomes known.

On a year by year basis, spending on planned Capital Projects has been balanced as follows:

1995	$3.2 million
1996	$3.8 million
1997	$3.9 million
1998	$1.0 million
1999	$0.1 million
	$12.0 million