508 Selkirk Ave.
Shore Restoration Project

SITE DESCRIPTION

508 Selkirk Avenue is located at the southeastern end of the Gorge Waterway; a shallow, narrow inlet extending northwest of Victoria Harbour (Figure 1). The Gorge is strongly influenced by tidal currents, especially at the narrowest constrictions. Portage Inlet, a shallow basin at the upper end of the Gorge Waterway, receives freshwater drainage from the Colquitz River and Craigflower Creek, major watersheds of the municipality of Saanich. The Gorge is well protected from wave action, but some sections of shore are subject to erosion due to boat wake. Suspension feeding organisms (sponges, ascidians, bryozoans) are abundant in subtidal areas of the Gorge due to the high current regime. The Gorge and Portage Inlet also support the largest eelgrass beds in the Victoria and Esquimalt Harbour region.

The shore of 508 Selkirk is approximately 20m in length and formed entirely of a concrete seawall (Figure 2). The property is bounded by a sewage trunk line to the west and a retaining wall running perpendicular to shore (part of a former boat haul-out) to the east. Historic air photos suggest that infilling and construction of the seawall occurred prior to 1930. The seawall was last replaced in 1979.

The upland of this site is characterized by "typical" urban vegetation; a lawn slopes gently to the top of the seawall with a large weeping willow in the middle of the property.

Figure 1. Location of 508 Selkirk Ave. on the Gorge Waterway (blue asterisk)

The base of the seawall (approximately +0.5m elevation relative to chart datum) is a mixed substrate beach formed of broken concrete, boulder, cobble and gravel overlain with a mud veneer (Figure 3). There is a bedrock outcrop at the west end of the property. A small amount of rockweed (*Fucus sp.*) and a few Pacific oysters (*Crassostrea gigas*) grow on this bedrock outcrop. During outgoing tides the current at the base of the seawall forms a back eddy, and the fine sediments overlaying the substrate indicates a depositional environment.

The Land Conservancy (TLC) purchased 508 Selkirk Avenue in 2002, subdivided it, reselling the section adjacent to Selkirk Avenue and transferred the Gorge waterfront property to the City

of Victoria for conservation purposes. TLC then registered a conservation covenant on the waterfront property and entered into a restoration agreement with the City agreeing to restore the waterfront, as near as practical, to its natural condition. Important elements of the agreement include:

- removal of existing seawall
- removal of fill
- replanting of native vegetation

Figure 2. Property at 508 Selkirk Ave showing seawall at mid tide and sewer truck corridor (right side).

In addition TLC's stated objectives for the property include:

- building partnerships by using the restoration project to build support for shore restoration in the community.
- sharing information on shore restoration design and process with others in the Gorge Waterway.

SITE AND DEVELOPMENT ISSUES

Most waterfront properties along the Gorge are residential and many follow a historic trend of shore hardening, primarily by the construction of seawalls. The cumulative impacts of shore hardening in the Gorge include loss of riparian vegetation, brackish marshes as well as sand and mudflats. In many cases seawalls are built because of a perceived threat of erosion but, in an area like the Gorge, seawalls have been built primarily as a result of upland development (infilling, drainage/runoff control). 508 Selkirk is an example of this type of waterfront modification. The major challenge at this site was to design a more natural shore, increasing environmental values and providing better connectivity between the upland and water.

Figure 3. Property at 508 Selkirk St at low tide, showing bedrock outcrop (right) and mixed sediment beach (left).

Specific issues and concerns at this site included:

1. The small length of shore and physical constraints (sewer trunk and boat haul-out) at both ends of the property which limited restoration opportunities.
2. Public perception and concern that this kind of program, if applied to their property, could limit their access and shore related activities. The adjacent neighbours were concerned about increased use and noise on the newly created public property.
3. The nature of the historic fill used at this site was not known. It was possible that the fill was contaminated or otherwise unsuitable for use in the newly restored shore.
4. The small area of upland available for restoration. The covenanted waterfront lot is approximately 20m deep, and it was undesirable to lose most of this upland in the effort to create a shallow sloped, softer shore zone.

DESIGN PROCESS AND SOLUTIONS

Due to the public concerns outlined above, financial constraints and the desire that this project serve as an example to the community of alternative and environmentally friendly shore design, TLC adopted a novel design process that included:

1. **Educational Opportunities and Use of Community Resources -** TLC and the City of Victoria partnered with the Restoration of Natural Systems program at the University of Victoria to create a "Coastal Shoreline Restoration" course with the focus of developing a restoration plan for this site. The teaching plan drew heavily from local professional expertise (marine habitats, coastal processes, geotechnical, engineering, and archaeology) from both the academic and private sector. In addition a number of community members with a specific interest in the restoration of this site (including neighbourhood property owners) took the course. This provided a means of obtaining professional advice at little to no cost, as well as addressing public concerns (see below) as part of the course program.
2. **Public Interviews –** Students taking the restoration course solicited public concerns and issues about the project, particularly those of adjacent neighbours. In this way, concerns were identified and addressed in the design concepts provided by the students. In addition, neighbours were free to audit the course to familiarize themselves with the restoration process and design concepts
3. **Recognizing Partnership Opportunities -** The Capital Regional District (CRD) was planning to upgrade the trunk sewer at the west end of the property. This was an opportunity to partner with the CRD Engineering Department and associated consultants in the design and engineering for both projects, providing access to important professional services and reduced costs. In addition, the re-designed trunk sewer removed some of the design constraints at the west end of the property, in particular the concrete structure containing the old sewer line.
4. **Adopting Realistic Design Goals –** The intent of this project was to restore the shore to the natural condition "to the degree practical". It was recognized that the small size of the property and structures on adjacent properties constrained the ability to restore to "natural conditions". For example the amount of filled upland which would have to be removed to restore to full natural conditions would reduce the upland to an unusable size and reduce the ability of the property to demonstrate alternative, shore friendly design.

The chosen restoration design includes creation of a small intertidal beach area, suitable for intertidal clams and a terraced marsh bench modeled after an existing natural marsh on the opposite side of the Gorge Waterway (Figure 4). In addition the design incorporates plantings of riparian vegetation and use of logs to create the marsh bench and provide the required degree of protection from erosion. Runoff has been directed onto the marsh bed with use of a rock splash pad to minimize the potential for erosion. Most of the seawall has been removed and a new, small section poured at the east side of the site to buttress the boat haul out retaining wall.

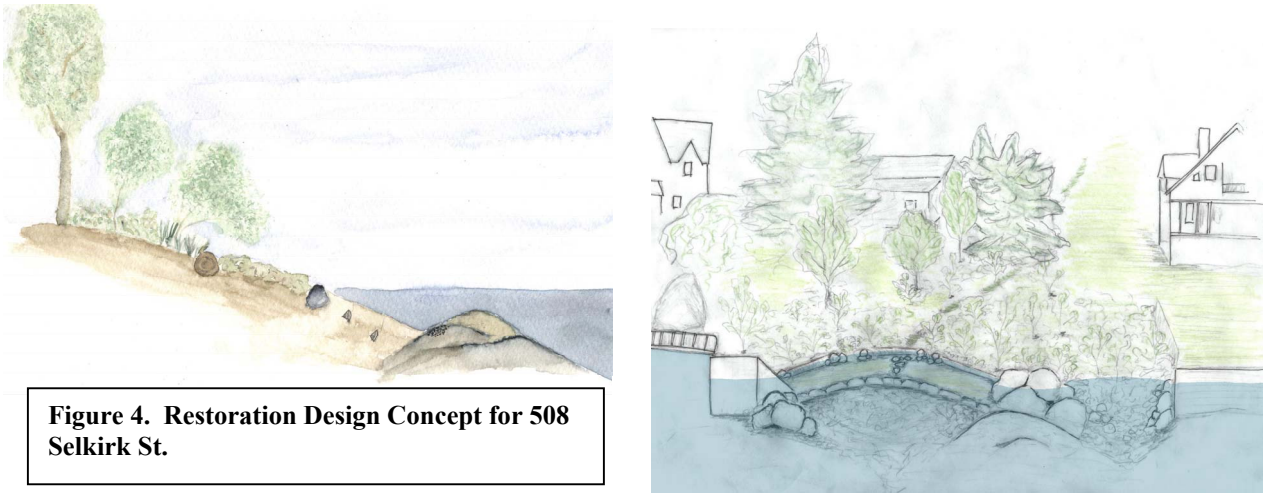

Figure 4. Restoration Design Concept for 508 Selkirk St.

PROJECT STATUS

The nature of the fill and areas of potentially contaminated soils were characterized in test pit excavations conducted in 2004. The design drawings for this project and the adjacent sewer truck upgrade were completed in March, 2005 and the seawall removed and the site rough graded in the summer of 2005. Final site grading and marsh planting is scheduled for the fall of 2005 and the spring of 2006.

GREEN SHORES ASSESSMENT

The ability of this project to address a Green Shores approach and principles are assessed in Table 1. In all categories, except alongshore connectivity, the project contributes in a positive way to meeting Green Shores principles. The project is considered to have a neutral effect on alongshore connectivity. Although the project is small in size, its ultimate value will be in demonstrating to other property owners along the Gorge Waterway that alternatives to seawall construction can provide an aesthetically pleasing and recreationally valuable shore; contributing to, rather than detracting from, the important environmental values of the Gorge Waterway.

Table 1 Green Shores Assessment Matrix

Green Shore Principle	Design Rating	Comment
Integrity of Coastal Processes-Connectivity **A. Across Shore** **B. Along shore**	 + **0**	Design considers natural flow from upland to subtidal zone; the existing seawall had minimal impact on along shore transport therefore the restoration has had a neutral impact on alongshore connectivity.
Maintenance of Habitat Function	+	Addition of riparian vegetation, marsh bench and a potential clam bed adds to habitat diversity and site productivity.
Minimize Pollution	+	Redirection of rainwater runoff (which may contain storm runoff from Selkirk Ave.) to the marsh bench may increase retention time slightly and reduce contaminated sediment input to the Gorge. Areas of existing contaminated fill will be removed, reducing risk of these sediments moving into the Gorge.
Avoid Cumulative Impacts	+	Incremental reversal of the degree of shore hardening in the Gorge
Other Green Shore Benefits **A. Use of Integrated Design Process** **B. Educational/Stewardship Value**	 + +	Close association of habitat biologists and restoration specialists with engineering design. The project will serve as a demonstration of alternative shore treatments for other Gorge waterfront property owners.

\+ contributes in a positive fashion to the GS principle

0 has a neutral effect (this may be the best possible outcome, such as a shore protection design which allows for continued alongshore sediment transport)

\- Does not meet the specific GS principle, has a negative impact on the GS principle