



Planning and Land Use Committee Report

Date: January 23, 2014 **From:** Robert Batallas, Senior Planner
Subject: Ship Point (City-owned lands) Environmental and Geotechnical Analysis

Executive Summary

The purpose of this report is to inform Council on technical findings related to the environmental and geotechnical analyses that were recently completed for the City-owned lands located at 940, 946 and 1000 Wharf Street, referred to as the Ship Point site for the purpose of this report and identified in Attachment 1.

As a key Inner Harbour land owner and on the basis of prudent land stewardship, the City of Victoria retained the services of SNC-Lavalin Environment & Water in April 2013 to undertake an environmental and geotechnical analysis. This analysis provides the City with a better understanding of the physical conditions of its land and is also important information for consideration through any subsequent planning or initiatives within the Ship Point site, including the proposed Inner Harbour Revitalization Opportunities project. The environmental and geotechnical analysis for Ship Point included the completion of Phase 1 and Phase 2 Preliminary Site Investigations (PSI) which identified any potential sources and evidence of environmental contamination while the Geotechnical Analysis provided an evaluation and summary of the site's sub-surface conditions related to physical composition, stability, seismic risks and suitability for potential redevelopment. All research, field work and analysis was performed and reported in accordance with the criteria and regulations established by the Province of British Columbia Ministry of Environment (MOE).

According to the information prepared by SNC-Lavalin Environment & Water, the eastern portion of the site (940 Wharf Street) is generally better suited for potential redevelopment than the western portion of the site (946 and 1000 Wharf Street) as the eastern portion is situated on more level bedrock within the natural shoreline, contains a thinner layer of fill material, and exhibits lower levels and distribution of contamination. These overall conditions would likely support a more cost-effective approach for preparing the site to accommodate potential enhancement or redevelopment. The analysis also identified that any future redevelopment proposals for the site will need to be discussed with the MOE and will likely require the City, as the landowner, to undertake more detailed environmental and geotechnical analysis in accordance with Provincial (MOE) criteria.

Recommendations

1. That Council accept the Ship Point environmental and geotechnical analysis summary for information.
2. That Council direct staff to incorporate the Ship Point environmental and geotechnical analysis as public background information for the proposed Inner Harbour Revitalization Opportunities project.

Respectfully submitted,



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Deb Day, Director
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Report accepted and recommended by the City Manager:



Jocelyn Jenkyns

RB:aw

1.0 Purpose

The purpose of this report is to inform Council on technical findings related to the environmental and geotechnical analysis that was recently completed for the City-owned lands located at 940, 946 and 1000 Wharf Street, referred to as the Ship Point site. As a key Inner Harbour land owner and on the basis of prudent land stewardship, the City of Victoria retained the services of SNC-Lavalin Environment & Water in April 2013 to undertake the analysis. The findings from this work also serve to support and inform the advancement of the Inner Harbour Revitalization Opportunities project.

2.0 Background

As a key Inner Harbour land owner, the City of Victoria is committed to seeking opportunities to revitalize the Inner Harbour, as outlined in various Council-approved policy plans including the *City of Victoria Strategic Plan (2013)*, *Official Community Plan (2012)*, *Downtown Core Area Plan (2011)*, *Economic Development Strategy (2011)*, *Harbour Pathway Plan (2008)* and the *Victoria Harbour Plan (2001)*. Although these plans have been developed at different times and for different purposes, they all share similar goals and objectives for the Inner Harbour which generally relate to:

- supporting the Waterfront and Harbour revitalization
- enhancing tourism
- ensuring sensitivity to the surrounding historic and waterfront context
- maintaining a Working Harbour
- completing the Harbour Pathway (David Foster Way)
- maintaining and enhancing the Harbour's important role for marine transportation and as a gateway to the City, region and Vancouver Island
- providing well-designed and appropriate public-realm improvements
- providing a reason for people to visit, enjoy, invest and have pride in the Harbour.

With the overall vision and objectives for the Inner Harbour confirmed by the various policy plans described above, staff identified the need to gain a better technical understanding of the physical qualities (environmental/geotechnical) of the City's land holdings to allow for a more strategic and focused approach to planning within the Inner Harbour. Therefore, the City of Victoria issued a Request for Proposal (No. 13-010) on March 26, 2013, for a qualified consultant/consultant firm to undertake Stage 1 and Stage 2 Preliminary Site Investigations (PSI) and a Geotechnical analysis of the City-owned lands at Ship Point. This contract was subsequently awarded to the Victoria office of SNC-Lavalin Environment & Water. This project included field work, laboratory analysis and reporting which was carried out between June 2013 and October 2013 and was completed in accordance with the criteria established by the Province of British Columbia Ministry of Environment (MOE). All project work was managed by SNC Lavalin Environment & Water and jointly coordinated and reviewed by City of Victoria staff.

2.1 Phase 1 Preliminary Site Investigation (PSI)

The Phase 1 PSI identified areas of potential environmental concern (APEC), associated with potential contaminants of concern (PCOC) and the potentially-affected media such as soil, groundwater, surface water, soil vapour and/or sediment. The completion of the Phase 1 PSI was based on a review of information derived from historical and background site information, a visual inspection of the site and interviews with existing businesses on or adjacent to the site, all of which were completed by the consultant. The Phase 1 PSI identified the following historic and environmental information:

Historic

- The site has been used for various industrial purposes for over 100 years, therefore, the environmental history is generally complex.
- Development on the site began as early as the mid-1870s and continued periodically until 1974.
- The site contained a cement and concrete plant from 1910 until the early 1970s when the Ocean Cement plant and associated buildings and wharves were demolished.
- The City of Victoria acquired the lands at 940 and 946 Wharf Street in 1973. The City of Victoria already owned the land at 1000 Wharf Street.
- Infilling westward from the natural shoreline to the current configuration occurred in the early 1970s. The source and origin of the fill materials are not known.
- The current facilities include a pre-manufactured building that contains the Harbour Air Terminal, a 22,700 litre concrete bunker and fuel tank for the associated float plane operations, CycleTreks, a parking lot area and open space along the shore line.

Environmental

- There is a potential for environmental impact to the site as a result of the historic activities on and adjacent to the site.
- There is a potential environmental risk to the site based on the 35-year-old on-site fuel bunker and distribution lines.
- Additional potential off-site environmental risks were identified. These included the historic operation of a planing mill, a service/gas station and a machine shop which were all located adjacent to the site at Wharf Street and Broughton Street.
- Based on the information derived in the Phase 1 PSI, the consultant recommended that further investigation be completed through a Phase 2 PSI to confirm or refute the potential for environmental impacts on the site.

2.2 Phase 2 Preliminary Site Investigation (PSI)

The Phase 2 PSI was completed for the purpose of assessing the soil and groundwater quality of the site as a means to confirm or refute the potential environmental impacts that were identified during the Phase 1 PSI. The Phase 2 PSI was based on field work which included the drilling of eight boreholes in strategic locations across the site which provided soil samples for analysis as well as installing groundwater monitoring wells in two of the boreholes. Soil samples were logged for soil type, colour, moisture content and density. Soil samples were then shipped to a laboratory for analysis. The Phase 2 PSI identified the following environmental information:

Environmental

- Soil in the southwest portion of the site contains forms of oil and oil-based contamination commonly found in many sites within the Inner Harbour. The source of this contamination is likely attributed to infilling of the Harbour with materials from unknown locations (which have been previously contaminated) as well as abandoned creosote-treated wood pilings associated with a former wharf.
- The contamination level in this area is marginally above the acceptable standards for Commercial Land Uses (CL) as stipulated in the *Provincial Contaminated Sites Regulation* (CSR).

- There is no contamination related to metals or solvents that exceed the CL standards as described in the CSR.
- The distribution of contamination is not extensive and, where it does exist, it is generally deeply buried at approximately 6 m below the surface.
- Groundwater samples contained forms of oil and oil-based contamination, however, at levels that are less than the applicable Provincial standards.
- Groundwater samples indicated the intrusion of saltwater along the west side of the site; therefore, the Provincial standards for the protection of drinking water are not considered to be applicable.

2.3 Geotechnical Analysis

A Geotechnical analysis of the site was also carried out in conjunction with the Phase 2 PSI for the purpose of providing a summary of the geotechnical site conditions, including constraints and considerations which may affect potential site enhancement or redevelopment. Information derived through the geotechnical analysis was also compared against information contained in a geotechnical investigation that was completed by Thurber Engineering Ltd. in 1999 for the same site. The Geotechnical analysis identified the following information:

Soil Materials

- Soil stratigraphy consists of sand and gravel fill overlying silt underlain with marine clay (Victoria Clay).
- The thickness of this variable fill is generally less than 1 m on the eastern part of the site to nearly 8 m on the northwest portion of the site.

Seismic Considerations

- In the event of a large earthquake, the western portion of the site would be at greatest risk of slope failure and lateral spread due to the steep-sloping profile of the sub-surface bedrock in combination with the thick layer of poorly-compacted fill above. This would likely result in the collapse of any structure on the site if built atop conventional footings. This portion of the site would also be at risk of liquefaction due to a high ground-water level and the presence of poorly compacted granular fill and other unconsolidated loose/soft fills.
- The detailed structural design of the adjacent sea wall on the west side of the site is unknown and it is highly probable that the wall does not meet the standards of the 2012 *BC Building Code*. The stability of the wall is a significant concern, particularly in regard to seismic requirement.

Development Considerations

- The construction of a building atop this fill would likely result in significant post-construction settlement due to building loads that would be well beyond tolerable limits. The risk of post-construction settlement is also compounded by the presence of marine clay deposits (Victoria Clay) below the fill layers that are considered compressible if loaded beyond the current pre-consolidated pressures.
- The risk of post-construction settlement is higher on the western portion of the site where fill depths are higher.
- The majority of the site, particularly the western portion, appears to be atop dredged or variable fill that is poorly compacted, which is generally not suitable

material for supporting conventional building foundations.

- It is possible that the entire site could require significant amounts of excavation to remove contaminated materials to accommodate any potential redevelopment (i.e. commercial building). This process could require deep excavation below the water table, which could result in further contamination of the surrounding marine habitat.
- A large amount of fill would be required to reconstruct the site following excavation to accommodate new development.
- Site excavation will require significant dewatering/unwatering in addition to conventional sump pumps to maintain a dry excavation due to the high water table.
- The physical condition of the adjacent sea wall is questionable as potential voids were encountered during the subsurface investigation and there are cosmetic signs that may relate to the wall undergoing movement.

3.0 Issues & Analysis

3.1 Suitability of Ship Point for Redevelopment

The environmental and geotechnical analysis that was completed by the consultant identified that the eastern portion of the site (940 Wharf Street) is generally better suited for redevelopment than the western portion of the site (946 and 1000 Wharf Street). The eastern portion is situated on more level bedrock within the natural shoreline, contains a thinner layer of fill material and exhibits lower levels and distribution of contamination. These conditions may support a more cost-effective approach for preparing the site and accommodating new development due to the need to excavate less fill and the ability to design and develop more conventional forms of building foundations due to the closer proximity to bedrock.

3.2 Remediation Requirements

SNC Lavalin Environment & Water was requested to identify order-of-magnitude costs for three development scenarios. These scenarios are not intended to reflect preferred or pre-determined options but were established solely for the purpose of providing high-level cost estimates based on the extent of potential site redevelopment. Staff acknowledge that if Council chooses to pursue the redevelopment or enhancement of this site at a later time, the costs identified below may be subject to further refinement based on consultation with the Ministry of Environment (MOE). The role of the MOE will be to review any proposed detailed development concepts and determine the appropriate remediation standards (i.e. commercial, industrial, residential) based on the proposed use and design. The MOE may also identify risk-based solutions that do not require remediation, but rather design solutions to mitigate any potential impacts from existing contamination.

Development Scenario	Order of Magnitude Cost Estimate	Notes
1. Leave site as-is (parking/special events)	<ul style="list-style-type: none">• \$5,000 for additional environmental analysis• \$15,000 for geophysical survey of sea wall Total Estimate \$20,000	Provides basic information without advancing redevelopment or enhancement

2. Only develop 940 Wharf Street	<ul style="list-style-type: none">• \$30,000-\$50,000 for additional environmental assessment• \$30,000 for further geotechnical assessment• \$15,000 for geophysical survey of sea wall Total Estimate \$75,000-\$95,000	Maintains existing uses on 946 and 1000 Wharf Street (e.g. parking, special events, pathway)
3. Develop 940 Wharf Street and portion of 946 Wharf Street to within 5-10 m of seawall	<ul style="list-style-type: none">• \$50,000-\$100,000 for additional environmental assessment• \$100,000 if only Risk Based Assessment is required by MOE (no soil remediation)• \$250,000 if Risk Based Assessment and soil excavation are required by MOE• \$100,000 for further geotechnical assessment• \$35,000 for MOE fees• \$15,000 for geophysical survey of sea wall Total Estimate \$550,000-\$600,000	Costs may be higher if MOE requires further assessment and remediation on adjacent water lot

Options and Impacts

1. That Council accept the Ship Point environmental and geotechnical analysis summary for information and direct staff to incorporate this summary as public background information for the proposed Inner Harbour Revitalization Opportunities project.
 - This provides Council with a better understanding of the environmental and geotechnical conditions of the City-owned lands at Ship Point and provides important background information to support the public engagement process for the Inner Harbour Revitalization Opportunities project.
2. That Council direct staff otherwise.

Recommendations

1. That Council accept the Ship Point environmental and geotechnical analysis summary for information.
2. That Council direct staff to incorporate the Ship Point environmental and geotechnical analysis as public background information for the proposed Inner Harbour Revitalization Opportunities project.

Attachments

- City of Victoria Lands - Ship Point.

City of Victoria Lands - Ship Point



Produced by: Community Planning Division, Planning & Development Department
 Data Sources: City of Victoria, BC Land Title and Survey Office
 Note that the Study Area Boundary has been slightly modified to follow the shoreline.