Areas of Potential Concern

Since the early 1900s, SEFC has been a heavy industrial area (see Chapter One, "History"). Occupied by sawmills, steel fabrication and bridge works, shipbuilding, sand and gravel production, and brick and shingle manufacturing, this area has been filled with a variety of contaminants.

Twelve Areas of Potential Environmental Concern (APEC) were identified on the site, predominantly in the western areas occupied by galvanizing plants, shipyards and heavy steel fabrication facilities. Eighteen APECs were identified off site, mainly to the south and the east, reflecting the heavy industrial use of the area with support industries located nearby to service the primary industries.

Compliance and Capping

The Olympic Village site was divided into 11 parcels for development, plus parks and public areas. With the exception of three parcels, the lands were remediated and Certificates of Compliance were issued. However, at parcels 3, 6 and 11, residual contaminants remained: groundwater contamination at parcels 3 and 6, and soil contamination at parcel 11. The residual contamination was addressed by a risk assessment process, which showed that risk to people and the environment was within acceptable levels to the ministries of Health and Environment and therefore no further remediation was necessary.

At parcels 3 and 6, the zinc in groundwater contamination extended more than 12 metres into the bedrock. It was shown that this residual contamination does not prevent a risk to the environment, and consequently it was not necessary or practical to conduct further remediation.

Human or environmental exposure to the residual contamination in soil at parcel 11 is blocked by the concrete walls and foundation of the building, and the contamination does not therefore present a risk.

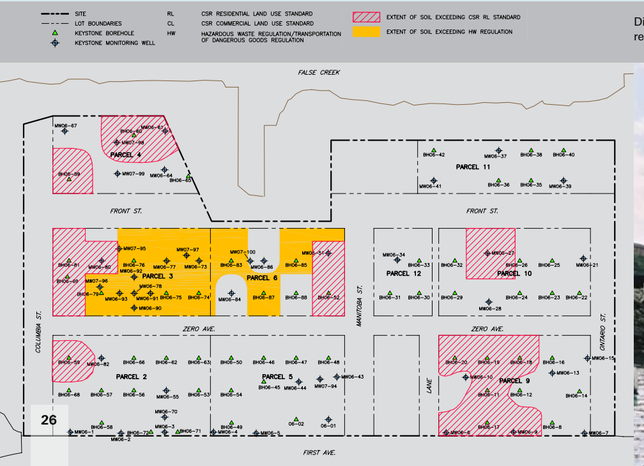

Diagram shows locations of test excavations used to identify areas of contamination. Below, waterfront before remediation. At right, jet grout walls are built to contain soils and prevent contact with the waters of False Creek.

140 Trucks a Day . . .

Picture 64 Olympic-sized pools of excavated material. With approximately 160,000 cubic metres of material excavated in 10 months, this was the biggest excavation in the history of Vancouver. There were 95,000 cubic metres (38 Olympic-sized pools) of contaminated site material, of which 22,350 cubic metres (almost 9 Olympic-sized pools) was hazardous waste. All of the soil had to be classified as hazardous or not and whether it met or exceeded commercial or residential standards. Anything that was not hazardous but exceeded residential standards was sent to the Vancouver landfill to be used as capping material. Residential quality material went to the Tsawwassen First Nation band landfill where the material had to meet stringent federal standards and was used as preparation filling for future development. All hazardous material went to the hazardous waste facility in Princeton, BC. At a rate of about 140 trucks per day (ten trucks per hour in a 14-hour workday), each load was tracked by licence, soil quality, tonnage and destination.

The pace of construction necessitated that all soil be classified before excavation began. Using a 20-metre grid, sampling at every one-metre depth interval and drilling as much as 11 metres, Keystone Environmental characterized the quality of the soil for the entire site. By assessing the soil before excavation, excavated material could go straight into the truck, thereby cutting in half the amount of equipment needed. "There was no other way to do it in the short amount of time allowed for remediation," Bill Donald concluded. The main investigation took place from July to September 2006, requiring 93 boreholes, 43 monitoring wells and over 1,400 samples.

CHALLENGE To environmental authorities, to consider the full footprint of traditional brownfield remediation, including carbon costs of excavation, trucking and water treatment. Where risk assessment deems feasible, capping and controlling brownfield soil *in situ* can be proven to be a better option.

PROFILE

Bill Donald

P. Eng.
Principal, Keystone Environmental Ltd.

Bill Donald and Keystone Environmental Ltd. joined Millennium's team during the bid process, bringing expertise in sustainable management options for the site contamination. Keystone Environmental is an eminent environmental consulting firm headquartered in Vancouver. Remediation of this brownfield site was challenged by the stringent timeline. To address this, Donald and his team developed and completed a program to identify all contamination before construction began. Armed with this detailed information, the team was able to facilitate the excavation of over 160,000 cubic metres of material (over two-thirds of which was contaminated or hazardous waste), classifying it for appropriate disposal as excavation proceeded and without delays over a six-month period. For each inch of rainfall, the site generated over 1.5 million litres of water. The Keystone team worked with other team members to manage this water and the related regulatory process, including securing approval (a first in Vancouver) to discharge treated water to False Creek. "We are privileged to be a part of this team," says Donald, "creating what is arguably the most sustainable community on the continent."