

BROWNFIELDS

Published by *HazMat Management* magazine

MARKETPLACE

PUBLISHED IN ASSOCIATION WITH:

CORPORATE PARTNER:



The Canadian
Real Estate
Association



Cement
Association
of Canada



SUSTAINABLE DEVELOPMENT
TECHNOLOGY CANADA™
Partnering for real results.

FCM
Green Municipal Fund
Fonds municipal vert

cbn 
Canadian Brownfields Network



Real Property
Institute of Canada
Institut des biens
immobiliers du Canada



Pinpointing Your Environmental Risks

SUMMER 2011

THE KILMER PROJECT

USING ZERO VALENT IRON TECHNOLOGY
ON A TORONTO LAKESHORE SITE

Photo courtesy of Kilmer Brownfield Equity Fund

SPONSORED BY:



QUANTUM
MURBA

Stuyvesant 
www.stuyvesantenvironmental.com

 **XCG**

PINCHIN
ENVIRONMENTAL

 **CleanEARTH**
SOLUTIONS LTD.

DAVIS | LLP

 **intrinsic**

 **MMM GROUP**

RESTORING A LAKESHORE SITE IN TORONTO, ONTARIO

CLEANTECH GREENS BROWNFIELD

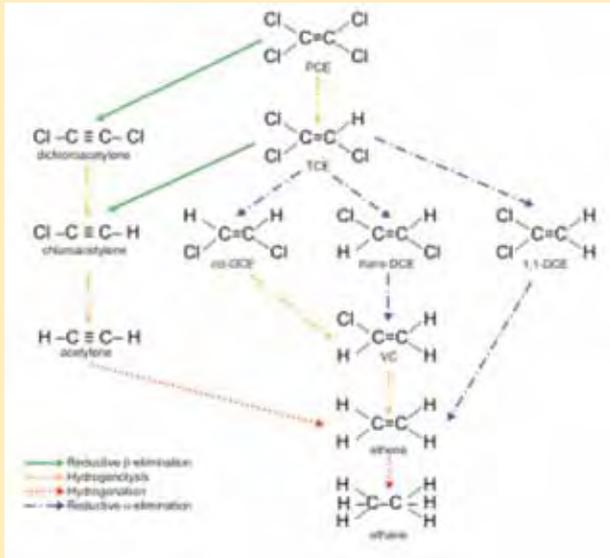


Artist's rendering of the residential area in the finished project.

Rows of new townhouses. Mid-rise condominiums. Green space and retail properties. Site plans are rosy for the redevelopment of 3600 Lake Shore Boulevard West near the waterfront in Toronto, Ontario, where the soil remediation phase is nearly complete. For years the four-hectare property was home to an auto parts manufacturer; it will soon be home to parks and mixed use areas along with residential neighbourhoods.

Time and cash are familiar obstacles in the development world. Strict timelines and market pressures often cause redevelopment projects to fall victim to lengthy remediation processes that frustrate growth. But with new perspectives from the Ontario Ministry of the Environment — such as a streamlined risk assessment processes — brownfield cleanup may increasingly represent an attractive prospect for companies seeking to redevelop previously unusable land.

Zero Valent Iron and clay



Proposed pathways for dechlorination of chlorinated ethenes. Pathways in thin lines have shown to be negligible when starting with PCE or TCE. Modified from Arnold and Roberts, 2000. Source: In Situ remediation of Chlorinated Solvent Plumes, SERDP/ESTCP 2010

Lakeshore's innovative process uses chemical reactions to alter the contaminants in the soil and groundwater. It represents the first commercial scale brownfield application of zero valent iron (ZVI) technology, which is mixed with clay (ZVI-clay) to treat soil contaminated with chlorinated volatile organic compounds (cVOCs), in this case leftover from an auto parts manufacturer. ZVI-clay, developed by the University of Waterloo and implemented through the consortium partner Environmental Technologies Incorporated (ETI) The ZVI-clay technology uses ZVI particles, which have been ground down to between 45 to 150 microns. These particles are combined with clay, acting as a stabilizing agent, to form a slurry, which is then mixed into soils contaminated with cVOCs.

As the ZVI-clay slurry is mixed into the soil, ZVI reacts with the cVOCs: the chlorine atom in the cVOC structure is replaced with a hydrogen atom. This results in the degradation of chlorinated contaminants without harmful side products.

The project demonstrates how ZVI-clay neutralizes the cVOCs on site: for example, TCE (trichloroethylene) is expected to be reduced from an average concentration of 1000 µg/l to 15 µg/l after six months, which is below the site specific standards.

One of these companies, Lakeshore EMPC Two L.P. (a subsidiary and joint venture of the Kilmer Brownfield Equity Fund www.kilmergroup.com/brownfield and developing partners Diamondcorp), has partnered with Sustainable Development Technology Canada (SDTC, www.sdtc.ca) to redevelop the brownfield site on Lakeshore Blvd.

Kilmer estimates that there are likely more than 50,000 brownfield sites throughout Canada. Approximately 20 per cent of these sites are estimated to contain contamination from chlorinated solvents (used for industrial processes or dry cleaning). The traditional remedial approach to many sites, including those impacted by chlorinated solvents, has incorporated "dig and haul" to landfill; any remaining groundwater contamination was treated with oxidizing agents. This remedial approach is expensive and impractical

for many sites with these types of impacts.

In contrast, the Lakeshore project uses chemical processes to treat both contaminated soil and water onsite. The project is among the first to demonstrate a commercial-scale brownfield application of "zero valent iron" (ZVI) technology mixed with clay (ZVI-clay) to treat soil contaminated with chlorinated volatile organic compounds (cVOCs). Developed in Canada at the University of Waterloo, ZVI-clay has been used previously in the United States for contaminated sites attempting to comply with government-issued cleanup orders, as well as government projects such as the decontamination of air force bases.

The Lakeshore project is the first commercial property redevelopment using ZVI-clay in the context of brownfield redevelopment.

Cleantech fund

The remediation process has been made possible by a sizable funding investment of \$1.07 million, representing approximately 42 per cent of the project costs, from SDTC (a not-for-profit foundation established in 2001 by the federal government). SDTC supports clean technologies at the development stage of the innovation chain; it's the cleantech fund supports innovative projects addressing climate change, air quality, water and soil. Its mission is to act as the primary catalyst in building sustainable development technology infrastructure in Canada, attract private-sector investments, promote new technologies, and fund redevelopment projects like the Lakeshore Blvd. example. Specifically,



"The Lakeshore project is the first commercial property redevelopment using ZVI-clay in the context of brownfield redevelopment."

by Guy Crittenden



Excavating the site: soil was reused and groundwater was treated with the ZVI-clay technology.



Diggers tear down the old auto parts facility on the site.

the funding was provided by SDTC's \$550 million SD Tech Fund.

Kilmer has called this kind of project the "brownfield opportunity" on its website. Kilmer managing partner David Harper emphasizes the sustainability of the Lakeshore project.

"Many remediation programs in Ontario use the dig and haul approach, removing the contaminated soil from the site and sending it to landfills," he explains. "Other jurisdictions in Canada and also internationally develop environmental policies and remedial strategies to treat and reuse contaminated soils.

"Lakeshore's approach is more environmentally friendly and sustainable but not at the expense of effectiveness, cost or time."

With Lakeshore's chemical approach to neutralizing and altering the cVOCs, contaminated soil becomes

reusable on site. As well, more than 90 per cent of the materials from the demolished manufacturing building have been recycled, with much of the materials reused on site.

"Investing in clean technologies like Lakeshore's ZVI-clay benefits not only the brownfield industry, but all of us, because we are using our infrastructure in more efficient ways," says Keith Watson, SDTC Screening and Evaluation Manager (water and soil).

The official plan for the 4.33 hectare site includes 550 residential units, along with parks, at-grade retail areas, and an avenue along Lakeshore Boulevard West. The project is expected to last until October 2012.

***Guy Crittenden is Editor of this magazine.
Contact Guy at gcrittenden@hazmatmag.com***