

NovaTox

Birchwood Park Investigation of Fly Ash Cover and Risk Assessment

Client
City of Mississauga

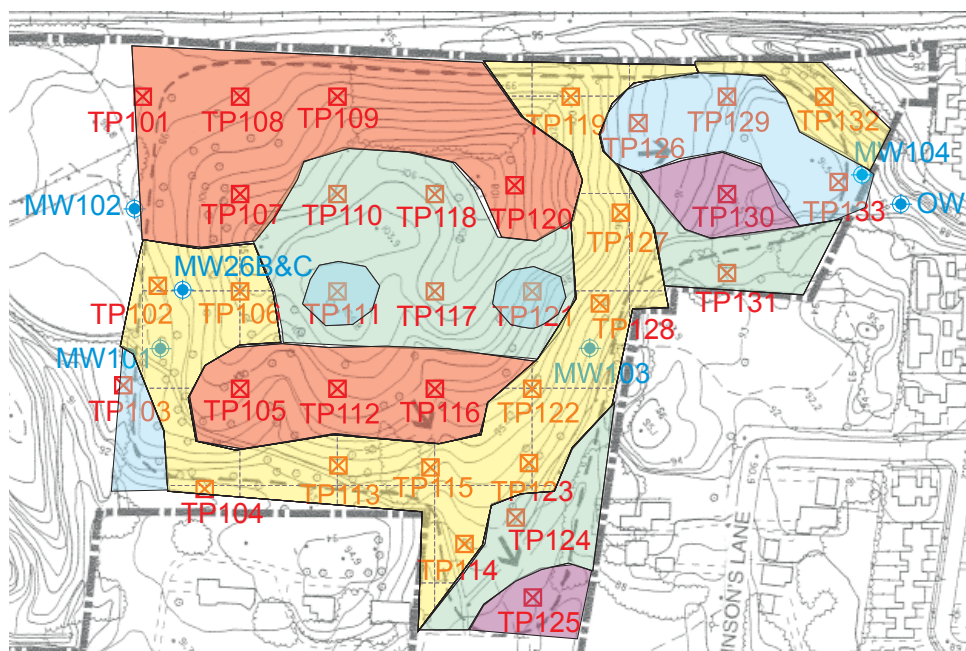
Location
Mississauga, Ontario

Date Completed
2010

NovaTox scientists and Terrapex Environmental Ltd. were retained by the City of Mississauga to perform a Phase II Environmental Site Investigation and conduct a risk assessment at a park in Mississauga, Ontario. The purpose of the RA was to ensure that human health and the natural environment are adequately protected from exposure to contaminants known to exist in flyash historically used as fill material at the site. The RA was necessary to confirm the appropriate thickness of a cover material and identify risk management measures necessary to mitigate risks associated with the flyash.

The objectives of the Phase II ESA included physical characterization of the thickness of soil cover, characterization of the environmental quality of existing cover material, confirmation of contaminants of concern present in the flyash, and examination of hydrogeologic conditions at the site as they pertained to leachate migration. The Phase II ESA included excavation of 33 test pits and installation of four groundwater monitoring wells at the subject area of the site to facilitate soil and groundwater sampling and analysis of metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, and general characteristics.

The results of the Phase II ESA indicated that the cover material at the site generally had no concentrations of metals, BTEX, PHC, or PAH exceeding the applicable O.Reg. 153/04 Table 3 SCS; but the flyash had concentrations of metals, primarily arsenic, beryllium and to a lesser extent boron and thallium, exceeding the Table 3 SCS. In addition, concentrations of metals, BTEX, and PHC in groundwater did not exceed the Table 3 SCS, indicating that metals in the flyash were not readily leachable.

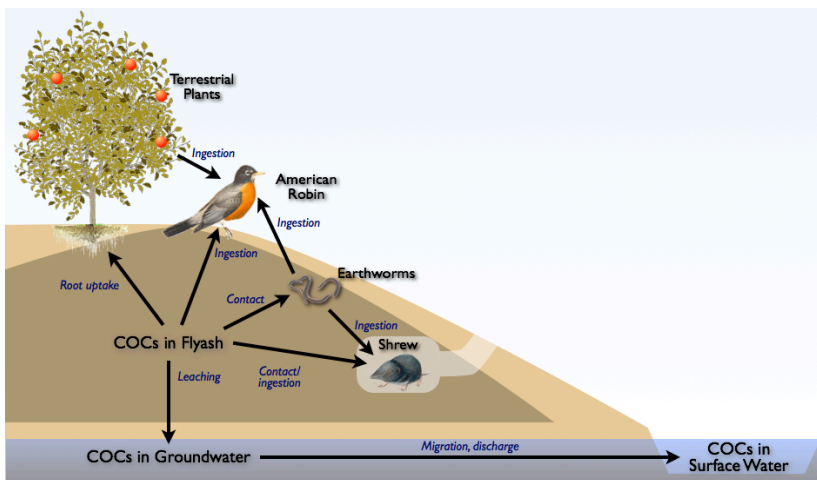


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The RA was conducted according to the principles in Ontario Regulation 153/04, Records of Site Condition. The Human Health Risk Assessment examined potential risks to those most likely to be present at the Site, including recreational visitors (adult and toddler), landscapers (groundskeepers), and construction workers. The primary exposure pathways were identified as direct contact (incidental ingestion, dermal contact) and inhalation of dust. Risks to the identified receptors were quantitatively examined using standard equations and MOE (2009) exposure assumptions, where available. The primary exposure for all receptors was direct contact, with little to no contribution to the overall exposure coming from inhalation of dust from the Site. Non-cancer risks to adult visitors were noted to be below the MOE risk target level of 0.2 with respect to Hazard Indices, but unacceptable risks were identified for toddlers, landscapers, and construction workers from exposure to arsenic and thallium. Risk of cancer from exposure to arsenic were noted to be above the MOE risk target level (10^{-6}) for all receptors. It is of note that no unacceptable risks were found from inhalation of dust; therefore risk management measures developed for the Site focused on mitigating the direct contact pathways (e.g., incidental ingestion and dermal contact).



Ecological receptors examined in the ecological risk assessment were terrestrial plants, soil invertebrates, small burrowing mammals, and birds. The primary exposure pathways were direct contact for plants and soil invertebrates; ingestion of vegetation, soil invertebrates, and soil for small mammals and birds; and discharge of ground water to surface water for off-Site aquatic receptors. Risks to ecological receptors were quantitatively assessed by comparing exposure concentrations/doses to reference values from the literature using a ratio approach. Exposure ratios were greater than one were calculated for all terrestrial receptors. Risks to off-Site aquatic receptors were assessed qualitatively by comparing ground water concentrations to the Ministry of the Environment's GW3 component values; no unacceptable risks to these receptors were identified, but continued monitoring of ground water concentrations was recommended to ensure no further degradation of ground water.

The results of the Human Health and Ecological Risk Assessments were used to develop Site Specific Target Levels, or remedial targets, and to inform the selection of risk management measures for the property.

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