



BACKGROUND

Barenco was retained by an oil company client to oversee the remediation of a former service station site along with several neighbouring properties with petroleum impacted soils and ground water. These properties are located in a primarily residential area of downtown Toronto.

THE REMEDIATION

The remediation objectives were to be achieved by conducting a soil excavation and disposal program, enhanced by soil slope stabilization and soil management. In addition, a vapour extraction system was installed and air sparging conducted to address the petroleum impact beneath the building on the property. Slope stabilization was required so that soil could be excavated to the required depth because of the overhead high-voltage distribution, the proximity of a natural gas main, narrow width of the area to be remediated, the depth of expected impact (4.5-5.5 metres), the soil strength and behaviour of silty sand. The most effective means to provide slope stabilization was through using continuous caisson wall construction with a stepped/phased excavation and backfill operation. In accordance with the caisson wall design, 10 steel soldier piles were installed at 3 metre intervals. A waler was welded to the piles.

A vapour extraction system was implemented to address impacts underneath the building.

Horizontal Directional Drilling (HDD) was completed to facilitate the installation of the vapour extraction system beneath the structure. The bottom layer of the vapour extraction system was the air sparging component.

Contaminant-free air was injected into the air sparging component of the system, enabling dissolved petroleum hydrocarbons to vaporize within the soil and be removed via the vapour extraction component. Soil vapours collected in the vapour extraction component in the middle were removed via a vacuum pump through an in-line carbon filter. The carbon filter was used to treat the vapours prior to discharge to the atmosphere. A sampling port installed on the discharge stack monitors was used to monitor the effluent for organic vapours. The top layer of the system was the monitoring component and was used to determine the efficiency and completion of the Vapour Extraction System.



THE RESULT

Over 1,000 tonnes of impacted soil was excavated and disposed. The site was backfilled to the waler elevation and the caisson wall was partially removed. Following removal of the raker, the soil was compacted in 1 foot lifts to achieve 95% compaction. The excavation was paved and restored.