BROMLEY-BY-BOW, EAST LONDON

Case Study

Plate 1 - Completed commercial buildings following the installation of the barrier.

Completion Date:	September 2003
Development:	Commercial / Industrial
Consultant:	BWB Consulting
Developer:	ProLogis
End Value:	£12m

Site Overview

The Bromley site occupies an area of approximately 7 acres. The site is contaminated with pollutants from historical activities near the site, most notably from the adjacent gasworks. It was the intention of ProLogis (Developer) to redevelop the site for commercial / industrial end use.

The contaminants of concern originated from the nearby gasworks and surrounding industrial area and include, Cyanide, Ammonia, PAH's and TPH. They are located predominantly within the made ground and underlying gravely clay.

Objective

The remediation strategy at the Bromley site was to install an Active Containment System comprising an active (permeable reactive) barrier incorporating Envirotreat modified pillared E-clays®. This remediation approach addressed the on-site contamination problems and prevented the potential risk of future contamination of the adjacent site through groundwater migration.

Methodology

The Envirotreat Soil Mixed Re-active barrier contains modified pillared E-clays designed to remove and chemically immobilise the prime pollutants of concern, which are primarily organic in nature. The clays incorporate the requisite treatment capability for the effective treatment of both cationic and anionic metallic species onsite.

The works were conducted over a 2-week period under the auspices of Envirotreat's Mobile Process Licence (MPL). Specialist technology, materials and supervision were supplied by Envirotreat, whilst Norwest Holst supplied all the required plant, and labour for application of the Envirotreat® Process.

The total length of the active barrier was 80 m, with an average depth of 9m (the total depth varied with the depth of the underlying clay into which the barrier was keyed into).

The barrier was installed by advanced soil mixing techniques using continuous flight auger systems. The active barrier comprised a single row of overlapping columns (each column having a nominal diameter of 900 mm).

Plate 2 - The mixing zone set-up for the Bromley site

Validation

Envirotreat were requested to undertake the validation of the barrier. Two boreholes used in the initial site investigation were utilised for validation. They are situated outside of the contaminant plume and in line with the anticipated migration path.

Plate 3 - The Re-active barrier following installation

Results

Table 1 presents the concentrations of contaminants downstream of the barrier at the Bromley site. The Site Specific Target Level (SSTL) has been derived from a Groundwater Risk Assessment conducted by Envirotreat that were subsequently agreed by the Environment Agency.

Determinand	BH113 05-03-04	BH114 05-03-04	Target
Ammoniacal Nitrogen	14	13	23 mg l^{-1}
Phenols (total)	<0.01	<0.01	2.0 mg l^{-1}
Cyanide (total)	<0.05	<0.05	1.5 mg l^{-1}
TPH (DRO)	<0.01	<0.01	1231 mg l^{-1}
Naphthalene	0.17	<0.01	70 µg l^{-1}
Phenanthrene	0.08	<0.01	5 µg l^{-1}
Anthracene	0.06	<0.01	5 µg l^{-1}
Fluoranthene	<0.01	<0.01	1 µg l^{-1}
Benzo(a)Anthracene	<0.01	<0.01	0.052 µg l^{-1}
Chrysene	<0.01	<0.01	0.042 µg l^{-1}
Benzo(k)Fluoranthene	<0.01	<0.01	0.021 µg l^{-1}
Benzo(a)pyrene	<0.01	<0.01	0.01 µg l^{-1}
Indeno(1,2,3cd)pyrene	<0.01	<0.01	0.05 µg l^{-1}
Benzo(ghi)perylene	<0.01	<0.01	0.023 µg l^{-1}

** SSTL adopted by Envirotreat and accepted by the Environment Agency was derived from a Groundwater Risk Assessment.

Table 1 - Summary of groundwater results compared to SSTL derived from GW Risk Assessment conducted by Envirotreat and agreed with the Environment Agency.

Conclusion

The results demonstrate that the Soil Mixed Reactive Barrier System installed by Envirotreat at the Bromley-by-Bow site effectively reduced the potential for off site contaminant migration. The concentrations of contaminants of concern are all below the site-specific target levels. Subsequent monitoring rounds have demonstrated that the contaminant levels are consistently below the stated target values and also consistent with the first round of monitoring.

The remediation project was successfully completed under the auspices of the MPL, with the results illustrating that the objective of protecting the surrounding area from the off-site migration of contaminants within the groundwater has been achieved. The barrier has intercepted the migration of contamination by the introduction of modified pillared E-clays designed to remove and chemically immobilise the prime pollutants of concern in the soil.