



Plate 1 Illustrative picture of Try Homes residential housing development

Completion Date:	January 2005
Development:	Residential
Developer:	Try Homes

Site Overview

The site occupied a total plan area of 0.4 hectares and was situated approximately 1 Km south of Uxbridge town centre. Historically, the site functioned as a car dealership, vehicle maintenance and MOT companies, a welding shop and a tyre fitter from which various contamination issues had arisen.

Site Investigations revealed a 'hotspot' of contaminated soil towards the centre of the site with elevated concentrations of Polycyclic Aromatic Hydrocarbons (PAH). Groundwater was found to be contaminated with elevated levels of diesel range hydrocarbons.

Objective

The overall remediation strategy was designed to address the source and pathway contamination issues, as a measure to protect both human health and groundwater receptors. Enviro-treat were awarded the Contract based on the flexibility of the E-Clay Technology and its application for the treatment of both the contamination hot-spot and groundwater migrating off-site, and the ability to offer the client a cost-effective solution.

The remedial operation involved the *ex-situ* treatment of the identified contamination hot-spot using the Enviro-treat E-Clay Technology. The strategy also included the installation of an Enviro-treat Soil Mixed Reactive Barrier System (SMRBS), comprising both passive and active

sections. The objective was to treat contaminated groundwater as it migrated off-site towards the adjacent Fray's River, utilising proprietary E-Clays.

The *ex-situ* treatment of contaminated soil enabled compliance with the identified Site Specific Target Levels (SSTL) through the immobilisation of leachable pollutants within the soils.

The SMRBS installation and *ex-situ* remediation operation were carried out on site consecutively using Enviro-treats Mobile Treatment Licence. Specialist technology, materials and supervision were supplied by Enviro-treat whilst subcontractors supplied all the required plant for the *ex-situ* operation and labour for application of the Enviro-treat® Process.

Methodology - Remediation Phase 1 - Ex-situ Treatment

The identified areas of contamination were excavated, stockpiled and treated on-site using the Enviro-treat E-clay Technology. The *ex-situ* operation was carried out over a 2 week period, treating a total volume of 1,060m³.



Plate 2 Excavation of contaminated soils

The soils were mixed in batches with the E-Clay slurry until a homogenous mix was produced. The treated soils were then temporarily stockpiled before being reused on-site as a substitute for imported clean fill, thus preventing the need for off site disposal.

Validation

Validation of the treated material was carried out through the analysis of six batch samples, which were leached and analysed on behalf of Enviro-treat by a UKAS accredited laboratory.

Results

Table 1 presents the results of the leachate analysis post-treatment. The Maximum Contaminant Level (MCL) of TPH contamination found in the soils prior to remediation was 17,300 mg/kg⁻¹. The Site Specific Target Level (SSTL) for Total Petroleum Hydrocarbons (TPH) was 187 µg/l⁻¹.

Sample Ref.	COC	Batch Volume (m ³)	TPH conc. (post treatment) (ugl ⁻¹)
UXB1	TPH	10	< 10
UXB2	TPH	240	< 10
UXB3	TPH	250	32
UXB4	TPH	250	< 10
UXB5	TPH	250	< 10
UXB6	TPH	60	< 10

Table 1 – Summary of treated soils leachate results compared to SSTL as agreed with The Environment Agency

The results illustrated that the objective of protecting human health and the groundwater receptors (i.e. The River Fray) had been achieved. The contaminants of concern had been fully addressed with leachate levels below the agreed Site Specific Target Levels for TPH, thus allowing the material to be re-deposited on-site.

Methodology - Remediation Phase 2- SMRBS Installation

Following the successful remediation of the identified hotspot of contaminated soil on site, the SMRBS was installed incorporating both reactive and passive sections, which enabled compliance with the identified receptor target levels for PAH's and TPH's.

The groundwater simulation program MODFLOW was used to model the effects of the proposed barrier system on the local groundwater regime.

The SMRBS was installed using a Continuous Flight Auger system, to create overlapping columns of treated soil to form an integral barrier to groundwater flow. This phase of the works was carried out over a three week period, incorporating the installation of a 130m barrier of which 80m was reactive and 50m was passive (Figure 1). The passive sections of barrier were designed to direct

migrating groundwater through the reactive sections, where any leachable contaminants were treated.

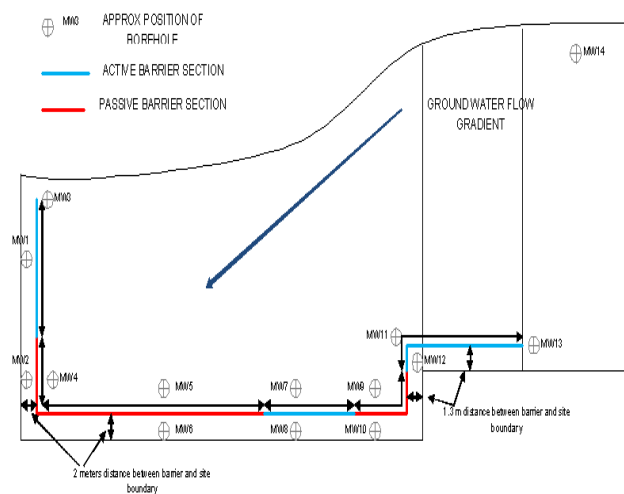


Figure 1 Schematic diagram showing SMRBS layout



Plate 3 SMRBS installation

Validation & Results

Validation was undertaken through the installation of 14 monitoring boreholes at various locations upstream and downstream of the barrier system.

Following twelve months of groundwater monitoring, the SMRBS was demonstrated to be successful at immobilizing the identified contaminants of concern, whilst having a negligible effect on the local groundwater regime. Borehole analysis downstream of the reactive barrier section demonstrated compliance with the identified target level (for TPH 0.03 mg/l⁻¹ indicator parameter).