

Client

**ENFRANCHISE 302
Limited**

Environmental Consultant:



Site Background & History

The site, located on Old Portsmouth Road, Guildford covers approximately 7000m² and is roughly rectangular in shape. It is bounded by the Old Portsmouth Road to the west, Mill Lane to the north, a stream to the south east and light industrial premises to the south. The Mill Stream also follows the northern boundary of the site and the River Wey lies approximately 150m to the East.

Figure 1 - Former Industrial site prior to redevelopment.



It had seen historical use as a timber yard and more recently had found use as a light industrial estate comprising saw mills, timber yards, garage workshops, showrooms, builder's merchants and also pockets of derelict land / buildings. Following decommissioning the site had been earmarked for commercial redevelopment.

QDS Environmental carried out Site Investigation works during June 2005 and identified made ground overlying alluvium and river terrace deposits; below this Atherfield Clay and Weald Clay formations were confirmed. Groundwater was confirmed at approximately 1.6m below ground level. Significant contamination issues were identified within the groundwater, namely Polycyclic Aromatic Hydrocarbons (PAHs) and Total Petroleum Hydrocarbons (TPH) believed to be derived from the above ground creosote dipping tanks and historical spillages. The investigation concluded that the contaminated groundwater was migrating north east across the site towards the Mill Stream.

Envirotrear was engaged by QDS Environmental on behalf of the end client Enfranchise 302 Limited to install an E-clay groundwater treatment barrier (Permeable Reactive barrier) with the prime objective of protecting both the River Wey and Mill Stream from impact from the identified onsite contamination issues.

The proposed barrier was designed to intercept the natural flow of groundwater offsite Mill Stream (as determined by MODFLOW). The barrier comprised of 60m long barrier installed to a depth of 3.5m bgl. The barrier toed into the relatively low permeable strata below the site.

The reactive barrier contained a highly pillared modified clay (E-clays) designed to chemically immobilise the prime pollutants of concern PAH and TPH in nature.

The groundwater treatment barrier was installed into the contaminated soils using advanced soil mixing techniques with a conventional piling rig and continuous flight auger system. Each column was keyed into the underlying clay strata with the E-clay mix injected into the ground through the hollow stem of the auger (see figures 2 and 3 overleaf). The active barrier comprised of a double row of overlapping columns (each column with a nominal diameter of 900 mm).

Figure 2 – The piling rig and auger.



During installation, E-clay slurry is injected via the ports at the base of the auger head as the auger is advanced and retracted – this approach ensures maximum E-clay / soil mixing efficiency.

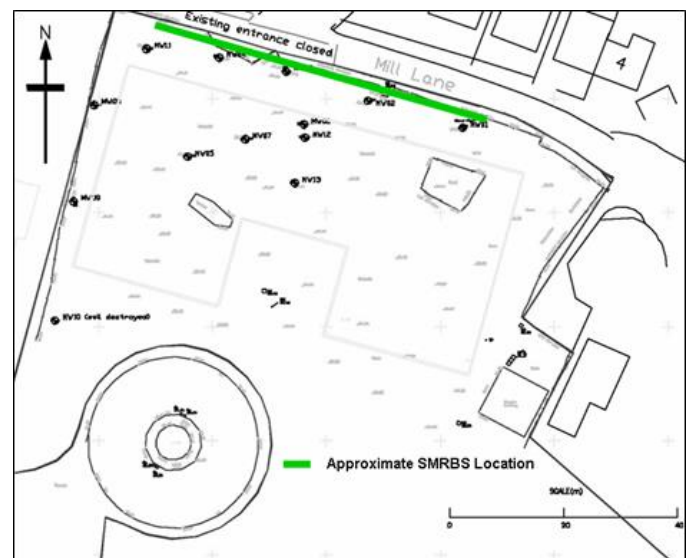
The completed barrier installation is shown in figure 3 below. Equally this figure illustrates the minimal piling arisings resulting from the barrier installation.

Figure 3 – Line of the installed barrier.



The location of the barrier installation in respect to the site is shown in figure 4 below.

Figure 4 – Site following barrier installation



Validation and Verification.

Following the completion of the barrier installation, a number of monitoring boreholes were installed both upstream and downstream of the E-clay barrier to allow the collection of groundwater samples to demonstrate the efficacy of the barrier design and installation.

The results from several rounds of groundwater monitoring over a two-year period indicated that the installation had effectively minimised the egress of contamination groundwater from the site and the groundwater analysis downstream of the barrier installation was fully compliant with the agreed remediation criteria.

the validation monitoring confirmed that the E-clay[®] groundwater treatment barrier had successfully achieved the required aim of protecting both the River Wey and the Mill Stream from contamination impact.

Conclusions.

Two-year post installation comprehensive monitoring of the groundwater downstream of the reactive barrier installation has shown that the installation is successful in attaining the agreed required remediation criteria and protecting Mill Lane Culvert from ongoing contamination associated with the sites former usage.

Figure 6 – Redeveloped site (circa 2013).

