CASE STUDY

E-Clay Source Treatment

Residential – Roade, Northamptonshire

Client

Main Contractor

Environmental Consultants

Site Background & History

The former Pianoforte factory site is located to the south of the village of Roade in Northamptonshire.

The site was closed in 2010. The site at closure covered over 11 hectares, consisting of a range of offices, warehouses and workshops.

Industrial activity on the site started in or around 1910, mainly specialising in the manufacture of piano parts. Following a major fire in the 1930's the facility was rebuilt. During the Second World War the company switched to making parts for aircraft and road vehicles as part of the war effort. Post war the company expanded into the growing automotive and aviation non-ferrous castings market. In the 1960s employment peaked at around 1,800 workers, falling to 700 in 1980, the year after the firm stopped making piano strings.

The site in the 1950's is shown in Figure 1 below.

Figure 1 – Former Pianoforte site circa 1950's

Prior to closure the company still employed 600 employees mainly producing car components. These were manufactured using rolled sections, pressings, extrusions and injection mouldings, which were then anodised, plated or powder-coated.

Persimmon Homes propose to develop the site for residential purposes with the construction of over 290 low rise properties on the site.

The Rolton Group were engaged by Persimmon to provide consultancy services. Rolton identified an area of the site contaminated with chlorinated hydrocarbon contamination believed to be associated with a historical degreasing shop (relating to metal plating and anodising activities undertaken on this part of the site). Site investigation indicated the presence of elevated levels of TCE (and associated daughter products) in both the soil and groundwater. One borehole down gradient of the former degreasing shop indicated levels of 87,000ug/l TCE in the groundwater.

The Cuddy Group (the Main Contractor) commissioned Envirotreat to devise a remediation strategy to address the identified chlorinated hydrocarbon contamination in the former Degreasing Room Area.

The proposed remediation strategy was designed to address the requirements of the regulatory bodies in relation to the protection of human health and controlled waters and to address the statutory planning conditions relating to contaminated land. The proposed remediation strategy comprised of E-Clay Stabilisation of the source contamination (soil and associated groundwater).

Methodology

The extent of the chlorinated hydrocarbon contamination within the vicinity of former Degreasing Room Area was delineated by carrying out a series of trial pits excavations around the periphery of the area to determine the lateral / vertical extent of the contamination. Envirotreat used a hand held PID meter to rapidly establish soil contamination levels and to assess / monitor VOC vapour concentrations during the remediation works. The use of the PID for headspace analysis is shown in Figure 2 below.

Figure 2 – Carrying Out On-Site Headspace Analysis to Delineate Contaminated Soils

The delineation process revealed that the hydrocarbon contamination was predominantly chlorinated hydrocarbon in nature and predominantly located at circa 6m below ground level, primarily at the interface between the Blisworth Limestone and the underlying low permeability Rutland Formation (blue clay layer), coinciding with the groundwater level on the site. The identified chlorinated hydrocarbon contamination is shown in Figure 3 below.

Figure 3 – Typically Observed Chlorinated Hydrocarbon Contamination

The delineation process (assessing the extent of the contamination) also showed that the contamination had migrated under the adjoining main plating shop building (which had not been demolished at this stage).

Based on the observed depth of the contamination and the close proximity of the source to the existing building(s), it was decided that an *in-situ* treatment approach would be the most practical for this application.

To achieve the required depth, it was necessary to undertake a reduced dig within the area, reducing the level by circa 2m. Excavated soils were assessed for the presence of contamination and stockpiled accordingly. The area requiring treatment was divided into a number of grids comprising of 5m x 2m sections. Each section was fully excavated down (and into) the Rutland Formation - base samples were obtained and assessed by headspace analysis to ensure the source was suitability delineated vertically, and where applicable, side wall samples were also assessed to fully delineate the lateral extent of the contamination.

The reduced level excavations are shown in Figure 4 below.

A suitable E-Clay formulation was developed for this application targeted at the identified chlorinated hydrocarbon contamination. This E-Clay formulation was produced in slurry form for use in the *in-situ* treatment process.

Figure 4 – Reduced Level Excavation and Introduction of E-Clay Slurry

Within each excavated section a known volume of E-Clay slurry was added together with previously excavated contaminated soils and mixed with the excavator until fully mixed. Further E-Clay additions and previously excavated contaminated soils were mixed in a similar fashion until all the contaminated soils were treated. The section was then reinstated with 'clean' soil to the required level. The addition of E-Clay Slurry is also shown in Figure 4 above.

Each section was treated sequentially until the accessible extent of the contamination plume had been treated. These works were undertaken in August and September of 2015.

Following demolition of the former plating shop, Envirotreat returned to site to treat the remaining contamination plume. These works were undertaken in December 2015.

Envirotreat were able to utilise over 12,000 litres of contaminated water within a reception pit used to historically collect contaminated rinse water from the former plating shop (prior to treatment in the former effluent treatment plant). This water was incorporated into the treatment process and was utilised as an alternative water supply for the treatment process. The reception pit is shown in Figure 5 below.

Figure 5 – Former Plating Shop Reception Pit (Contaminated Rinse Waters)

Validation

In addition to the onsite assessment of soils (and vapours) by PID, side and base samples were collected and submitted to i2 Analytical Laboratories for analysis – this was to demonstrate the satisfactory delineation of the TCE source contamination in accordance with the agreed remediation criteria.

Samples of each treated section were collected - composite samples were prepared for analysis purposes. These were submitted to i2 Analytical Laboratories for assessment to confirm compliance with the agreed total and leachate remediation target criteria developed by the Rolton Group. All tested samples were shown to be compliant with the remediation target criteria. The treated material was therefore considered suitable for reuse onsite and was re-emplaced in the void created by the excavations.

Conclusions

Envirotreat were able to demonstrate through a comprehensive Validation Report that the remediation strategy had been successfully implemented. The prime drivers for the remediation works were the protection of human health and controlled waters.