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CASE STUDY

Earthworks, Soil Management & Watching Brief

New Primary School Development
Tyseley, Birmingham

Client

BOUYGUES UK

Remediation Contractor

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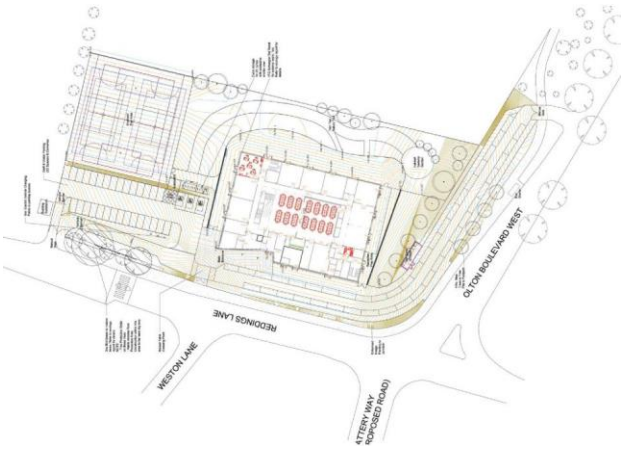
Site Background & History

The site comprises of a roughly rectangular parcel of land occupying circa 1 hectare - the site is located approximately 3 miles from Birmingham City Centre.

Historically, the site formed the western part of the former Eaton Electrical Works. The central and eastern parts have already been redeveloped for residential purposes. This area of the works had previously been occupied by buildings associated with the treatment and processing / coating of metals. The remaining buildings had been demolished some years previously.

The site is to be redeveloped for the construction of a new primary school [Olive Primary School] with associated access road, parking and landscaped areas for Birmingham City Council. The development layout is shown in Figure 1 below.

Figure 1 – Olive Primary School – Proposed Development Layout



Site Investigations

Wardell Armstrong and Travis Baker carried out separate site investigations on the whole area of the former Eaton site between 2015 and 2017. The findings of the Wardell Armstrong investigation identified visible and olfactory evidence of hydrocarbon contamination in borehole LP14 consistent with the location of a former above ground oil storage tank. A slightly elevated zinc concentration was identified in borehole LP16; no other visible or olfactory evidence of hydrocarbons were identified and no other significant heavy metal concentrations were confirmed.

Travis Baker carried out a supplementary site investigation focusing on previously uninvestigated areas of the site. No significant contamination was identified during these works.

Ground Investigation Specialists [GIS] carried out an initial review of the previous site investigations and subsequently carried out further site works in 2018 to 2019 focusing on the western area of the site (i.e. the site earmarked for the Olive Primary School Development).

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These works comprised of the excavation of further trial pits across the site. The trial pit locations are shown in Figure 2 below.

Figure 2 – GIS Trial Pit Locations

The findings of this investigation identified slightly elevated levels of PAHs and cadmium in TP4 – asbestos was also identified. WAC analysis of three samples [WAC 1, 2 and 3] identified elevated TOC and pH in two of the samples (thus confirming the presence of varying concentrations of contaminants and isolated locations of elevated TOC and pH).

Supplementary Site Investigation

GIS carried out a supplementary trial pitting exercise focusing on the surface materials. Envirotreat supervised the investigation.

These surface soils had been deposited in early 2019 by a third party and were of a poor geotechnical quality.

Bouygues had confirmed that these soils formed part of the earthworks and would require offsite disposal as required (following discussions and agreement with the overall client).

The supplementary trial pit locations are shown in Figure 3 below.

Figure 3 – ETL / GIS Trial Pit Locations

Samples collected from these trial pits confirmed no significant contamination within the surface soils. A trace concentration of asbestos was identified at one location.

Envirotreat concluded that the proposed earthworks and the requirement for significant offsite disposal would require careful management under an intensive watching brief to ensure full compliance with regulatory requirements and to minimise disposal costs.

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Remediation Strategy

Based on the findings and conclusions from the site investigations Envirotreat proposed the following remediation strategy with the prime objectives of providing a cost-effective remediation solution for the site and to satisfy regulatory requirements / enable the discharge of the respective planning conditions:

- Enabling works to achieve required levels as part of the 'cut and fill' balance for the site
- Offsite disposal of all arisings from the cut and fill (initial estimate circa 13,000 tonnes)
- Intensive watching brief to ensure effective soil management during excavations
- Implementation of a 'Discovery Strategy' during all works (relating to the discovery of unexpected contamination during excavations)
- Provision of a comprehensive Validation and Verification Report

Upon mobilisation, Envirotreat carried out the excavation of twenty-six trial pits across the reduced level dig area in order to:

(a) provide programme optimisation (i.e. minimising any potential delays caused by laboratory analysis / ensuring unsuitable materials were suitably separated etc)

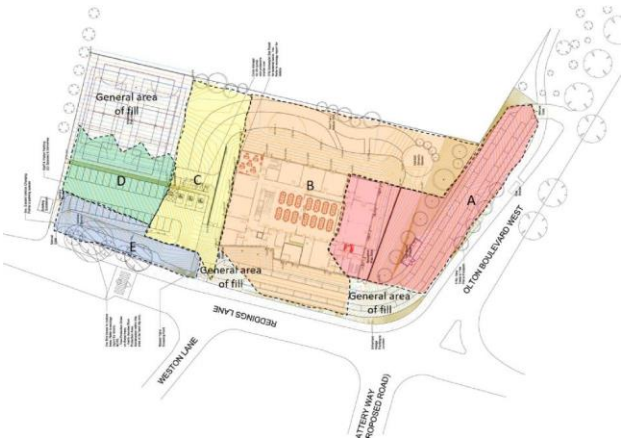
(b) provide additional confidence to the disposal facility regarding the composition and waste classification of the soils.

Cut and Fill Enabling Works

This element of works was carried out on a phased approach in general accordance with the plan shown in Figure 4 below (i.e. area A followed by area B etc). Soils were assessed on excavation using both visual and olfactory methods (supported by headspace analysis using hand-held Photoionisation Detector [PID]).

This was carried out as part of the watching brief ensuring that the identified risks were fully addressed and that the soils were correctly classified in waste terms.

Figure 4 – Cut and Fill Phasing Plan



The enabling cut and fill works are illustrated in Figures 5, 6 and 7 below.

Figure 5 – Excavation of Southern Access Road

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Figure 6 – Excavation of Western Access Road

Figure 7 – Excavation of Building Footprint

Offsite Disposal of Soil Arisings

The excavated soils were subsequently stockpiled at the northern end of the site to await offsite disposal. The stockpiled soils are shown in Figure 8 below.

Figure 8 – Soil Stockpiles

A wheel wash was installed to ensure that no mud / debris was transferred from the site out into the neighbouring school and residential areas. The wheel wash is shown in Figure 9 below.

Figure 9 – Wheel Wash Installation

Soils were loaded onto wagons and taken to local restoration facilities for disposal. It was necessary to use a number of facilities due to the condition of the excavated soils (generally very wet due to high levels of unseasonal rainfall and the presence of on-site surface water) and the availability of the individual sites. The offsite disposal was carried out in close conjunction with FGD Limited, a firm of waste brokers.

Envirotreat utilised NRS Meriden (approx. 75%); FCC Rowley Regis (approx. 10%); Wood Farm, Essingdon (approx. 5%); Oak Farm Quarry, Himley (approx. 5%); Shire Oak Quarry, Walsall (approx. 3%) and RR Groundworks, Great Barr (approx. 2%).

Envirotreat ensured that each load was accompanied by the appropriate waste consignment note prior to leaving site.

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The loading of wagons is shown in Figure 10 below.

Figure 10 – Loading of Wagons

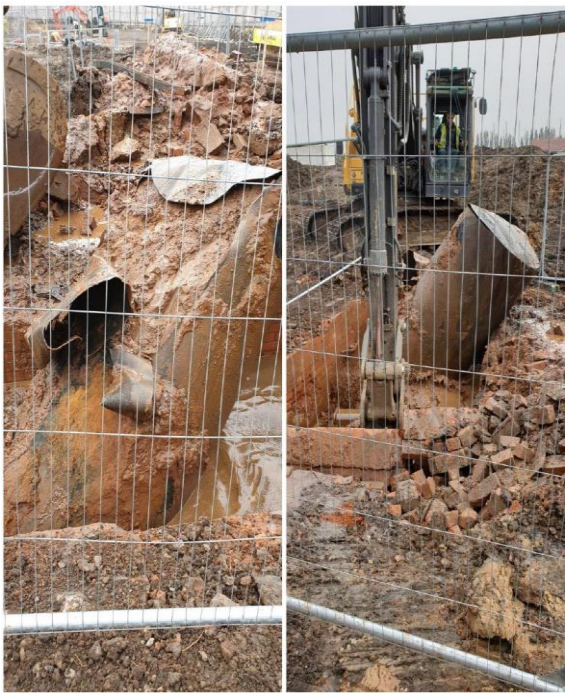
Discovery Strategy

Envirotreat encountered an underground fuel storage tank during the reduced level dig works. The tank contents and surrounding soils were fully assessed by Envirotreat who subsequently ensured the tank contents were removed for offsite disposal along with the tank. The brick-built bund was broken out and the surrounding soils delineated, assessed and stockpiled locally for offsite disposal. The tank and brick bund are shown in Figure 11 below.

Figure 11 – Tank and Brick Bund

The tank removal is shown in Figure 12 below.

Figure 12 – Tank Removal



Watching Brief During Subsequent Earthworks

Envirotreat provided a watching brief during key stages of the subsequent general earthworks. These stages comprised the following:

- Foundations for the new building (consisting of deep strip footing and supporting piers)
- Drainage (storm, foul and all inspection chambers)
- Attenuation tank
- Service ducts
- General excavations for achieving levels, curbing works etc

The foundation excavations are shown in Figures 13 and 14 below. The excavations for the attenuation tank are shown in Figure 15 below.

Figure 13 – Foundation Excavations

Figure 14 – Building Foundations Excavation

Figure 15 – Attenuation Tank Area

Olfactory assessment of soils excavated from the building foundations indicated the possible presence of hydrocarbon contamination. This was supported by headspace analysis (VOC result – 65 ppm). Samples were collected for analysis which confirmed that the soils were suitable for offsite disposal to the designated repositories.

The local drainage excavations are shown in Figure 16 below.

Figure 16 – Local Drainage Excavations

Envirotreat also attended the watching brief works to enable the Tree Protection Officer (TPO) to assess soils in the vicinity of the retained trees on site. The soils were assessed by Envirotreat and confirmed as suitable to remain on site in the required area. The excavations in the proximity of the TPO are shown in Figure 17 below.

Figure 17 – Excavations in Proximity to TPO area

Validation

All soils were disposed of at local restoration facilities in full accordance with Envirotreat's Duty of Care responsibilities. The enabling 'cut and fill' works were verified by a Site Engineer with all levels compliant with the required specifications.

Conclusions

Envirotreat has successfully demonstrated through a comprehensive Validation Report that the remediation objectives for the site have been achieved. The watching brief, enabling works and discovery strategy have all been successfully implemented in accordance with the agreed Remediation Strategy and Remediation Method Statement.

The works involved the effective management and offsite disposal of 16,967 tonnes of excavated soils (primarily for restoration purposes) - this tonnage was calculated based on the removal of 893 loads from site at an average of 19 tonnes per load.

These works will enable the discharge of the respective planning conditions required for the development.