



Plate 1 – Contamination at Cranes Lagoon, Ipswich.

Development:	Car Park
Consultant:	WRc Ltd
Developer:	Cranes Fluid Systems
Main Contractor	Chris Griffin Groundworks

Site Overview

The Envirotreat Technology was applied to remediate contaminated liquid waste settlement lagoon at an industrial factory in Ipswich, Suffolk.

The Crane Fluid Systems factory had seen industrial activity for 70 years. The contamination was the result of liquid wastes from the manufacturing process. As a result, considerable material was identified as being substantially contaminated with heavy metals and hydrocarbons, including TPH, toluene, TCE and TCA.

Objective

The remediation strategy for the Ipswich site was designed to address the contaminated lagoon area. This represented an area at the northern extremity

of the site, whereby liquid wastes from various manufacturing processes had been discharged into a settlement pond over a period of many years.

Following cessation of disposal activities, Cranes decided to restore the settlement pond and surrounding environ for use as an car parking and general landscape areas.

Methodology

Numerous remediation strategies were considered for the site and only Envirotreat stabilisation / solidification with E-clay was found to meet all the requirements of the Quantitative Risk Assessment and provide a sustainable solution and most importantly a material with suitable geotechnical properties to enable reuse on-site.

The modified organophillic clay was designed on a site specific basis prior to the commencement of the remedial works. Bench and site trials were undertaken to prove the suitability of the E-clay process and formed an important part of the validation process, both for WRc Ltd. and the Environment Agency.

Envirotreat employed an *ex-situ* soil mixing strategy to remediate approximately 2,800m³ of contaminated soils at the lagoon site.

The works were conducted over a period of 3 months under the auspices of Envirotreat's Mobile Process Licence (MPL). Specialist technology, materials and supervision were supplied by Envirotreat, Chris Griffin Groundworks supplied all the required plant, and labour for application of the Envirotreat process.

The lagoon material was excavated by dragline and stored in prior to treatment. Due to the nature of the contaminated material, Envirotreat utilised its specialist plant to combine the contaminated material and E-clay slurry.

The contaminated materials were blended in 5m³ batches to allow known quantities of contaminated soils to be combined with the E-clay slurry until a homogenous mix was produced. The treated soils were then temporarily stockpiled before being reused on-site

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As a consequence of the proposed treatment strategy and much improved geotechnical properties of the treated material, Envirotreat were able to redistribute all the treated material back in the lagoon area (see plate 2) to maximise the cost effectiveness of the process and able to achieve all project objectives.



Plate 2 – Re-deposition of treated material on basis of Best Practice Methodology.

Validation & Results

Validation was initiated to evaluate the performance of the treatment process. Samples were collected for each 150m³ of material treated (these samples represented composite samples of the 5m³ batch treatments). These samples were cured, leached and then analysed by a UKAS accredited laboratory on behalf of Envirotreat.

Table 1 presents the Maximum Contaminant Level (MCL) for Zinc, Copper and TPH contamination present at the Lagoon site prior to remediation and the results of leachate analysis post-treatment.

The remediation project was successfully completed with the results illustrating that the objective of protecting human health and the groundwater receptors as being achieved. The contaminants of concern had been fully addressed with leachate levels falling well below the agreed Site Specific Target Levels for Zinc, Copper and TPH. Analysis of the geotechnical properties proved the material suitable for proposed re-use, thereby allowing the material to be re-deposited on-site.



Plate 3 – Compacted treated material re-used as infill.

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Table 1 – Summary of treated soils leachate results compared to SSTL derived from GW Risk Assessment conducted by Envirotreat and agreed with the Environment Agency.

Contaminant of concern	Calculated Target Standard (mg/kg)**	MAX concentrations in Soil Prior to Clean-up (mg/kg)	Average Leachate Concentration (mg/kg)
Zinc	3.6	24,360	0.08
Copper	0.45	1,000	0.32
TPH	6.20	154,000	0.58

** SSTL adopted by Envirotreat is calculated by Groundwater Risk Assessment and agreed by the Environment Agency.

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