



Civil & Structural Engineers
Building Surveyors
Geo-Environmentalists

Phase II Interpretative Ground Assessment

At

Prospect House Primary School
Blackley
Manchester

Liverpool

T: 0151 227 3155

Manchester

T: 0161 817 5180

Wrexham

T: 01978 664071

London

T: 020 74 584136

Head Office

18-20 Harrington Street
Liverpool L2 9QA

T: 0151 227 3155

F: 0151 227 3156

E: enquiries@sutcliffe.co.uk

www.sutcliffe.co.uk

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SUTCLIFFE INVESTIGATIONS

Phase II Interpretative Ground Assessment

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Prepared by:

Checked/Approved by:

Name:	S Hale	Name:	A Lewis	
Title:	Senior Environmental Scientist	Title:	Associate	
Qualifications:	BSc (Hons) PIEMA	Qualifications:	BSc MSc AIEMA FGS	

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FOREWORD (Geotechnical and Environmental Assessment)

This report has been prepared for the sole internal use and reliance of the Client named on page 1. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Sutcliffe Investigation; such authorisation not to be unreasonably withheld. If any unauthorised third party comes into possession of this report, they rely on it at their risk and the authors owe them no duty of care and skill.

The report presents observations and factual data obtained during our site investigation and provides an assessment of Geotechnical and environmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Sutcliffe Investigation prior to significant revision of the development proposals. Primary aims of this exploratory phase of investigation were to identify salient geotechnical and environmental issues affecting the site to enable the client to obtain budget costs for the necessary site preparatory and remedial works.

The report should be read in its entirety, including all associated drawings and appendices. Sutcliffe Investigation cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from a variety of sources as detailed within this report, and which Sutcliffe Investigation believes are reliable. All reasonable care and skill has been applied in examining the information obtained. Nevertheless, Sutcliffe Investigation cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

The report represents the findings and opinions of experienced Geotechnical and environmental consultants. Sutcliffe Investigations does not provide legal advice and the advice of lawyers may also be required.

Intrusive investigation can only investigate shallow ground beneath a small proportion of the total site area. It is possible therefore that the intrusive investigation undertaken by Sutcliffe Investigation, whilst fully appropriate, may not have encountered all significant subsurface conditions. Any opinions expressed as to the possible configuration of strata between or below exploratory holes are for guidance only and no responsibility is accepted as to its accuracy.

It should be borne in mind that the timescale over which the investigation was undertaken might not allow the establishment of equilibrium groundwater levels. Particularly relevant in this context is that groundwater levels are susceptible to seasonal and other variations and may be higher during the wetter periods than those encountered during this commission.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

This report assumes that ground levels will not change significantly from those existing at present. If this is not to be the case, then some modification to this report may be required.

It should be noted that the banning of the co-disposal of hazardous and non-hazardous waste was introduced in 2011, as a result of the implementation within the UK of the Landfill Directive. This will considerably affect the current practices and procedures for the handling and disposal of wastes, in particular hazardous wastes. In addition, it will be a requirement for all wastes to be pre-treated and to comply with certain waste acceptance procedures prior to sending wastes to landfill. The full potential effects of these important changes are not known at this stage, but it is perceived that disposal costs will rise, particularly for hazardous wastes, and waste pre-treatment may, in some cases, become an 'additional' redevelopment cost with regard to the remediation of contaminated sites.

Should this report recommend that materials could be excavated and removed off site for landfill disposal, then it should be noted that the costs, timescales and implications of the pending changes to waste management legislation couldn't be predicted at this stage. Sutcliffe Investigation will not be responsible for changing practices, etc that may affect the viability of necessary remedial actions or of the implications of potential alternative treatment techniques.

Sutcliffe Investigation reserves the right to amend their conclusions and recommendations in the light of further information that may become available. General notes and limitations relevant to all Sutcliffe Investigations are described in the Foreword and should be read in conjunction with this report.

Executive Summary

INTRODUCTION	Sutcliffe Investigations was instructed by Interserve (the “client”) to undertake a Phase II ground assessment for the site at Prospect House, Bank House Road, Blackley, Manchester M9 8TL. These intrusive works were completed over a 2No. staged period by Sutcliffe’s, undertaken in June 2019 with supplementary works completed in July 2019 and March 2020, following the fire on site, thus allowing access to the footprint of the building. NOTE: The purpose of the March 2020 site investigation was for geotechnical purposes (piling information), post demolition sampling and delineation of the landfill material. The site is centred on National Grid Reference (NGR) 385159, 403511 and is approximately 1.00ha in area. This report assesses the ground based geotechnical and environmental risks, constraints and liabilities associated with the proposed development of the site. This is required in support of the discharge of contaminated land planning conditions assigned to the site and to allow the design of economic foundation solutions.
SITE DESCRIPTION	The site is irregular in shape and is approximately 1.00Ha in area. The site can be accessed off Bank House Road to the south of the site. At the time this PRA was written, a single storey school building occupied the centre of the site however, this school was no longer operational. An isolated temporary classroom was also still noted on the northern portion of the site, along with a number of outbuildings. Much of the remaining area to the north of the on-site building comprised of soft landscaping, which was becoming slightly overgrown. A number of shrubs and trees were also noted in this area. To the rear of the existing school, soft landscaping areas appeared to show evidence of variable settlement noted during the site reconnaissance. Car parking was located to the south and south west of the site, adjacent to Bank House Road. Overall the site was generally level, with occasional changes in elevation in the soft landscaping areas. The site was bound by a mixture of green metal palisade fencing on the northern, western and southern sides of the site boundary, while the eastern boundary was bound by wooden fence panels, with padlocked gates for access. However, in circa October 2019, the site was subject to an arson attack and the principal school building has burnt down and has subsequently been demolished. Given the potential for asbestos to have been released from the structure during the fire a subsequent extensive cleaning operation has been undertaken by the council on site and in the surrounding area.
DEVELOPMENT PROPOSAL	It is understood that a new SEN teaching facility is proposed which is to include an indoor swimming pool. Externally, soft and hardstanding areas, external play areas and a MUGA are proposed on the site. Based on discussions with the client, soft landscaping will be minimal, with artificial surfacing proposed immediately adjacent to the classrooms in most outdoor play areas.
PRELIMINARY CONCEPTUAL MODEL	According to the Phase I Geo-Environmental Desk Study Report completed by HSP consulting the site was shown as open fields from the earliest mapping, up until 1975-1980 when Telford School was recorded on site, this school building remaining until present day. Therefore, the potential for significant contamination as concluded by HSP to have arisen at the site as a result of the current and former usage on site is

	considered to be low. Potential contaminants associated with such activities may comprise a wide range of metals, fuels, oils, acids, alkalis and asbestos.
PREVIOUS WORKS	HSP Consulting have completed a Phase I Geo-Environmental Desk Study Report (Report Reference: C2729 / PI- Hillside Centre), and a Phase II Geo-Environmental Assessment Report (Report Reference: C2729 / PII - Hillside Centre). Reference has also been made to a Geo-Environmental Investigation carried out by Sinclair Knight Merz (SKM) in November 2008 for the adjacent Co-Operative Academy. This report was reviewed in terms of the round gas risk assessment.
SITE INVESTIGATION	Field works were undertaken on 12th – 14th June 2019, 11th July 2019 and 9th - 11th and 25th - 27th March 2020 and comprised of: • 5No. Window Sample Holes. • 5No. Cable Percussion Boreholes • 15No. Trial Holes • 2No. Soakaways • 2No. Hand Dug Foundation Inspection Pits • Forensic Sampling • Contamination samples from various depth in the made ground, including asbestos. • Leachate samples. • Hazardous Waste Assessment. • Waste Acceptance Classification (WAC) • Monitoring of ground gas (HSP 2018 & Sutcliffe 2019).
GROUND CONDITIONS	Topsoil / Made Ground: Topsoil was noted to a maximum depth of 0.35m bgl over Made Ground. The Made Ground comprised of occasional macadam over brown / black slightly ashy fine to coarse grained SAND with fine to coarse brick including crushed brick, plastic, wood, tyres, bottles, jars, plastic bags, wire, rags, tile, metal, concrete, cinder and glass fragments, in a number of exploratory holes. Also noted were limestone cobbles and bands of silty sandy CLAY. Demolition material comprising of brownish red sandy fine to coarse GRAVEL of brick (whole and half) and occasional glass was noted within TP206 - TP208 between 0.25m and 1.90mbgl. The maximum MG depth encountered by Sutcliffe was 4.40mbgl. NOTE: Based on the logs it is that that the made ground material encountered (maximum depth of 5.00m from third party report) indicates that the landfill impinges / encroaches onto the development site. Although Made Ground was encountered and recorded by HSP Consulting no reconciliation was made between ground conditions recorded and the adjacent landfill. Natural Ground: Natural ground comprised of bands of SAND and CLAY. Sand was noted to be loose to medium dense orange / brown occasionally clayey occasionally gravelly fine to medium grained. Clay was noted to be very soft to very stiff brown / grey / red / yellow / orange occasionally friable slightly silty slightly sandy slightly gravelly with occasional sand bands. Sand is fine. Gravel is fine to medium subangular to sub-rounded and of mixed lithology. A band of brown cobbly slightly silty slightly clayey sub-rounded to subangular fine to coarse SAND AND GRAVEL of sandstone and limestone was recorded within BH203 only.
GROUNDWATER	Perched groundwater was recorded within WS101, TP101, TP102, TP104, TP204, TP209 - TP211. BH202 and BH203 between depths of 2.00m and 14.20mbgl.
ENVIRONMENTAL RISK ASSESSMENT	Long Term Human Health Currently the site does pose a risk to human health, and remediation works will be required as part of the development to ensure that the site is suitable for occupation and no longer poses a risk to human health. Controlled Waters Risk Assessment For controlled waters there are two assessment criteria, the Environmental Quality Standard (EQS) and the UK Drinking Water Standard (UKDWS).

	Despite a number of contaminants with exceedances above both the DWS and EQS screening criteria, these exceedances are not considered significant given the likely depth to groundwater, effects of natural attenuation, lack of nearby groundwater abstractions and the absence of any surface water courses that could be in continuity with ground water beneath the site. NOTE: Although it is recognised that piling operations could potentially generate a preferred pathway to the underlying Secondary B Aquifer, these risks will be mitigated and communicated via a Piling Risk Assessment within Appendix D.
ASBESTOS	Asbestos fibres (Amosite – loose fibres) were identified within TP101 at 0.60-1.00mbgl and WS101 at 0.20 – 0.60m. Chrysotile loose fibres were identified in TP204 at 0.50-0.90mbgl and Amosite boards within TP209 at 2.50-3.00m. This material has been quantified and TP101 and WS101 samples indicated an Asbestos Quantification of <0.001%. TP204 and TP209 indicated 0.002%. Based on Asbestos Quantification results further delineation may be required for disposal purposes details of which will be presented in the Phase III Remediation & Validation Proposal.
WASTE ASSESSMENT	Hazardous Waste Assessment Eight Samples were scheduled for Hazardous Waste Assessment, recovered from TP205 (0.30 - 0.80m), TP204 (0.50 - 0.90m), TP203 (0.50 - 1.00m), TP210 (1.50 - 2.00m), BH201 (0.80 - 1.00m), BH203 (0.70 - 1.00m), BH10 (0.20 - 0.60m) and TP101 (0.60 - 1.00m). BH101 (0.20 - 0.60mbgl) and TP101 (0.60 - 1.00mbgl) both contain Hazardous Waste. BH101 contains HP7 Carcinogenic and HP11 Mutagenic with a TPH concentration of 3541 mg/kg and TP101 contains HP7 Carcinogenic only with a Lead concentration of 1173 mg/kg. Based on this Hazardous Waste Assessment further delineation may be required for disposal purposes details of which will be presented in the Phase III Remediation & Validation Proposal. It should be noted that further costs may be required for disposal purposes. Waste Acceptance Criteria (WAC) Four samples were scheduled for Waste Acceptance Classification (WAC) Testing, recovered from TP202 (0.50 - 0.90m), TP204 (0.50 - 1.00m), TP209 (0.50 - 1.00m) and TP210 (0.50 - 1.00m). Of the samples tested, TP209, TP204 and TP210 are classed as Hazardous Landfill Waste due to the percentage of Loss on Ignition and Total Organic Carbon.
GROUND GAS RISK ASSESSMENT	Based on four ground gas monitoring visits, Sutcliffe classify the site as a Characteristic Situation 2 however, both HSP Consulting and SKM conclude in their site investigation reports that the site and the adjacent site both fall into a Characteristic Situation 4. In light of these classifications, the fact that the ground gas monitoring data collated so far was deemed insufficient based on information detailed within relevant guidance documents, given the landfill boundary is encroaching onto the site and correspondence with the local authority, Sutcliffe also believe that a worst case scenario should be adopted and the site classification should be increased to a Characterisation Situation 4.
COAL MINING RISK ASSESSMENT	No further action required.
RADON	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level. No radon protective measures are necessary
GEOTECHNICAL ASSESSMENT	General - It is understood that a new teaching facility with associated soft and hardstanding areas is proposed on the site.

	Due to the ground conditions encountered it would be Sutcliffe's recommendation that a driven piled foundation solution with a reinforced concrete slab is adopted, with piles being taken to a suitable depth in natural strata for bearing (circa >20mbgl). Final pile design will be undertaken by a specialist piling contractor. Additionally, a reinforced concrete retaining structure is required for the indoor pool. When the pile design has been completed a review of the Piling Risk Assessment will be undertaken to ensure the adopted pile methodology does not represent an additional risk to identified receptors including perched groundwater and the ingress of ground gas into the new builds. A Piling Risk Assessment has been completed and is presented in <i>Appendix D</i>. Limited groundwater ingress was recorded during site investigation works and subsequent monitoring. Sub-surface concrete that is only in contact with Made Ground can be Design Sulphate Class DS-2, with an ACEC Classification of AC-1s. Ground Floor Construction - Based upon the amount of Made Ground noted on site it is recommended that in-situ reinforced concrete suspended floor slabs are utilised on site. Geotechnical Uncertainty - Potential relic foundations and obstructions still cannot be discounted, especially beneath the former building footprint.
RECOMMENDATIONS	The following actions are recommended: • Submit the <i>Rev B Phase II Ground Assessment Report</i> to the LPA for discharge of contaminated land conditions assigned to the site. • Submit <i>Rev A Phase III Remediation Strategy</i> to the LPA for discharge of relevant conditions assigned to the site. • Consultation with the appointed Piling Specialist following detailed design to ensure no preferred pathways exists to identified receptors. • Liaise with the appointed Waste Disposal Company regarding the disposal routes and associated costs for removal of material surplus to requirements to a suitably licenced facility. • Design SMMP – management of material on and off site. • Good hygiene practices should be employed during construction work, in addition, the findings of this investigation should be included within the contractors H&S file and an assessment of risks associated with short term human health completed. No consumption of food or smoking should occur without prior hand washing. If dust is encountered, dust masks should be worn and dust suppression employed.

NOTE: The executive summary is an overview of the key findings and conclusions of the report. There may be other information contained in the body of the main report which puts into context the information presented within the executive summary. No reliance should be placed on the executive summary.

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1 Introduction

1.1 Terms of Reference

Sutcliffe Investigations was instructed by Interserve (*the “client”*) to undertake a Phase II Ground Assessment for the site at Prospect House, Bank House Road, Blackley, Manchester M9 8TL.

These intrusive works were completed over a 2No. staged period, undertaken in June 2019 with supplementary works completed in July 2019 & March 2020, following the fire on site, thus allowing access to the footprint of the building.

NOTE: The purpose of the March 2020 site investigation was for principally geotechnical purposes (piling information) and post demolition sampling but also included and delineation of the landfill material.

The location of the site is presented as *Figure 1*. The site is centred on National Grid Reference (NGR) 385159, 403511 and is approximately 1.00ha in area. An aerial photograph of the site is presented as *Figure 2*.

This report assesses the ground based geotechnical and environmental risks, constraints and liabilities associated with the proposed development of the site. This is required in support of the discharge of contaminated land planning conditions assigned to the site and to allow the design of economic foundation solutions.

1.2 Development Proposal & Legislative Context

Development Proposal

It is understood that a new SEN teaching facility is proposed which is to include an indoor swimming pool. Externally, soft and hardstanding areas (including car parking facilities), external play areas and a Multi-Use Games Area (MUGA) are also proposed on the site.

Based on discussions with the client, soft landscaping will be minimal, with artificial surfacing outdoor play areas proposed immediately adjacent to individual classrooms. The proposed plan is shown on *Drawing Number FS0831-JMA-01-00-DR-A-00-0002-S4-P27* produced by jm architects.

As part of these works a “Cut & Fill” Exercise is proposed, although the exact details are not yet confirmed. The management of this exercise ensuring that any material is “fit for purpose” will be documented with the revised Phase III Remediation & Validation Proposals. However, a preliminary plan detailing Cut & Fill Areas is presented as *Drawing No. FS0832-SUT-ZZ-00-DR-C-640-001*. This plan details the proposed soft landscaped areas will be subject to an infilling and cut exercise.

Legislative Context

The presence of contaminants which may pose a risk to human health or the environment is a material planning consideration. For planning it should be considered whether the site is suitable for its new use, and the responsibility for securing a safe development (including cumulative effects of pollution on health, and the potential sensitivity of the proposed development to adverse effects from pollution,) rests with the developer and/or landowner. Planning is concerned with the site's proposed use not its current use, where the amount of contamination is expected to be low relative to the level of risk. This is the opposite to Part 2A which considers high levels (significant harm) and the current use of the site.

Section 57 of the Environment Act 1995, adds Part 2A (ss.78A-18YC) to the Environmental Protection Act 1990 and contains the legislative framework for identifying and dealing with contaminated land. Where development is undertaken on land which may be affected by contamination, the National Planning Policy Framework, paragraphs 120 to 122 considers pollution and remediation. This links the contaminated land regime within the development process.

For there to be an environmental liability associated with the site there must be a perceived source (a contaminant), a receptor (humans, living organisms or property) and a pathway between them. The potential presence of all of these aspects would result in a complete contaminant linkage.

In accordance with environmental legislation and the associated guidelines, assuming the site is to be redeveloped as housing, it should be noted that any redevelopment of the site could actually create new pathways that could increase the liabilities associated with the site. In addition, the basis of the intrusive ground assessment is to refine the preliminary conceptual model.

1.3 Site Location and Setting

The site is located off Bank House Road, Manchester approximately 5.41km north of Manchester City Centre at National Grid Reference (NGR) 385159, 403511. The site is within the existing Camberwell Park School and the surrounding areas comprises of public open space and residential properties.

A location plans and aerial photograph of the site are shown as *Figure 1 & 2*.



Figure 1: General Location of Site

1.4 Site Description and Layout

The site is irregular in shape and is approximately 1.00Ha in area. The site can be accessed off Bank House Road to the south of the site.

At the time this PRA was written, a single storey school building occupied the centre of the site. However, this school is no longer operational. An isolated temporary classroom was also still noted on the northern portion of the site, along with a number of outbuildings. Much of the remaining area to the north of the on-site building comprised of soft landscaping, which was becoming slightly overgrown. A number of shrubs and trees were also noted in this area. To the rear of the existing school, soft landscaping areas appeared to show evidence of variable settlement noted during the site reconnaissance.

Car parking was located to the south and south west of the site, adjacent to Bank House Road.

Overall, the site was generally level, with occasional changes in elevation in the soft landscaping areas.

The site was bound by a mixture of green metal palisade fencing on the northern, western and southern sides of the site boundary, while the eastern boundary was bound by wooden fence panels, with padlocked gates for access.

However, in circa October 2019, the site was subject to an arson attack and the principal school building has burnt down and has subsequently been demolished. Given the potential for asbestos to have been released from the structure during the fire a subsequent extensive cleaning operation has been undertaken by the

council on site and in the surrounding area and included additional sampling completed by Sutcliffe's March 2020.



Figure 2: Aerial Photograph of the Site

1.5 Previous Studies

HSP Consulting have completed a Phase I Geo-Environmental Desk Study Report (*Report Reference: C2729 / PI- Hillside Centre*), and a Phase II Geo-Environmental Assessment Report (*Report Reference: C2729 / PII - Hillside Centre*).

In addition, Sutcliffe's have completed a Phase II Ground Assessment (*Report Reference 30186LG Ground Assessment Report Vr A*) prior to the fire breaking out on site and these works have been reported. Additional works have recently been completed by Sutcliffe's and this report includes all data compiled by Sutcliffe's.

Reference has also been made to a Geo-Environmental Investigation carried out by Sinclair Knight Merz (SKM) in November 2008 for the adjacent Co-Operative Academy and the HSP report, both reviewed to assist the Ground Gas Risk Assessment.

1.6 Objectives & Scope of Assessment

The aim of the intrusive ground investigations, supplementary to works completed by HSP Consulting was to identify potential geotechnical & environmental liabilities and constraints, associated with the development of the site area in support of the following:

- A planning application and the discharge of contaminated land conditions where reasonably practicable that may have been assigned to the site and to include the design of a remediation scheme, if required as part of the National Planning Policy Framework (NPPF).
- To assess the likelihood of reuse of materials that are site won or disposal options for surplus material.
- The preliminary design of detailed and economic foundations options inclusive of all information and specifications relating to foundation types, the location of underlying rock, (if encountered), preparation of ground, concrete grades, reuse of materials for both the proposed building, and the existing foundations.

2 Preliminary Conceptual Risk Assessment – HSP February 2018

2.1 Introduction

The Phase I Geo-Environmental Desk Study Report completed by HSP consulting is summarised below. This report should be read in conjunction with *Report Ref.: Phase I Geo-Environmental Desk Study Report, Hillside Centre, Manchester Ref.: C2729/ PI.*

As reported within the Phase I Geo-Environmental Desk Study Report noted the following;

“The site is currently part of an existing primary school, it is irregular in shape and is approximately 1.00Ha in area.

The site is shown as open fields from the earliest mapping, up until 1975-1980 when Telford School is recorded on site. The surrounding land use has changed from predominantly agricultural use into a residential area, with an area of open space to the north and south east of the site. A landfill is recorded adjacent to the northern boundary of the site from 1964.

The BGS Mapping indicates Made Ground deposits are expected to the eastern boundary of the site.

Glacial Till superficial deposits and bedrock deposits belonging to the Manchester Marls Formation are expected to underlie the site.

The superficial geology is designated as a Secondary Undifferentiated Aquifer and the bedrock geology is designated as a Secondary B Aquifer. The site is not within a Groundwater Source Protection Zone.

*The Preliminary Conceptual Site Model indicates a **low possibility** that harm could arise to a designated receptor from identified hazards.*

A ground investigation was recommended to assess the geo-environmental constraints identified on site by this desk study.”

2.2 Site History

Based on information reported within the Phase I Geo-Environmental Desk Study Report completed by HSP consulting the site was shown as open fields from the earliest mapping, up until 1975-1980 when Telford School was recorded on site, this school building remaining until circa October 2019 when the school's principal building was burnt down..

Therefore, as reported by HSP the potential for significant contamination to have arisen at the site as a result of the current and former usage on site is considered to be low. Potential contaminants associated with such activities may comprise a wide range of metals, fuels, oils, and asbestos.

The surrounding area from 1848 – 1956 did not identified any significant former land uses, however between 1963 – 1968 three refuse tips were recorded to the north of the site boundary, approximately 40m at its closest point. No further significant former land users were identified up until the latest map dated 2014.

It is proposed to develop the site with a new teaching facility with associate soft and hardstanding areas.

2.3 Geotechnical Constraints

Coal Mining

With regards to coal mining, the Phase I Geo-Environmental Desk Study Report completed by HSP Consulting identified the site lies within a Coal Mining Area. The CON29M Residential Mining Report obtained for the site indicated no issues were identified, therefore, no further action was required.

Geology

The Groundsure report appended in the Phase I Geo-Environmental Desk Study Report completed by HSP consulting identified the following;

- *The closest record of artificial ground was 498m South of the site and was noted to be Made Ground.*
- *The closest fault was noted 36m north east of the site.*

Historical Land Use

Following the demolition of the on-site building, the potential for relic foundations and obstructions cannot be discounted.

2.4 Potential Contaminant Linkages

Sources

The likely contaminants from made ground associated with former site usage, infilling activity which may be present on site could include: heavy metals such as cadmium, chromium, copper, lead, nickel and zinc, asbestos, hydrocarbons and organic compounds such as Polycyclic Aromatic Hydrocarbons (PAHs). Furthermore, ground gases such as methane and carbon dioxide may be generated from areas of made ground material and adjacent landfill.

Potential off-site sources of contamination identified in the Phase I Geo-Environmental Desk Study Report completed by HSP consulting included the adjacent landfill site, Made Ground and Historical & Contemporary Land Use. The risk from the adjacent landfill could represent a risk to the site.

The likely contaminants from previous land uses are shown below in *Table 2.1*.

Table 2.1: Potential Source(s) of contamination

Reference	Potential Sources (Onsite)	Potential Contaminants
S1 (On site)	Historical Land Use / Made Ground	Localised metals, asbestos, PAHs, ground gas.
S2 (Off Site)	Adjacent Landfill / Made Ground / Historical Land Use	Localised metals, asbestos, PAHs, ground gas.

Receptors

The most sensitive receptors identified using the conceptual site model are considered to be site and adjacent site users, construction and maintenance workers, controlled waters (Secondary B Aquifer / Unnamed Tertiary River 183m South East), infrastructure and buried services. These are most likely to be affected by made ground and any associated contaminants and gas generated from made ground, if present on site.

Human receptors would comprise construction workers, future site users and adjacent site users. It is likely that the exposure to contamination by construction workers will be limited due to the short exposure to the potential contamination and the use of PPE. If ground gases are produced this could be a potential risk to the future site users and properties and workers in confined spaces / trenches etc.

Due to the potential for contaminants to be present on site there is the potential for contaminants to leach and migrate to the underlying Secondary B Aquifer.

Table 2.2 below details the potential receptors.

Table 2.2: Receptors

Ref	Receptor	Description
R1	Current & future site users	Site users; personnel, general workers and maintenance workers,
R2	Construction Workers	Contractors working on the development of the site. Construction workers, maintenance workers or other personnel who may be directly exposed to contaminated materials in the course of their activities).
R3	Controlled Waters	Secondary B Aquifer / Secondary Undifferentiated Aquifer and on-site drainage
R4	Adjacent Site Users	Adjacent site users.

		Third-party land (<i>i.e.</i> the possibility of contamination migrating off-site onto third party land <i>via</i> contaminated groundwater, surface water run-off).
R5	Infrastructure / Buried services	Proposed buildings and buried services

Pathways creating contaminant linkages

Table 2.3: Pathways

Ref	Pathway	Description
P1	Direct contact with potential contaminants.	Dermal absorption, ingestion and inhalation of contaminants via direct contact.
P2	Ingestion of potential contaminants.	Construction workers may come into contact during the site works; however, this will be for a short time and therefore limited exposure will occur. PPE can be used. Construction workers may come into contact during the site works, however this will be for a short time and therefore limited exposure will occur. PPE can be used and worn as a precaution to reduce the risk.
P3	Inhalation of potential contaminants.	
P4	Leaching and migration of contaminants.	Leaching of possible contaminants could migrate into the underlying Secondary B Aquifer via shallow groundwater. On site drainage is also at risk from shallow contamination, if present.
P5	Vertical and lateral migration of ground gases / vapours.	There is the potential for contaminants to be present on the site, which could generate ground gas & vapours on site.

2.5 Risk Evaluation

Each potential contaminant linkage is identified in *Table 2.4* below. An evaluation of the risk that each contaminant linkage poses to the project (as identified in the *Section 2*) has been undertaken, in general accordance with CIRIA guidance document C552, 2001 (as detailed in *Appendix B*).

The evaluation and the resultant actions identified are based on the available information presented within this report. A visual representation of the CSM is presented as *Figure 3*.

The evaluation and resultant actions identified are based on available information presented within the *Phase I Geo-Environmental Desk Study Report completed by HSP consulting (C2729/ PI)*.

During the development there is a potential for short term human health risk to construction workers. These should be assessed and anticipated by the contractor under CDM Regulations 2015.

Table 2.4: Preliminary Risk Evaluation of Potential Contaminant Linkages

1. Hazard Identification		2. Hazard Assessment				3. Risk Estimation		4. Risk Evaluation	5. Managing the Risk
Contaminant Source		Pathway		Receptor		Consequence of risk being realised	Probability of risk being realised	Classification	Action required
S1	Historical Land Use / Made Ground	P1	Dermal contact	R1/2	Site users	Medium	Low	Moderate / Low	It is possible that harm could arise to a designated receptor from an identified hazard. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
		P2	Ingestion of soil / soil dust	R1/2	Site users	Medium	Low	Moderate / Low	
		P3	Inhalation of vapours / soil gas	R1/2	Site users	Severe	Unlikely	Moderate / Low	
		P4	Leaching and migration of contaminants	R3/5	Secondary Aquifer B	Medium	Low	Moderate / Low	
		P5	Lateral migration of soil gas / vapours	R1	Site users	Severe	Low	Moderate	
				R4	Property	Severe	Unlikely	Moderate / Low	
S2	Adjacent Landfill / Made Ground / Historical Land Use	P3	Inhalation of vapours / soil gas	R1/2	Site users	Severe	Low	Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
		P4	Leaching and migration of contaminants	R3/5	Secondary Aquifer B	Medium	Low	Moderate / Low	
		P5	Lateral migration of soil gas / vapours	R1	Site users	Severe	Unlikely	Moderate / Low	
				R4	Property	Severe	Unlikely	Moderate / Low	

3 Ground Investigation

3.1 Phase II – C2729 Hillside Centre (April 2018)

As reported by HSP, the Phase II Geo-Environmental Assessment Report noted the following;

“The ground investigation comprised 7No window sample boreholes to a maximum depth of 5.00m begl and 1No cable percussive borehole to a depth of 12.50m begl. The exploratory hole locations were chosen to provide general coverage of the site.

Geology

The geology of the site comprises made ground overlying superficial Glacial Till deposits and the Manchester Marls Formation bedrock deposits.

Foundations

Due to the depth of made ground across the site it is likely to be most cost effective to use a piled foundation solution. The design of the pile should be carried out by and warranted by a specialist piling contractor. Due to the strength of the ground and presence of cobbles, piles may need to be pre-bored.

Alternatively, ground improvement in the form of vibro stone columns may be appropriate for the proposed building at the site. The stone columns should found in the natural deposits. As the base of the made ground has not been proven in the north and east of the site, a deep borehole is likely to be required to determine the founding depth of the piles or vibro columns.

Human Health Risks

The concentrations of lead and arsenic recorded across the site are considered to pose a potential risk to the proposed end users and construction workers. Any risk will be mitigated during construction either by removal from site or by provision of capping in the form of hard cover (hard landscaping) or a suitable cover system (BRE 465) in landscaped planted or play areas.

Ground Gas Risk Assessment

Analysis of the ground gas monitoring undertaken to date indicates the site falls into a Characteristic Situation 4. Gas protection measures will be required at the site providing at least 5.5 points according to BS8485. Provision should be made for passive or active sub-floor ventilation, to achieve very good performance, in combination with a proprietary gas resistant membrane and suspended floor slab. The membrane should be installed to sufficient levels of workmanship / in line with current good practice under

CQA with integrity testing. Further protection measures will be required and should be selected at the discretion of the structural engineer or architect.

Water Supply Risk Assessment

Based on the chemical analysis report it is considered that specialist materials may be required for water supply pipes, the VOCs and TPH exceeds the Polyethylene threshold in multiple samples.”

3.2 Sutcliffe Fieldwork – June 2019, July 2019 & March 2020

3.2.1 Design Rationale

The aim and design of the ground assessment supplementary to works completed by Sutcliffe's was to provide additional information to satisfy planning conditions assigned to the site by reference to the National Planning Policy Framework (NPPF). This will identify elevated concentrations of determinants with the aim of assessing long term human health risks to site users and groundwater resources. In addition, the works have been designed to allow the design of economic foundation solutions for the proposed new builds.

3.2.2 Fieldwork

Field works were initially undertaken on 12th - 14th June 2019 by PM Drilling, a specialist ground investigation contractor. Additional works were carried out on the 11th July 2019 and comprised of hand dug foundation inspection pits. Further additional works were carried out between 9th - 11th and 25th - 27th March 2020 which comprised of cable percussive boreholes and trial pits for geotechnical purposes (piling information), post demolition sampling and delineation of the landfill material.

All works were supervised by a suitably qualified Sutcliffe engineer. The investigation was carried out in general accordance with the following standards:

- *BS10175:2011+A2:2017 Investigation of Potentially Contaminated Sites – Code of Practice;*
- *R&D Technical Report P5-066/TR Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination, 2001 (Environment Agency);*
- *BS 5930:2015 Code of practice for site investigations; and,*
- *BS EN ISO 22475-1:2006 Geotechnical investigation and testing. Sampling methods and groundwater measurements. Technical principles for execution.*

Window sample, trial hole and borehole logs collated as part of the ground investigation completed by Sutcliffe's are presented in *Appendix C*.

3.3 Health & Safety

Service plans for the development site were obtained prior to any site investigation works. A copy of these plans were maintained on site by the Sutcliffe engineer who is also responsible for clearing the areas to be investigated by use of a Cable Avoidance Tool (CAT) and signal generator (Genny).

3.4 Sampling Strategy

To date the site has been subject to 2No. targeted and non-targeted intrusive investigations, completed over a 3 staged period by HSP and Sutcliffe's and before and after the buildings were demolished and removed from site.

The most recent works completed by Sutcliffe's (March 2020) works targeted two specific areas - under the former building footprint (*geotechnical/piling information*) and within the soft landscaping area in order to delineate the landfill boundary.

Further analysis was included in this most recent phase of works (March 2020) primarily for the assessment of risk associated the release of asbestos during the fire and for the purpose of Waste Classification.

Therefore 20 samples were recovered from the site and submitted for a variety of chemical tests for the assessment of risk to identified receptors (*Long Term Human Health / Controlled Waters & Waste Classification*).

The site area is $10,000\text{m}^2 \div 20 \text{ sample positions} = 500\text{m}^2 \div 0.8 = 625$

$\sqrt{625\text{m}^2} = \text{a } 25\text{m grid.}$

Therefore, this gives an 80% probability of finding a circular area of interest of 625m^2 .

A summary of exploratory hole locations completed by Sutcliffe's, detailing the rationale is shown in *Table 3.1* below.

Table 3.1: Summary of Site Activities – Sutcliffe (2019 – 2020)

Exploratory Hole ID	Location Rationale	Method	Completed Depth (mbgl)	Installation Details	Testing & Sampling details
WS101	General Site Coverage (CW, HH)	Window Sampler	5.45	No installation	SPTs and small bulk samples
WS102	General Site Coverage (CW, HH, F)	Window Sampler	5.45	No installation	SPTs and small bulk samples

Exploratory Hole ID	Location Rationale	Method	Completed Depth (mbgl)	Installation Details	Testing & Sampling details
WS103	General Site Coverage (CW, HH, F)	Window Sampler	5.45	No installation	SPTs and small bulk samples
WS104	General Site Coverage (CW)	Window Sampler	5.45	No installation	SPTs and small bulk samples
WS105	General Site Coverage (CW, HH, F)	Window Sampler	5.45	No installation	SPTs and small bulk samples
TP101	General Site Coverage (CW, HH, F)	JCB	3.30	No installation	Small bulk samples
TP102	General Site Coverage (CW, HH)	JCB	3.90	No installation	Small bulk samples
TP103	General Site Coverage (CW, HH)	JCB	3.00	No installation	Small bulk samples
TP104	General Site Coverage (CW, HH)	JCB	3.10	No installation	Small bulk samples
TP201	Delineating Landfill Boundary (HH)	JCB	1.30	No installation	Environmental samples
TP202	Delineating Landfill Boundary (HH)	JCB	1.30	No installation	Environmental samples
TP203	Delineating Landfill Boundary (HH)	JCB	2.50	No installation	Environmental samples
TP204	Delineating Landfill Boundary (HH)	JCB	2.20	No installation	Environmental samples
TP205	Delineating Landfill Boundary (HH)	JCB	2.80	No installation	Environmental samples
TP206	Delineating Landfill Boundary (HH)	JCB	1.90	No installation	Environmental samples
TP207	Delineating Landfill Boundary	JCB	1.20	No installation	N/A
TP208	Delineating Landfill Boundary	JCB	2.00	No installation	Environmental samples

Exploratory Hole ID	Location Rationale	Method	Completed Depth (mbgl)	Installation Details	Testing & Sampling details
	(HH)				
TP209	Delineating Landfill Boundary (HH)	JCB	3.00	No installation	Environmental samples
TP210	Delineating Landfill Boundary (HH)	JCB	2.90	No installation	Environmental samples
TP211	Delineating Landfill Boundary (HH)	JCB	3.00	No installation	N/A
BH101	General Site Coverage (F, CW, HH)	Cable Percussion	15.00	No installation	SPTs and small bulk samples
BH102	General Site Coverage	Cable Percussion	15.00	No installation	SPTs
BH201	Proposed Building Footprint (HH)	Cable Percussion	17.45	No installation	SPTs, U100s, environmental and geotechnical samples
BH202	Proposed Building Footprint	Cable Percussion	17.45	No installation	SPTs, U100s, geotechnical samples
BH203	Proposed Building Footprint (HH)	Cable Percussion	24.16	No installation	SPTs, U100s, environmental and geotechnical samples
SA101	Potential Soakaway Design	JCB	1.80	No installation	N/A
SA102	Potential Soakaway Design	JCB	2.50	No installation	N/A
HD101	Foundation Inspection	Hand Dug Pits	5.50	No installation	N/A
HD102	Foundation Inspection	Hand Dug Pits	4.00	No installation	N/A

GG – Ground Gas / CW – Controlled Water / HH – Human Health / F - Forensics

A plan detailing the position of sampling locations on an existing layout of the site is presented as *30186-SUT-ZZ-00-DR-G-720-0001-P1*.

3.5 Chemical Laboratory Testing

Selected soil samples (made ground) were collected at various depths and horizons and submitted for chemical analysis, details of which are presented in *Table 3.2*.

Table 3.2: Summary of Soils Analysis (Total & Leachate Concentrations)

Suite Reference	Analysis Suite
Soils Suite – total	<i>Metals suite, speciated (16) polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons according to the Total Petroleum Hydrocarbon Working Group (TPHCWG), asbestos screen, total cyanide, phenols and soil organic matter.</i>
Leachate – total	<i>Metals suite, speciated (16) PAHs.</i>
Waste Acceptance Classification	<i>WAC E (Inert, SNRHW + Hazardous Landfills) 2 stage.</i>
Hazardous Waste Assessment	<i>Hazwaste Envirolab testing minimum requirements, Hazardous Waste Assessment and EPH CWG GCxGC ID (for FID characterisations).</i>
Asbestos	<i>Asbestos in Soil (including matrix) and Asbestos in Soil Quantification% (Hand Picking & Weighing).</i>

All samples were stored in airtight containers appropriately labelled and transported in cool boxes with icepacks maintained at 4°C, under completed chain of custody documentation to Envirolab laboratories.

All samples were analysed by MCERTS accredited soil analysis laboratory Envirolab under UKAS accredited methods. All samples have been taken in accordance with current British Standards.

Envirolab are appropriately accredited for the works required and are an approved supplier under the Sutcliffe's Quality Management System.

Analytical test certificates are presented in *Appendix G*.

TPH Speciated aromatic and aliphatic bands with BTEX analysis have been carried out in line with the TPHCWG. The toxicity and migration risk associated with a TPH is dependent on the specific aliphatic aromatic carbon banding. Of particular concern are the low molecular weight compounds, which are highly mobile and show a greater level of toxicity than the higher molecular weight compounds. Therefore, a low TPH consisting of low molecular weight aliphatic and aromatic carbon banding compounds may present more of a risk than a high TPH consisting of heavy weight aliphatic and aromatic carbon banding compounds.

Based on the TPHCWG the aromatic band C5 – C7 is considered to consist only of Benzene and the aromatic band C7 – C8 of Toluene. Therefore, the more specific BTEX analysis has been used for risk assessment rather than the aromatic bands.

3.6 Drainage

It is recommended that the client / developer contact United Utilities with respect to capacity in existing foul and surface water sewers in the vicinity of the development area.

3.7 Water Supply

Please note the testing suite carried out for this site is for human health purposes and may not cover the suite of contaminants required by United Utilities for pipe selection and therefore further testing may be required.

HSP however, reported that a Barrier Pipe would be required due to the elevated levels of VOC encountered.

3.8 Services

It is recommended that the client / developer contact the relevant service provided to ascertain the requirements for power reinforcement and / or relocation / diversion of existing services.

3.9 Limitations

During the March 2020 site investigation it was advised that initially BH203 could not be completed within the desired location (*beneath the building footprint*) due to high asbestos risks to workers. Therefore, Sutcliffe's mobilised onto site again once this issue had been resolved. Additionally the California Bearing Ratios (CBRs) were not completed after discussions with the client and agreement that it would be best suited at a later date when the hardstanding and top layer of the ground was scraped back for efficiency and accuracy in CBR results.

4 Ground Model

4.1 General

The following section describes the ground conditions encountered during the intrusive ground assessments completed by Sutcliffe (2019 – 2020). The ground comprises of Topsoil / Made Ground to a maximum depth of 4.40m bgl overlying bands of soft to very stiff silty sandy gravelly CLAY, loose to medium dense clayey gravelly SAND and occasional SAND AND GRAVEL.

A summary of the strata depths and thicknesses is detailed in *Table 4.1*.

Table 4.1: Ground Conditions Encountered – Sutcliffe (2019 – 2020)

Strata	Depths encountered (m bgl)		Thickness (m)		
	Min	Max	Min	Max	Average
Topsoil / Made Ground ⁴	0.00	4.40*	0.05	4.40	0.66*
Very soft to very stiff brown / grey / red / yellow / orange occasionally friable slightly silty sandy gravelly CLAY with occasional sand bands. Sand is fine. Gravel is fine to medium subangular to subrounded and of mixed lithology ¹ .	0.35	24.16*	0.10	6.56	1.50*
Loose to dense orange / brown occasionally clayey occasionally gravelly fine to medium grained SAND ² .	0.90	16.00*	0.20	3.30	1.42*
Brown cobbly slightly silty slightly clayey subrounded to subangular fine to coarse SAND AND GRAVEL of sandstone and limestone. ³	14.20	17.60	3.40	3.40	3.40

* Final Depth of Strata not proven, average thickness on identified ground.

¹ Not encountered in TP101 – TP102

² Only encountered in WS102, WS105, BH101, BH102, SA102

³ Only encountered within BH203

⁴ Maximum depth and thickness related to all Made Ground material identified.

4.2 Topsoil / Made Ground

Topsoil was noted to a maximum depth of 0.35m bgl over Made Ground. The Made Ground comprised of occasional macadam over brown / black slightly ashy fine to coarse grained SAND and CLAY with fine to coarse brick including crushed brick, plastic, wood, tyres, bottles, jars, plastic bags, wire, rags, tile, metal, concrete, cinder and glass fragments, in a number of exploratory holes. Also noted were limestone cobbles and bands of silty sandy CLAY. Demolition material comprising of brownish red sandy fine to coarse GRAVEL of brick (whole and half) and occasional glass was noted within TP206 - TP208 between 0.25m and 1.90mbgl. The maximum depth of Made Ground identified by Sutcliffe's was 4.40mbgl.

The characteristic values for the Made Ground are shown below in *Table 4.3* and *Plate 1*.

Based on the logs it is considered that the made ground material encountered (maximum depth of 5.00m within third party report) indicates that the landfill impinges / encroaches onto the development site.

Although Made Ground was encountered and recorded by HSP Consulting no reconciliation was made between ground conditions recorded and the adjacent landfill. The table below details both Sutcliffe and HSPs exploratory holes indicating the depth of the made ground and the material encountered. A plan detailing these positions is also presented as *Drawing No. 30186-SUT-ZZ-00-DR-G-720-0002-P01* and an inferred line of the landfill boundary is annotated.

Table 4.2: Landfill Material and Locations

Sample Reference	Depth of Made Ground	Material Encountered
WS3 (HSP)	3.00m	Glass, plastic, ash, clinker, textiles, mudstone and coal.
WS4 (HSP)	3.50m	Brick, glass, plastic and ash.
WS5 (HSP)	5.00m	Brick, ash, clinker, wood, glass, plastic, metal and paper.
WS6 (HSP)	5.00m	Brick, ash, glass, plastic, and ceramics.
WS7 (HSP)	2.30m	Brick, ash, concrete, glass and ceramics.
TP101 (Sutcliffe)	3.30m	Plastic, wood, metal, glass, bricks, tyres, bottles and jars.

TP102 (Sutcliffe)	3.90m	Bottles, wood, glass, plastics, wire, jars and rags.
TP103 (Sutcliffe)	2.40m	Bricks, rags, plastics, wood, jars and metals.
TP104 (Sutcliffe)	2.40m	Bricks, wood, glass, plastics, wire, jars and metals.
WS101 (Sutcliffe)	3.50m	Ash, cinder, brick and concrete.
WS102 (Sutcliffe)	2.20m	Ash, cinder, brick glass and concrete.
WS103 (Sutcliffe)	3.40m	Crushed brick.
WS104 (Sutcliffe)	4.40m	Plastics, bricks, tiles, metals and glass.
TP202 (Sutcliffe)	1.00m	Metal, brick, glass, ceramics and coal.
TP203 (Sutcliffe)	2.10m	Glass and plastic bottles, paper, newspapers, plastic, metal, foil wrappers, plastic bags, mesh materials, wood and concrete.
TP204 (Sutcliffe)	2.20m	Coal, material, ceramics, metal, wood, plastic, plastic bags, metal cans, rubber and glass.
TP205 (Sutcliffe)	2.70m	Coal, material, ceramics, metal, wood, plastic, plastic bags, metal cans, rubber and glass.
TP206 (Sutcliffe)	1.90m	Brick, glass, wood.
TP207 (Sutcliffe)	1.20m	Brick, glass, wood.
TP208 (Sutcliffe)	1.90m	Brick, glass, wood.
TP209 (Sutcliffe)	1.20m	Brick, plastic, mesh material, clothing material, glass, plastic sheeting, and foil.
TP210 (Sutcliffe)	2.90m	Brick, plastic, mesh material, clothing material, glass, plastic sheeting, and foil.
TP211 (Sutcliffe)	3.00m	Brick, plastic, mesh material, clothing material, glass, plastic sheeting, and foil.
BH203	0.70m	Metal and rubber wires, plastic tubes, plastic sheeting, coal, sandstone, glass,

(Sutcliffe)		plastic bottles, rubber, wood, paper, material mesh, ceramics and polystyrene.
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Table 4.3: Material Properties MADE GROUND

Property	No. of Tests	Range	Average
SPT N Values	18	4 - 12	7.44

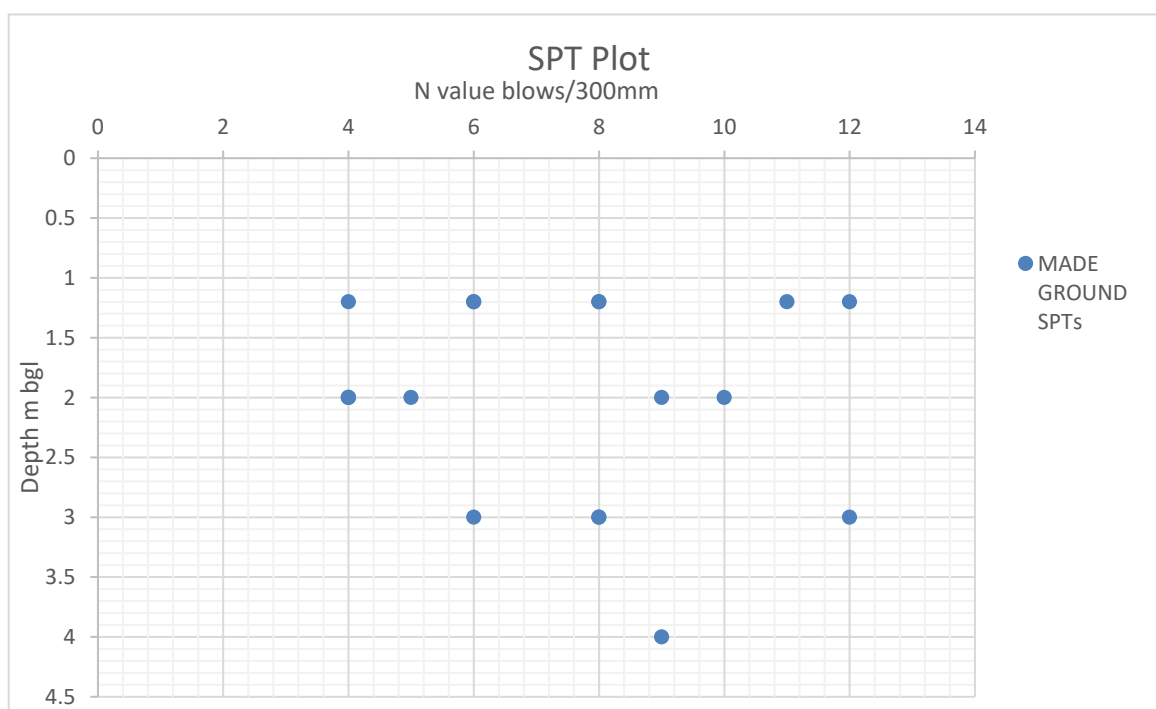


Plate1: Material Properties Made Ground

4.3 Natural Ground

Natural ground comprised of bands of SAND and CLAY. Sand was noted to be loose to dense orange / brown occasionally clayey occasionally gravelly fine to medium grained. Clay was noted to be very soft to very stiff brown / grey / red / yellow / orange occasionally friable slightly silty sandy gravelly with occasional sand bands. Sand is fine. Gravel is fine to medium subangular to sub-rounded and of mixed lithology. A band of brown cobbly slightly silty slightly clayey sub-rounded to subangular fine to coarse SAND AND GRAVEL of sandstone and limestone was recorded within BH203 only.

The characteristic values for the natural ground are shown below in *Tables 4.4 - 4.6 and Plates 2 - 4*.

Table 4.4: Material Properties SAND

Property	No. of Tests	Range	Average
SPT N Values	19	4 - 44	17.11

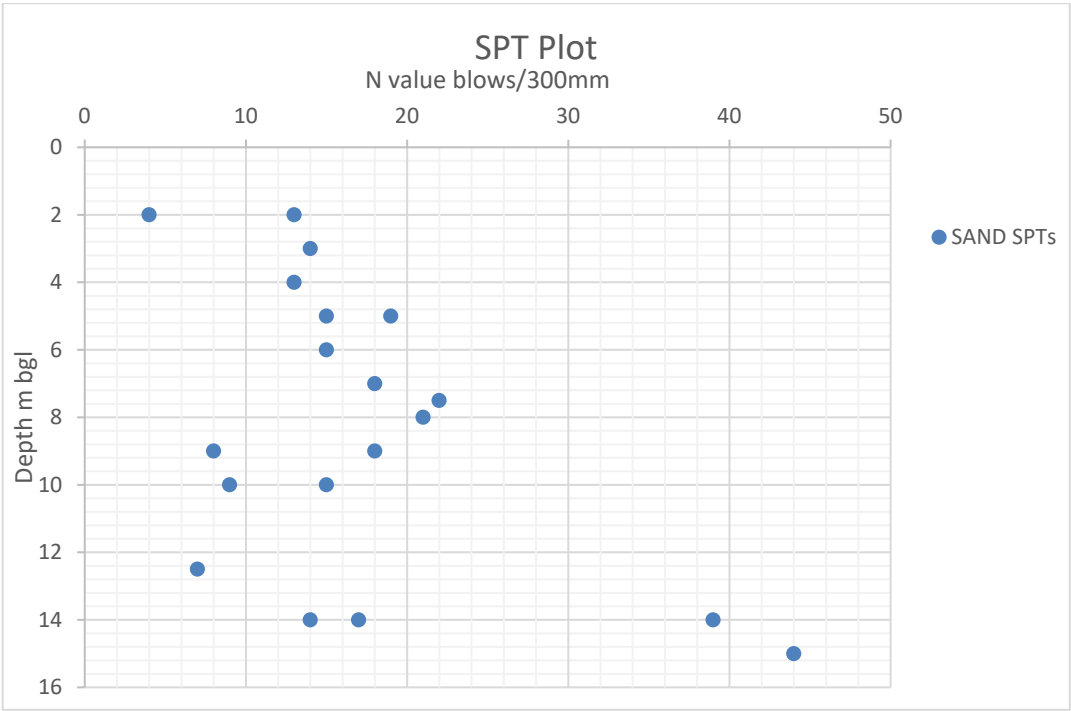


Plate 2: Material Properties Sand

Table 4.5: Material Properties CLAY

Property	No. of Tests	Range	Average
SPT N Values	53	2 – 50	21.94

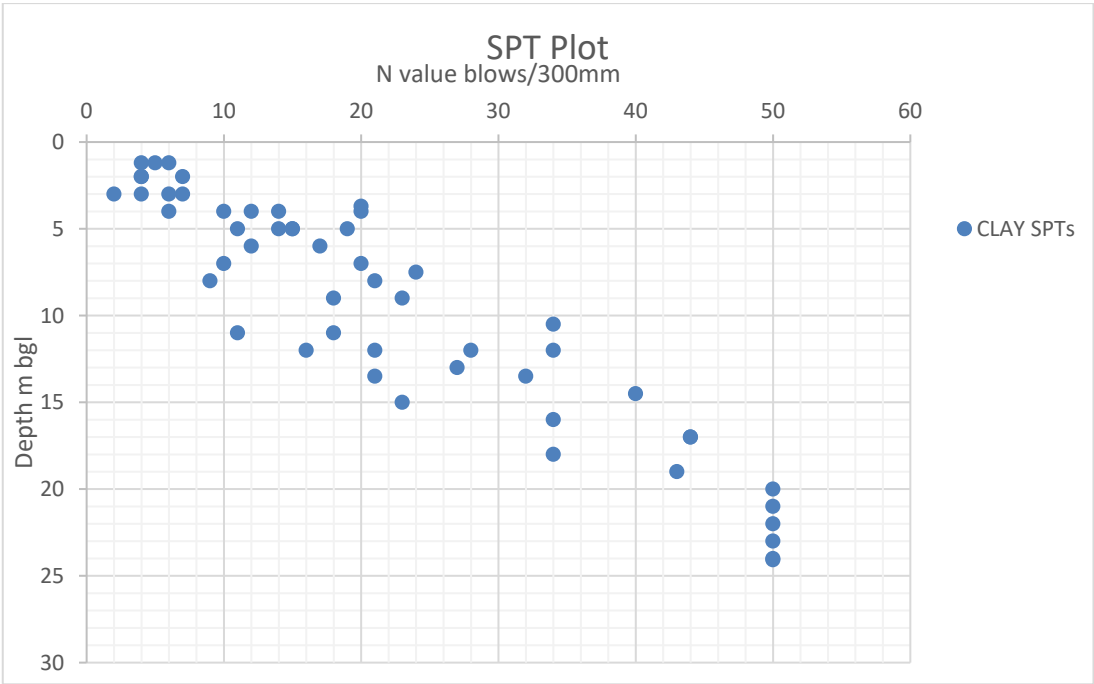


Plate 3: Material Properties Clay

Table 4.6: Material Properties SAND AND GRAVEL

Property	No. of Tests	Range	Average
SPT N Values	3	12 – 34	25.33

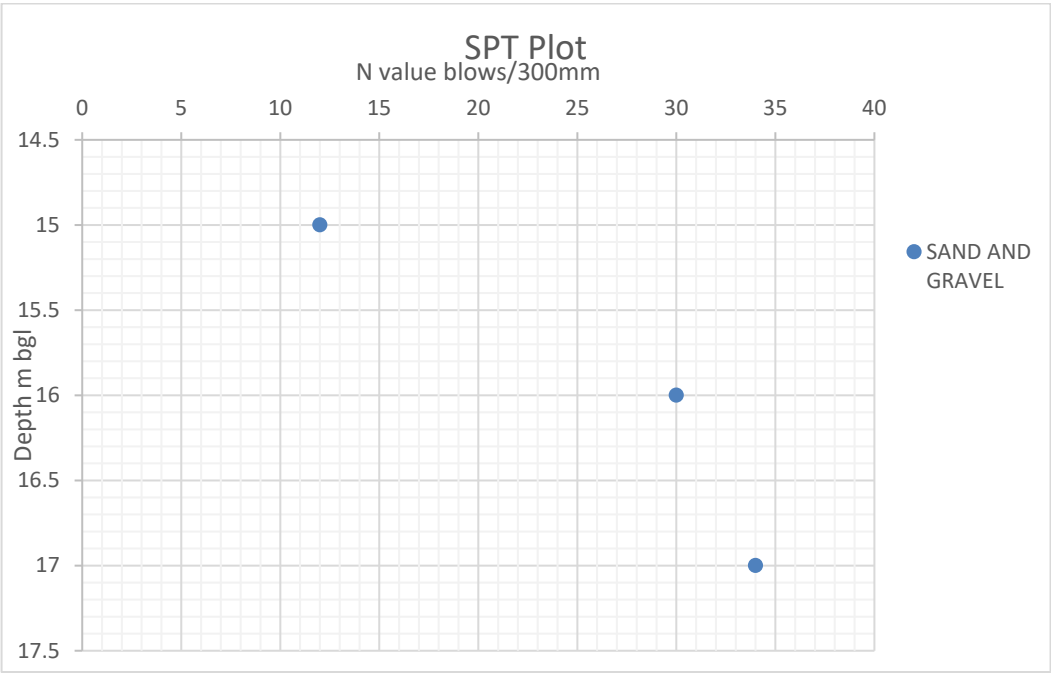


Plate 4: Material Properties Sand and Gravel

4.4 Field Evidence of Contaminated Soils

Field evidence of contamination was identified across site in the form of made ground which included evidence of landfill material encountered to a maximum depth of 4.40m bgl during site investigation works completed by Sutcliffe Projects.

As the landfill was only thought to border the site as reported by HSP and the investigation works completed by Sutcliffe's have indicated that the landfill has in fact encroached onto the site.

Therefore, Sutcliffe's returned to site in order to delineate the landfill boundary as part of this March 2020 site investigation. The locations from this investigation that contained landfill material were TP202 - TP211 & BH203. BH203 is located under the proposed new build where the landfill material extends to a maximum depth of 0.70mbgl.

All locations identifying landfill type material is presented in *Table 4.2* above.

Additionally, during works being completed as part of the demolition exercise a Fuel Oil Storage Tank was identified in the northwest portion of the site, by the client. On return to the site to complete the March 2020 investigation the storage tank was identified to Sutcliffe's.

No evidence of an excavation was noted and it assumed that this tanker was within the fabric of the building and not underground.

Subsequently, TP202 (which is within the vicinity of the former storage tank) showed visual and olfactory field evidence of possible red diesel/hydrocarbon contamination, which could possibly be linked to this Tank.

4.5 Groundwater

Perched groundwater was recorded at the following locations which can be found within *Table 4.7* below.

Table 4.7: Perched Groundwater Data

Location	Depth Perched GW encountered	Rise after 20mins (mbgl)	Comments
BH202	6.60	6.60	N/A
BH203	7.00	6.90	N/A
BH203	14.20	14.10	N/A
WS101	2.00	2.00	N/A

TP101	3.10	3.10	N/A
TP204	2.10	2.10	Water ingress
TP209	3.00	3.00	Water ingress
TP210	2.90	2.90	Water ingress
TP211	2.80	2.80	Water ingress
TP102	3.90	3.90	Water seepage
TP104	2.20	2.20	Water ingress

Monitoring of groundwater installations completed by HSP (2018) were undertaken using an electronic ATEX Dipmeter on 4No. occasions, results of which are presented in *Table 4.8*.

Table 4.8: Groundwater Monitoring Data (HSP 2018)

Location	Water Level (m bgl)			
	11.07.19	22.07.19	21.08.19	27.09.19
WS1	DRY	3.63	3.59	3.60
WS3	-	2.78	2.62	2.32
WS7	-	4.33	4.36	4.32

Based on the Resting Groundwater Levels (RWLs) no discernible groundwater flow has been recorded.

Groundwater monitoring data is presented as *Appendix E*.

NOTE: Please note, monitoring period is insufficient given the landfill is known to encroach onto the site. Therefore, in consultation with Contaminated Land Case Officer the site defaulted to CS4 gas regime.

5 Geotechnical Laboratory Testing and Assessment

General

In total eleven samples were recovered from site for the purpose of geotechnical laboratory testing from the following positions BH101 (5.00mbgl), WS102 (3.50mbgl), WS103 (4.00mbgl), WS105 (3.50mbgl), BH201 (2.50m, 8 - 8.45m and 4 - 4.45mbgl), BH202 (5 - 5.45m and 3 - 3.45m) and BH203 (3.20 - 3.65m and 9.00 - 9.45mbgl). A breakdown of the testing scheduled is set out in *Table 5.1* below.

Table 5.1: Geotechnical Testing – Sutcliffe (2019 -2020)

Borehole Number	Depth (m)	Plasticity Index	Triaxial	Moisture Content	PSD	Description Only
BH101	5 - 5.45	✓	✓	✓		
WS102	3.50 -4.00	✓		✓		
WS103	4.00 - 5.00	✓		✓		
WS105	3.50 - 4.50	✓		✓		
BH201	2.50m	✓		✓		
BH202	5 - 5.45	✓		✓		
BH203	3.20 -3.65	✓	✓	✓	✓	
BH201	8 - 8.45			✓	✓	
BH202	3 - 3.45			✓	✓	
BH201	4 - 4.45		✓	✓		
BH203	9.00 - 9.45					✓

Plasticity Index

A total of seven samples were tested to determine the plasticity index of the underlying CLAY strata spread across BH101, WS102, WS103, WS105 and BH201 - BH203 and taken from depths of between 3.50-5.45m bgl. The plasticity results and the modified plasticity index are outlined in *Table 5.2* below.

Table 5.2: Plasticity Test Results - Sutcliffe (2019 -2020)

Borehole Number	Depth (m)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 0.425mm (%)	Modified Plasticity Index (%)	Soil Classification
BH101	5.00	33	17	16	78	12.48	CL
WS102	3.50	34	18	16	93	14.88	CL
WS103	4.00	40	18	22	81	17.82	CL
WS105	3.50	31	16	15	98	14.70	CL
BH201	2.50m	35	25	10	85	8.5	MI
BH202	5 - 5.45	31	25	6	97	5.82	ML
BH203	3.20 -3.65	28	15	13	96	12.48	CL

The results indicate that the majority of the underlying CLAY is low plasticity. At BH201 the underlying clay behaves as a silt with intermediate plasticity and at BH202 the underlying clay behaves as a silt with low plasticity. Plasticity test results are included in *Appendix F*.

Triaxial Testing

Triaxial testing was scheduled on 3No. samples recovered from site from BH101 and BH201 & BH203. The results of this testing are outlined below in *Table 5.4*.

Table 5.4: Triaxial Test Results - Sutcliffe (2019 -2020)

Borehole Number	Depth From (m)	Depth To (m)	Undrained Shear Strength (kPa)		
			Stage 1	Stage 2	Stage 3
BH101	5.00	6.00	68	76	106
BH203	3.20	3.65	303	322	350
BH201	4.00	4.45	70	81	83

Particle Size Distribution (PSD) Testing

A total of three samples were tested to determine the particle size distribution testing spread across BH201 - BH203 and taken from depths of between 3.00-8.45m bgl. The PSD results are outlined in *Table 5.5* below.

Table 5.5: PSD Test Results - Sutcliffe (2019 -2020)

Borehole Number	Depth From (m)	Depth To (m)	Sieve Percentage (%)		
			Gravel	Sand	Silt/Clay
BH201	8.00	8.45	5	40	55
BH202	3.00	3.45	1	21	78
BH203	3.20	3.65	4	32	64

PSD testing results indicate that the underlying ground conditions are brown (slightly) gravelly (slightly) sandy CLAY.

Laboratory Description

A laboratory description was requested on 1No. sample recovered from BH203 (9.00 - 9.45mbgl). The results indicated a very soft brown slightly gravelly slightly sandy SILT/CLAY, gravel is fine angular to sub-rounded of siltstone, sand is fine to medium.

Stability

Some evidence of instability was noted in the exploratory holes that were undertaken on site and given the amount of Made Ground and Landfill material noted onsite shoring would likely be required if any groundworks are to be left open during site works.

Soluble Sulphate and pH

It is envisaged foundations will extend through the Made Ground and into the natural strata and samples taken from the Made Ground have been submitted for pH and water-soluble sulphate (2:1 soil/water extract) analysis.

The highest water-soluble sulphate concentration and the lowest pH value for the Made Ground is shown in *Table 5.6*.

Table 5.6: Soluble sulphate and pH classification

Soil Type	Lowest pH Values	Highest Soluble Sulphate Concentration (g/l)
Made Ground	6.71	1.23

Therefore, in accordance with Table C2 of BRE: Special Digest 1 2005, sub-surface concrete that is in contact with Made Ground should be Design Sulphate Class **DS-2**, with the ACEC classification of **AC-1s**.

A complete set of geotechnical laboratory certificates are presented in *Appendix F*.

5.1 Foundation Recommendations

General

Following the demolition of the onsite building, it is understood that a new teaching facility with associated soft and hardstanding areas is proposed on the site.

Due to the ground conditions encountered it would be Sutcliffe's recommendation that a driven piled foundation solution with a reinforced concrete slab is adopted, with piles being taken to a suitable depth in natural strata for bearing, circa >20mbgl. Final pile design will be undertaken by a specialist piling contractor. Additionally, a reinforced concrete retaining structure is required for the indoor pool.

A Piling Risk Assessment has been completed and is presented in *Appendix D*.

When the pile design has been completed a Piling Risk Assessment will be reviewed to ensure the adopted pile methodology does not represent an additional risk to identified receptors including ground water and the possible ingress of gas.

Limited groundwater ingress was recorded during site investigation works and subsequent monitoring.

Sub-surface concrete that is only in contact with Made Ground can be Design Sulphate Class DS-2, with an ACEC Classification of AC-1s.

Ground Floor Construction

Based upon the amount of Made Ground noted on site it is recommended that in-situ concrete suspended reinforced floor slabs are utilised on site.

Designated Concrete Mixes

The following designated mix in accordance with BRE Special Digest SD1 and BS 8500: Part1: 2015 will be suitable for use on this site.

Table 5.7: Designated Concrete Mixes - Sutcliffe (2019 -2020)

Application	DS-2 Conditions (Made Ground and Natural) ACEC Class AC-1s
Unreinforced strip / trench fill footings	GEN1
Reinforced strip / trench fill footing (mesh reinforcement)	RC30
Reinforced strip / trench fill footings (rebar etc)	RC30
Unreinforced concrete floor slabs	GEN2
In situ reinforced concrete floor slabs	RC30

*Note: Although RC 30 is in line with BS8500, Sutcliffe Investigation recommend the use of RC35 for concrete used in structurally sensitive works, to provide greater certainty of compliance with strength verification tests. Tolerable mixes dispatched by a batching plant are +/- 10%, and delays on site can also result in deterioration of the concrete.

5.2 Geotechnical Uncertainty

Potential relic foundations and obstructions still cannot be discounted, especially beneath the former building footprint.

6 Long Term Human Health Risk Assessment

6.1 Soils – Long Term Human Health

Methodology

Based on the Preliminary Risk Assessment and Ground Model for this site, a Generic Quantitative Risk Assessment for human health has been undertaken in accordance with CLR and SR (SC050021 series) (DEFRA) guidance as well as CL:AIRE guidance on Comparing Soil Contamination Data with a Critical Concentration, May 2008 and comprises the following:

- *Selection of appropriate generic screening values for human health assessment.*
- *Creation of relevant datasets from which to undertake the assessment.*
- *Assessment of contamination distribution and comparison of site data to screening values using relevant statistical tests (in accordance with CIEH guidance).*
- *Assessment of risks to receptors.*
- *Determination of requirements for further investigation or remediation.*

Selection of Soil Screening Values

Soil screening values appropriate for a residential without plant uptake end use scenario were selected.

Creation of Relevant Datasets

As part of the desk study assessment and Preliminary Conceptual Model, made ground was identified as the principal potential source identified for contamination in the risk evaluation (*Section 2.0*). Consequently, the sampling strategy targeted made ground encountered on site.

Assessment

The soil analytical data has been assessed following CL:AIRE/CIEH guidance, CLR11 Model Procedures Section 2.3, and NHBC R&D Publication 66 2008 “*Guidance for the Safe Development of Housing on Land Affected by Contamination*”.

The purpose of human health risk assessment for planning is to decide whether the land is suitable for the proposed end use and does not pose a risk to human health. Therefore, the key question to answer is, “*Is there sufficient evidence that the true mean concentration is less than the critical concentration*”?

Statistics are used to assist in answering the key question raised above and to help decide whether to support a particular hypothesis. The null hypothesis is the starting point because it is believed to be true but needs to be proved.

In terms of planning, the hypotheses are as follows:

- *Null Hypothesis (H0) - the true mean is equal to, or greater than the critical concentration.*
- *Alternative Hypothesis (H1) - the true mean is less than the critical concentration.*

The null hypothesis needs to be rejected in order to confirm that the land does not pose a human health risk and is suitable for use under the planning regime.

Identification of Contaminants of Concern

The results of the soil analysis from the investigation are shown in *Appendix G*. These results were then compared against the relevant GACs for 5% soil organic matter (SOM). The average percentage SOM was 11.39% for 18 samples from

NOTE: The dataset used is collated from *Revision A* of this report (October 2019) and this current March 2020 site investigation.

Elevated levels of contamination (including Asbestos) were recorded in twelve samples taken from site when assessed against the 5% residential without plant uptake end use scenario values. These are recorded below in *Table 6.1*.

Table 6.1: Statistical Analysis Results for Made Ground Stratum - Sutcliffe (2019 -2020)

Contaminant	Guideline Assessment Value	95% ile	Mean Value Test	Max Value Test	No. of Outliers removed to pass
Arsenic	40 (LQM 5%)	127.4715676	Fails	2 Outliers	2 Outliers removed - INCONCLUSIVE
Lead	310 (C4SL)	812.7872038	Fails	4 Outliers	4 Outliers removed - PASS
Cyanide	34 (Atkins)	17.00654646	Passes	5 Outliers	N/A
C21 to C35 Aromatic	1900 (LQM 5%)	937.1702477	Passes	1 Outlier	N/A
Benzo(a)anthracene	15 (LQM 5%)	12.12817844	Passes	3 Outliers	N/A
Benzo(b)fluoranthene	4 (LQM 5%)	10.3734869	Fails	3 Outliers	3 Outliers removed - PASS
Benzo(a)pyrene	3.2 (LQM 5%)	8.555879741	Fails	3 Outliers	3 Outliers removed - PASS
Dibenzo(ah)anthracene	0.32 (LQM 5%)	0.94913234	Fails	3 Outliers	3 Outliers removed - PASS

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Seven exceedances of Arsenic were noted which can be found within *Table 6.2* below.

Table 6.2: Exceedances of Arsenic - Sutcliffe (2019 -2020)

Location	Depth (mbgl)	Concentration recorded above the applied screening value (mg/kg)
TP101	0.60 - 1.00	276
TP102	0.30 - 0.70	61
TP103	1.10 - 1.60	57
TP209	2.80 - 3.00	61
TP205	0.30 - 0.80	62
TP203	0.50 - 1.00	205
TP210	1.50 - 2.00	52

Arsenic was noted to fail the mean value test with 2 outliers (TP101 at 0.60 - 1.00m and TP203 at 0.50 - 1.00mbgl). When these outliers were removed from the dataset, Arsenic was noted to be inconclusive with regards to a pass or fail with no outliers. Therefore, Arsenic contamination will need to be treated as site wide.

Six exceedances of Lead were noted which can be found within *Table 6.3* below.

Table 6.3: Exceedances of Lead - Sutcliffe (2019 -2020)

Location	Depth (mbgl)	Concentration recorded above the applied screening value (mg/kg)
TP101	0.60 - 1.00	1650
TP102	0.30 - 0.70	332
TP209	2.80 - 3.00	881
TP205	0.30 - 0.80	1080
TP203	0.50 - 1.00	672
TP204	0.50 - 0.90	412

Lead was noted to fail the mean value test with four outliers (TP101 at 0.60 - 1.00mbgl, TP209 at 2.80 - 3.00mbgl, TP205 at 0.30 - 0.80mbgl and TP203 at 0.50 - 1.00mbgl). When these outliers were removed from the dataset Lead was noted to pass the mean value test with no outliers indicating hotspot areas of Lead contamination in the area of TP101, TP209, TP205 and TP203.

In addition, the following contaminants were identified:

One exceedance of Cyanide was noted (TP101 at 0.60 - 1.00mbgl - 37mg/kg). Cyanide was noted to pass the mean value test with 5 outliers (TP101 at 0.60m - 1.00mbgl, TP205 at 0.30m - 0.80mbgl, TP204 at 0.50m - 0.90mbgl, TP209 at 2.80m - 3.00mbgl and TP102 at 0.30m - 0.70mbgl). These outliers are therefore only considered to be statistical outliers within the dataset and Cyanide does not pose a significant risk of significant harm to future end users of the site.

One exceedance of C21 to C35 Aromatic was noted (BH101 at 0.20m - 0.60mbgl - 2680mg/kg). C21 to C35 Aromatic was noted to pass the mean value test with one outlier (BH101 0.20m - 0.60mbgl). This outlier is therefore only considered to be a statistical outlier within the dataset and C21 to C35 Aromatic does not pose a significant risk of significant harm to future end users of the site.

Two exceedances of Benzo(a)anthracene were noted, (BH101 at 0.20m - 0.60mbgl - 29.3mg/kg and WS105 at 0.30m - 0.70mbgl - 23mg/kg). Benzo(a)anthracene was noted to pass the mean value test with three outliers (BH101 at 0.20m - 0.60mbgl, WS105 at 0.30m - 0.70mbgl and TP102 at 0.30m - 0.70mbgl). These outliers are therefore only considered to be a statistical outliers within the dataset and Benzo(a)anthracene does not pose a significant risk of significant harm to future end users of the site.

Three exceedances of Benzo(b)fluoranthene were noted, (BH101 at 0.20m - 0.60mbgl 22.4mg/kg, TP102 at 0.30m - 0.70mbgl - 4.54mg/kg and WS105 at 0.30m - 0.70mbgl - 22mg/kg). Benzo(b)fluoranthene was noted to fail the mean value test with three outliers (BH101 at 0.20m - 0.60mbgl, TP102 at 0.30m - 0.70mbgl and WS105 at 0.30m - 0.70mbgl). When these outliers were removed from the dataset Benzo(b)fluoranthene was noted to pass the mean value test with no outliers indicating hotspot areas of Benzo(b)fluoranthene contamination in the area of BH101, TP102 and WS105.

Two exceedances of Benzo(a)pyrene were noted, (BH101 at 0.20m - 0.60mbgl - 18.3mg/kg and WS105 at 0.30m - 0.70mbgl - 18.7mg/kg). Benzo(a)pyrene was noted to fail the mean value test with three outliers (BH101 at 0.20m - 0.60mbgl, TP102 at 0.30m - 0.70mbgl and WS105 at 0.30m - 0.70mbgl). When these outliers were removed from the dataset Benzo(a)pyrene was noted to pass the mean value test with no outliers indicating hotspot areas of Benzo(a)pyrene contamination in the area of BH101, TP102 and WS105.

Three exceedances of Dibenzo(ah)anthracene were noted, (BH101m at 0.20 - 0.60mbgl - 1.84mg/kg, TP102 at 0.30m - 0.70mbgl - 0.48mg/kg and WS105 at 0.30m - 0.70mbgl - 2.21mg/kg). Dibenzo(ah)anthracene was noted to fail the mean value test with three outliers (BH101 at 0.20m - 0.60mbgl, TP102 at 0.30m - 0.70mbgl and WS105 at 0.30m - 0.70mbgl). When these outliers were removed from the dataset Dibenzo(ah)anthracene was noted to pass the mean value test with no outliers indicating hotspot areas of Dibenzo(ah)anthracene contamination in the area of BH101, TP102 and WS105.

It should be noted that the screening values for Aliphatics EC12-16, Aliphatics EC16-35 and Aliphatics EC35-44 are based upon the theoretical lower saturation limit for the compounds in question. The lower saturation limit has been used for these contaminants as the CLEA calculated SGV/GAC is greater than the lower saturation limit and vapour inhalation is an important contributor to exposure (SR4).

Soil screening tables are shown in *Appendix G*.

Asbestos

In addition to the site wide contamination, Asbestos Containing Materials (ACMs) were identified across site and can be found within *Table 6.4* below.

Table 6.4: ACMs identified

Location	Depth (mbgl)	Asbestos Containing Material (ACM)	Asbestos Quantification (%)
TP101	0.60 - 1.00	Amosite loose fibres	<0.001
WS101	0.20 - 0.60	Amosite loose fibres	<0.001
TP204	0.50 - 0.90	Chrysotile loose fibres	0.002
TP209	2.50 - 3.00	Amosite board	0.002

Based on Asbestos Quantification results further delineation may be required at these locations for disposal purposes details of which will be presented in the Phase III Remediation & Validation Proposal.

Discussion

The statistical analysis indicates that the null hypothesis cannot be rejected for all the contaminants must be accepted for Arsenic, Lead, Benzo(b)fluoranthene, Benzo(a)pyrene & Dibenzo(ah)anthracene. For all other contaminants the alternative hypothesis can be accepted.

Conclusions

Currently the site does pose a risk to human health, and remediation works will be required as part of the development to ensure that the site is suitable for occupation and no longer poses a risk to human health.

In areas of the site designated for soft landscaping a 450mm of clean validated capping system as agreed with the Contaminated Land Case Officer due to the site wide contamination from Arsenic.

This can either comprise the reduction of current site levels and the importation of a clean validated capping system or the emplacement of the capping system

on current existing site levels. In both instances it is recommended that a geo grid is installed beneath the capping system to mitigate the risks of differential settlement in the landfilled area. The installation of this 450mm clean validated capping system will negate the risk associated with the identified hotspots and asbestos impacted locations.

However, for disposal purposes a need to reduce costs, a delineation exercise may be warranted.

7 Controlled Waters Risk Assessment

7.1 Methodology

Based on the Preliminary Risk Assessment and Ground Model for this site, a Level 1 Screening Assessment has been undertaken in general accordance with Environment Agency guidance Environment Agency Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination, 2006.

The methodology comprises:

- Identification of potential contaminant linkages.
- Selection of appropriate generic screening values for controlled waters.
 - *Screening measured concentrations of leachate against the generic screening values available for UK Drinking Water Standards (UK DWS) and Environmental Quality Standards (EQS).*
- Assessment of contaminant distribution and risk to receptors.
 - *Identification of contaminants of concern and relevant contaminant linkages.*
 - *Identification of potential contaminants and contaminant linkages which are no longer of concern.*

Identification of Potential Contaminant Linkages

Contaminant linkages have been identified in *Section 3.0* between the made ground and the underlying aquifer via infiltration and/or migration of dissolved phase contaminants.

Selection of Generic Screening Values

Screening values for Drinking Water Standards (DWS) have been used to assess leachability. DWS are relevant to potable receptors (Secondary B Aquifer).

Environmental Quality Standards (EQS) screening values have been used to assess risks to surface water resources.

Leachate Screening – UK DWS & EQS

Metals and Speciated PAHs were assessed. Exceedances of relevant UK DWS and EQS screening criteria were encountered, details of which are identified in *Table 7.1 & 7.2*. It should be noted that several determinands have limits of detection greater than their respective screening values (Cadmium, Chromium III and VI, Mercury, Phenols, Sulphide). Due to the level of uncertainty associated

with such results, these exceedances are not considered significant and are excluded from the table below.

Table 7.1: Leachate Exceedances Summary - DWS

Determinant	DWS Screening Value (µg/l / mg/l)	Range of concentrations (µg/l / mg/l)	Location and depth of exceedances
Lead	10	<1 – 24	BH101 0.20 – 0.60m – 13µg/l TP104 2.40 – 2.70m – 24µg/l WS101 0.20 – 0.60m – 15µg/l WS102 0.30 – 0.70m – 21µg/l WS104 4.40 – 4.90m – 11µg/l
Sulphate	250	1.79 – 253.66	TP102 2.00 – 2.50m – 253.66mg/l
Benzo(a)pyrene	0.01	<0.01 – 0.47	BH101 0.20 – 0.60m – 0.15µg/l WS105 0.3 – 0.70m – 0.47µg/l

Table 7.2: Leachate Exceedances Summary – EQS

Determinant	EQS Screening Value (µg/l)	Range of concentrations (µg/l)	Location and depth of exceedances
Copper	1	2 - 29	BH101 0.20 – 0.60m – 7µg/l TP101 0.60 – 1.00m – 8µg/l TP102 2.00 – 2.50m – 2µg/l TP103 – 2.40 – 3.00m – 11µg/l TP104 2.40 – 2.70m – 11µg/l WS101 0.20 – 0.60m – 11µg/l WS102 0.30 – 0.70m – 10µg/l WS103 0.20 – 0.60m – 6µg/l WS104 4.40 – 4.90m – 29µg/l WS105 0.30 – 0.70m – 6µg/l
Lead	14	<1 – 24	TP104 2.40 – 2.70m – 24µg/l WS101 0.20 – 0.60m – 15µg/l WS102 0.30 – 0.70m – 21µg/l
Zinc	10.9	2 – 82	TP101 0.60 – 1.00m – 82µg/l WS101 0.20 – 0.60m – 11µg/l

Anthracene	0.1	<0.01 – 1.04	WS104 4.40 – 4.90m – 0.19µg/l WS105 0.30 – 0.70m – 1.04µg/l
Fluoranthene	0.12	<0.01 – 5.26	BH101 0.20 – 0.60m – 1.71µg/l TP104 2.40 – 2.70m – 0.15µg/l WS104 4.40 – 4.90m – 0.21µg/l WS105 0.30 – 0.70m – 5.26µg/l
Benzo(b)fluoranthene*	0.017	<0.01 – 0.61	BH101 0.20 – 0.60m – 0.2µg/l WS105 0.30 – 0.70m – 0.61µg/l
Benzo(k)fluoranthene*	0.017	<0.01 – 0.25	BH101 0.20 – 0.60m – 0.08µg/l WS105 0.30 – 0.70m – 0.25µg/l
Benzo(a)pyrene	0.27	<0.01 – 0.47	WS105 0.30 – 0.70m – 0.47µg/l
Benzo(ghi)perylene*	0.0082	<0.01 – 0.16	BH101 0.20 – 0.60m – 0.05µg/l WS105 0.30 – 0.70m – 0.16µg/l
Indeno(123cd)pyrene	0.002	<0.01 – 0.19	BH101 0.20 – 0.60m – 0.06µg/l WS105 0.30 – 0.70m – 0.19µg/l

* Although all other values were noted above the EQS assessment values, these elevated levels were a result of laboratory detection limits.

Leachate screening tables are presented in *Appendix G*. Analytical certificates are presented in *Appendix G*.

Contaminant Distributions and Risk to Receptors

Several determinants marginally exceeded the DWS and EQS screening values. However, the risk to controlled waters (*groundwater & surface waters*) is diminished as a result of the following:

- *The site is underlain by a layer of Glacial Till which is classified as Unproductive Strata that will act as an aquiclude impeding the flow of water to the underlying Secondary B Aquifer.*

Any risks to the underlying Secondary B Aquifer associated with the proposed piling operations is mitigated and communicated via the Piling Risk Assessment presented in *Appendix D*.

Conclusion

Exceedances of DWS and EQS screening criteria are not considered significant given the likely depth to perched groundwater, effects of natural attenuation, lack of nearby groundwater abstractions and the absence of any surface water

courses that could be in continuity with ground water beneath the site. Therefore, the risk to Controlled Waters is deemed to be **LOW**.

8 Waste Assessment

In accordance with the agreed scope of works, a preliminary assessment for Waste Disposal purposes was undertaken, comprising a Tier 1 Hazardous Properties Assessment with selected samples submitted for Waste Acceptance Criteria (WAC) analysis.

Tier 1 Hazardous Properties Assessment

Eight Samples were scheduled for Hazardous Waste Assessment, recovered from TP205 (0.30 - 0.80m), TP204 (0.50 - 0.90m), TP203 (0.50 - 1.00m), TP210 (1.50 - 2.00m), BH201 (0.80 - 1.00m), BH203 (0.70 - 1.00m), BH10 (0.20 - 0.60m) and TP101 (0.60 - 1.00m). The results can be found within *Table 8.1* below.

Table 8.1: Tier 1 Hazardous Waste Assessment Results

Location	Depth (m)	Waste Classification of Sample	Hazardous Property Codes	Hazardous Chemical Components and Concentrations
TP203	0.50 - 1.00	Non-Hazardous	N/A	N/A
TP204	0.50 - 0.90	Non-Hazardous	N/A	N/A
TP205	0.30 - 0.80	Non-Hazardous	N/A	N/A
TP210	1.50 - 2.00	Non-Hazardous	N/A	N/A
BH201	0.80 - 1.00	Non-Hazardous	N/A	N/A
BH203	0.70 - 1.00	Non-Hazardous	N/A	N/A
BH101	0.20 - 0.60	Hazardous	HP7 - Carcinogenic HP11 - Mutagenic	TPH - 3541 mg/kg
TP101	0.60 - 1.00	Hazardous	HP7 - Carcinogenic	Lead - 1173 mg/kg

Based on the results above BH101 (0.20m - 0.60mbgl) and TP101 (0.60m - 1.00mbgl) both contain Hazardous Waste. BH101 contains HP7 Carcinogenic and HP11 Mutagenic with a TPH concentration of 3541 mg/kg and TP101 contains HP7 Carcinogenic only with a Lead concentration of 1173 mg/kg.

Based on this Hazardous Waste Assessment further delineation may be required for disposal purposes details of which will be presented the appointed contractors Site Material Management Plan (SMMP). It should be noted that further costs may be required for disposal purposes.

The locations of the hazardous material can be found within *Drawing 30186-SUT-ZZ-00-DR-G-720-0003-P1*.

The Hazardous Waste Assessment report can be found within *Appendix G*.

Waste Acceptance Criteria (WAC) Analysis

Four samples were scheduled for Waste Acceptance Classification (WAC) Analysis, recovered from TP202 (0.50m - 0.90mbgl), TP204 (0.50m - 1.00mbgl), TP209 (0.50m - 1.00mbgl) and TP210 (0.50m - 1.00mbgl).

Of the samples tested, TP209, TP204 and TP210 are classed as Hazardous Landfill Waste due to the percentage of Loss on Ignition and Total Organic Carbon.

9 Ground Gas Risk Assessment

9.1 CIRIA C665 Assessment

Gas monitoring wells were installed by HSP in 3No exploratory hole locations (WS1, WS3 & WS7) as part of the 2018 ground investigation completed by HSP Consulting.

A full copy of all gas monitoring readings from the Phase II Geo-Environmental Assessment Report completed by HSP Consulting can be found in *Appendix E*.

Additionally, Sutcliffe have carried out more recent ground gas monitoring using these wells.

9.2 Methodology

A ground gas risk assessment has been undertaken in general accordance with the *British Standard BS8485:2015+A1:2019, "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings"*.

The guidance is written specifically for use by designers of gas protection measures relating to the development of a site. Reference has also been made to the CIRIA document C665:2007: "*Assessing Risks Posed By Hazardous Ground Gases To Buildings*" and to the Health and Safety Executive document EH40/2005 "Workplace Exposure Limits".

Our assessment comprises the following:

- *Review of results.*
- *Calculation of Gas Screening Values for methane (CH₄) and carbon dioxide (CO₂).*
- *Assessment of risks from ground gas.*
- *Development options.*

9.3 Review of Field Data

Sutcliffe had proposed to carry out additional ground gas monitoring using the wells installed by HSP in 2018. However, on the first monitoring visit, only one of the wells could be found (WS1). Sutcliffe returned to site with a metal detector and located WS3 and WS7.

Four rounds of gas monitoring have been undertaken supplementary to the monitoring exercise completed by HSP. Further monitoring was unable to be carried out on the site following a fire on the premises. Gas monitoring was

undertaken using a fully calibrated GA2000 gas monitor which measured concentrations of oxygen, carbon dioxide and methane as well as gas flow emission rates.

The findings are summarised below, and the results are presented in full in *Appendix E*. Calibration certificates are also presented in *Appendix E*.

Table 9.1: Summarised Ground Gas Monitoring Data

Maximum gas readings encountered during monitoring						
Location	MAX CH ₄ %	MAX CO ₂ %	MIN O ₂ %	MAX ppm	Atmospheric Pressure mb	MAX Flow Rate l/hr
11 th July 2019						
WS1	0.2	7.9	12.0	-	1001	-0.1
WS3	-	-	-	-	-	-
WS7	-	-	-	-	-	-
22 nd July 2019						
WS1	0.2	7.3	11.5	-	1008	-0.7
WS3	0.1	3.1	15.7	-	1008	0.0
WS7	0.2	9.4	10.0	-	1008	0.0
21 st August 2019						
WS1	0.0	9.1	10.7	-	1016	0.0
WS3	0.1	0.1	21.1	-	1016	0.2
WS7	0.0	8.7	4.3	-	1016	0.2
27 th September 2019						
WS1	0.2	10.2	9.6	-	989	0.6
WS3	0.2	3.0	18.7	-	989	0.6
WS7	0.2	11.6	1.8	-	989	0.7
5 th VISIT – UNABLE TO UNDERTAKE DUE TO FIRE ON SITE						
6 th VISIT – UNABLE TO UNDERTAKE DUE TO FIRE ON SITE						

9.4 Calculation of Gas Screening Values

Methane (CH₄)

As part of the monitoring exercise completed by Sutcliffe's, positive concentrations of methane (maximum concentration 0.2%) were recorded during monitoring along with a worst case flow rate of 0.7l/hr. The GSV will currently be calculated as:

Limiting volume flow rate of gas = gas concentration x measured borehole flow rate

$$= 0.002 \times 0.7 \text{ (gas concentration in table is \%)}$$

$$= 0.0014$$

The GSV classifies the site as **Characterisation Situation 1** for Methane.

Carbon Dioxide (CO₂)

As part of the monitoring exercise completed by Sutcliffe's, positive concentrations of Carbon dioxide (maximum concentration 11.6%) were recorded during monitoring and a worst case flow rate of 0.7l/hr. The GSV will be calculated as:

Limiting volume flow rate of gas = gas concentration x measured borehole flow rate

$$= 0.116 \times 0.7 \text{ (gas concentration in table is \%)}$$

$$= 0.0812$$

The GSV classifies the site as a **Characteristic Situation 2** for Carbon Dioxide.

Further Consideration of the Ground Gas Classification

A review of HSPs Consulting classification revealed a **Characteristic Situation 4**, based on the GSV calculation. In light of this classification further investigation was undertaken to determine the ground gas classification of the adjacent school. Sinclair Knight Merz (SKM) carried out a PHII Geo-Environmental Investigation on the Co-Operative Academy adjacent to the site in November 2008, based on this report the adjacent site was also classified as a Characterisation Situation 4.

Taking into account the above classifications, the fact that the ground gas monitoring data is incomplete due to a fire on the premises, and recent correspondence with the local authority, Sutcliffe believe that a worst case scenario of a lower bound **Characterisation Situation 4** should be adopted.

As per the guidance, for a Characteristic Situation 4 classification a typical scope of protection measures would include;

- *a reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 2000g DPM,²*
- *all joints and penetration sealed, and,*
- *a proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility.*

9.5 Radon

The property is not recorded to be within a radon affected area as less than 1% of properties are above the action level. Therefore, no radon protective measures are required in the construction of new buildings or extensions at the site.

9.6 Discussion

Based on four ground gas monitoring visits, Sutcliffe classify the site as a **Characteristic Situation 2**. However, both HSP Consulting and SKM conclude in their site investigation reports that the site and the adjacent site both fall into a **Characteristic Situation 4**. In light of these classifications, the fact that our ground gas monitoring data is incomplete due to a fire on the premises and correspondence with the local authority, Sutcliffe also believe that a worst case scenario should be adopted and the site classification should be a lower bound **Characterisation Situation 4**.

NOTE: Any risks associated with the proposed piling operations with regards to ground gas is mitigated and communicated via with a Piling Risk Assessment.

9.7 RB17 Pragmatic Approach - Methodology

Sutcliffe have undertaken a ground gas risk assessment in accordance with “*A Pragmatic Approach to Ground Gas Risk Assessment (RB17)*”. This is based on the low risk attached to the site from potential sources of ground gas, with only on site made ground considered to be a major source. The development proposal is likely to comprise a “cut” exercise, required to achieve proposed formation levels. In consequence the risk from ground gas is considered negligible and RB17 is considered suitable to assess the risk. Full laboratory results, forensic sample description and calculations can be found in the Appendices, a summary of the results from the testing are presented in *Table 9.2* below.

Our assessment comprises the following:

- *Review of results,*
- *Assessment of risks from ground gas, and,*
- *Development options.*

Review of Laboratory Data

Five (5) samples were collected from site for the purpose of undertaking forensic testing to obtain the Total Organic Carbon to allow the assessment of the potential for the made ground to generate ground gas. The forensic testing was undertaken by Envirolab laboratories in line with RB17 on three 1kg samples provided to them by Sutcliffe.

The findings are summarised below, and the results are presented in full in *Appendix E*.

Table 9.2: Forensic & TOC Summary for Site

Forensic Descriptions & TOC	Sample Total Weight (Kg)	Fine Soil and Gravel <10mm (%)	Coarse Inert Particles >10mm (%)	TOC Fine Soil as Whole (%)	TOC Remaining Soil as Whole (%)	Average TOC (%)
BH101	1	73.35	26.65	2.71	0.00	2.71
TP101	1	93.29	6.71	7.43	0.00	7.43
WS102	1	85.42	14.58	0.88	0.00	0.88
WS103	1	62.39	37.61	4.5	0.00	4.5
WS105	1	44.85	55.15	3.38	0.00	3.38
Site Average	/	/	/	/	/	3.78

Discussion

Samples retrieved from the site revealed an average TOC value of 3.78%, the samples generally consisted of Made Ground comprising grey / black ashy fine to coarse grained sand, with occasional graded granular limestone hardcore and cobbles and occasional subangular to angular gravel with occasional plastic bags, metal, glass, brick and wood fragments. Also noted was brown sandy clay with fine to medium sand bands and fine to medium brick, concrete and glass fragments.

Using the Pragmatic Approach to Ground Gas Risk Assessment (RB17) the TOC and forensic testing has given a site wide average TOC value of 3.78% with the levels of TOC ranging from 0.88% to 7.43%. This classifies the site as a Characteristic Situation 3 and therefore indicates that ground gas monitoring is required on this site, additionally, the CS4 classification to be adopted is suitable, albeit precautionary for this site.

9.8 Groundwater Protection Measures

There is no evidence at this stage of significant perched water either in the made ground or in the natural stratum encountered on site that would suggest special groundwater protection measures to the building foundations are required.

10 Land Contamination Risks and Remediation Requirements

10.1 Revised Conceptual Model

Based on the findings of the human health, the preliminary conceptual model has been revised and finalised as shown in *Figure 3*. The drawing shows all contaminant linkages from the preliminary conceptual model, identifying those which remain relevant.

10.2 Discounted Contaminant Linkages

Controlled Waters – Groundwater & Surface Waters

Groundwater Resources

The UK DWS Leachate screening identified concentrations of Lead, Sulphate and Benzo(a)pyrene that could pose a risk to the Secondary B aquifer. However, due to the likely depth of groundwater and the effects of natural attenuation, the risk is unlikely to be significant. Therefore, the risk to Controlled Waters (ground & surface waters) is considered **LOW**.

NOTE: Although it is recognised that piling operations could potentially generate a preferred pathway to the underlying Secondary B Aquifer, these risks will be mitigated and communicated via a Piling Risk Assessment within *Appendix D*.

Surface Water Resources

The EQS Leachate screening identified concentrations of Copper, Lead, Zinc, Anthracene, Fluoranthene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Benzo(ghi)perylene and Indeno(123cd)pyrene that could pose a risk to the local surface water features. However, the nearest surface water feature is noted 183m southeast of the site, and relates to an unnamed Tertiary River, as such the risk is unlikely to be significant.

10.3 Remaining Potential Contaminant Linkages

Long Term Human Health

Currently the site does pose a risk to human health, and remediation works will be required as part of the development to ensure that the site is suitable for occupation and no longer poses a risk to human health.

Ground Gas

Based on four ground gas monitoring visits, Sutcliffe classify the site as a Characteristic Situation 2 however, both HSP Consulting and SKM conclude in their site investigation reports that the site and the adjacent site both fall into a Characteristic Situation 4. In light of these classifications, the fact that our ground

gas monitoring data is insufficient due to the encroaching landfill boundary onsite and correspondence with the local authority, Sutcliffe also believe that a worst case scenario should be adopted and the site classification should be increased to a lower bound **Characterisation Situation 4**.

NOTE: Although it is recognised that piling operations could potentially generate a preferred pathway for ground gas, these risks are mitigated and communicated via a Piling Risk Assessment in Appendix D.

Table 10.1: Summary of Remaining Contaminant Linkages

1. Hazard Identification		2. Hazard Assessment				3. Risk Estimation		4. Risk Evaluation	5. Managing the Risk
Contaminant Source		Pathway		Receptor		Consequence of risk being realised	Probability of risk being realised	Classification	Action required
Table 3.1: Sources		Table 3.2: Receptors		Table 3.3: Pathways					
S1	Historical Land Use / Made Ground (on site)	P1	Direct contact	R1	Future site users,	Medium	Likely	Moderate	Currently the site does pose a risk to human health, and remediation works will be required as part of the development to ensure that the site is suitable for occupation and no longer poses a risk to human health.
		P2	Ingestion	R2	Construction workers	Medium	Likely	Moderate	
		P3	Inhalation of dust / vapours	R4	Adjacent site users	Medium	Unlikely	Low	
		P1	Direct contact	R5	Infrastructure / Buried Services	Mild	Unlikely	Very Low	Based on four ground gas monitoring visits, Sutcliffe classify the site as a Characteristic Situation 2 however, both HSP Consulting and SKM conclude in their site investigation reports that the site and the adjacent site both fall into a Characteristic Situation 4. In light of these classifications, the fact that our ground gas monitoring data is insufficient due to the encroaching landfill boundary onto the site and correspondence with the local authority, Sutcliffe also believe that a worst case scenario should be adopted and the site classification should be increased to a lower bound Characterisation Situation 4.
		P5	Vertical and lateral migration of ground gas	R1	Future site users,	Severe	Low	Moderate	
				R2	Construction Workers	Severe	Low	Moderate	
				R4	Adjacent	Severe	Unlikely	Moderate / Low	
				R5	Infrastructure / Buried Services	Severe	Unlikely	Moderate / Low	

10.4 Additional Works Required to Assess Outstanding Contaminant Linkages

Based on the proposed development plan, a remediation strategy will be required which is to include recorded documentation of all material removed from site and validation of all imported material. Additionally, site derived material scheduled for reuse would need to be designed to assess the risks to future site users.

10.5 Remediation Requirements

Human Health – Soils

Currently the site does pose a risk to human health, and remediation works will be required as part of the development to ensure that the site is suitable for occupation and no longer poses a risk to human health.

Human Health – Ground Gas

Despite the fact that Sutcliffe currently classify the site as a Characteristic Situation 2, HSP Consulting ground gas monitoring data indicates the site falls into a Characteristic Situation 4, additionally SKM who carried out site investigation works on the adjacent site also concluded that a characterisation situation 4 was also required. In light of these classifications, the fact that our ground gas monitoring data is incomplete due to a fire on the premises and correspondence with the local authority, Sutcliffe also believe that a worst case scenario should be adopted and the site classification should be increased to a **Characterisation Situation 4**.

NOTE: Although it is recognised that piling operations could potentially generate a preferred pathway for ground gas, these risks are mitigated and communicated via a Piling Risk Assessment in Appendix D.

11 Recommendations

11.1 Further works

The following actions are recommended:

- Submit the *Rev B Phase II Ground Assessment Report* to the LPA for discharge of contaminated land conditions assigned to the site.
- Submit *Rev A Phase III Remediation Strategy* to the LPA for discharge of relevant conditions assigned to the site.
- Consultation with the appointed Piling Specialist following detailed design to ensure no preferred pathways exists to identified receptors.
- Liaise with the appointed Waste Disposal Company regarding the disposal routes and associated costs for removal of material surplus to requirements to a suitably licenced facility.
- Design SMMP – management of material on and off site.
- Good hygiene practices should be employed during construction work, in addition, the findings of this investigation should be included within the contractors H&S file and an assessment of risks associated with short term human health completed. No consumption of food or smoking should occur without prior hand washing. If dust is encountered, dust masks should be worn and dust suppression employed.

References

BRE Special Digest (1991) 'Sulphate and acidic resistance of concrete in the ground' **363**

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Appendix A – General Notes

Generic Notes – Sutcliffe Investigations

Environmental Setting

General

Third party information obtained from the British Geological Survey (BGS), the Coal Authority, the Local Authority etc is presented in the Correspondence Appendix of the Geoenvironmental Report.

Geology, Mining & Quarrying

In order to establish the geological setting of a site, Sutcliffe Investigations refer to BGS maps for the area and the relevant geological memoir.

A coal mining report is obtained from the Coal Authority. Further information is sourced from the Local Authority and by reference to current and historical OS plans.

Landfills

Sutcliffe Investigations obtain data from the Landmark Information Group, the Environment Agency and the Local Authority with respect to known areas of landfilling within 250m of the proposed development site. Reference is also made to historical OS plans, which are inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Radon

Radon is a colourless, odourless gas, which is radioactive. It is formed in strata that contain uranium and radium (most notably granite) and can move through fissures eventually discharging to atmosphere, or the spaces under and within buildings. Where radon occurs in high concentrations, it can pose a risk to health.

In order to assess potential risks associated with radon gas, Sutcliffe Investigations refer to BRE Report BR211, 1999: *“Radon: guidance on protective measures for new dwellings”*.

BR211 provides a preliminary indication of the measures required for a particular site, but it is also often necessary to request a Stage 2 Protective Measures Site Report from the BGS.

The level of protection needed is site-specific and is determined by reference to the radon potential map for the area followed by a geological assessment of the site. This information is contained in the Annexes of BR211.

Annex A – derived from statistical analysis of radon measurements in existing houses carried out by the NRPB and grouped on 5km grid.

Annex B – based on an assessment of the same radon measurements grouped by geological units. The maps show the 5km grid squares underlain completely or in part, by geological units which potentially exceed the action levels for radon protective measures. The grid squares are coded according to highest potential within the square. In many cases the actual geological radon potential varies considerably within a grid square.

Sutcliffe Investigations adopt the following procedure when assessing risk associated with radon.

Firstly, Annex A maps are reviewed to see whether the site requires full, basic or no measures. If the site is in a dark brown square, full radon protection measures are required. If the site is in a light brown square, reference should be made to Annex B.

Secondly, Annex B maps are reviewed to see whether a further geological assessment is required which may result in upgrading the result from Annex A. If a site lies within a shaded square, it may require radon protection and Sutcliffe Investigations request a Stage 2 Protective Measures Site Report from the BGS.

If the site is in a square that is not coloured or shaded in either set of maps then no radon protection is needed and therefore a BGS Report is not normally necessary.

The BGS geological assessment involves checking whether the site is on or close to a geological unit that has statistically been found to have elevated radon potential. The geological assessment is based on either 1:50,000 or the 1:250,000 scale data. The search area specified as part of the request is increased by 50m in areas where 1:50,000 data is available and by 500m in areas with 1:250,000 scale data to allow for potential inaccuracies in the position of boundaries. The BGS report indicates the highest level of protection required within the search area and its buffer zone.

When requesting a BGS report, Sutcliffe Projects select the search radius carefully, since too large a search radius may result in the inclusion of areas underlain by geological units of a higher radon potential, thereby giving rise to recommending too high a level of protection.

The report also includes (where available), a list of the geological units included in the assessment. Sutcliffe Investigations check that these actually underlie the site, rather than the buffer zone only.

On the basis of radon measurements in dwellings and on their geological interpretation, the BGS report stipulates the level of protective measures required for the proposed development site, and this could be:

1. no measures
2. basic measures or
3. full measures

Details of these measures are provided in the Hazardous Gas section of this Geoenvironmental Report.

Hydrogeology

Sutcliffe Investigations obtain information from the Environment Agency (EA) and the Landmark Information Group with respect to:

- groundwater quality
- recorded pollution incidents
- licensed groundwater abstractions

Reference is also made to the EA document "Policy and Practice for the Protection of Groundwater" (1998) and the relevant Groundwater Vulnerability Map.

Bedrock and any overlying granular Drift deposits are classified by the EA.

Major aquifers: *"Highly permeable formations, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public water supply and other purposes".*

Minor aquifers: *"Fractured or potentially fractured rocks which do not have a high primary permeability, or other formations or variable permeability. Although these aquifers will seldom produce large quantities of water for abstractions, they are important both for local supplies and in supplying base flow to rivers".*

Non-aquifers: *"Formations which are generally regarded as containing insignificant quantities of groundwater. However groundwater flow through such rocks, although imperceptible, does take place and needs to be considered in assessing the risk associated with persistent pollutants. Some non-aquifers can yield water in sufficient quantities for domestic use".*

Groundwater vulnerability is determined by 4 variables:

1. The presence and nature of overlying soil (the weathered zone affected by living organisms; soil in the UK can extend up to 2m in depth). Physical properties of the soil affect the downward passage of water and its ability to attenuate pollutants. The EA make reference to a three-fold classification of soil types:-
 - Soils of **low** leaching potential are defined as “soils in which the pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants”.
 - Soils of **intermediate** leaching potential are defined as “soils which have a moderate ability to attenuate diffuse source pollutants or in which it is possible that some non-absorbed diffuse source pollutants and liquid discharges could penetrate the soil layer”.
 - Soils of high leaching potential are defined as “soils with little ability to attenuate diffuse source pollutants and in which non-absorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or to shallow groundwater”.

In urban areas and restored mineral workings the soil information is based on fewer observations than elsewhere. A worst-case vulnerability (H) is therefore assumed for these areas and for current mineral workings by the EA. All are given a designation of **HU** unless proved otherwise.
2. The presence and nature of Drift, which often overlies bedrock. Where Drift is of substantial thickness and low permeability, it can provide an effective barrier to surface pollutant migration. Permeability Drift is classified as a Minor Aquifer except where it is in probable hydraulic continuity with a Major Aquifer, where it is regarded as part of the Major Aquifer unless proven otherwise by site investigation.
3. The nature of the geological strata (bedrock). Rocks that contain groundwater in exploitable quantities are called aquifers.
4. The depth of the unsaturated zone; i.e. that part of the aquifer which lies above the water table.

The EA have also designated Source Protection Zones, which are based on proximity to a groundwater source (springs, wells and abstraction boreholes). The size of a Source Protection Zone may vary from tens to several thousand hectares.

Hydrology

Sutcliffe obtains information from the Environment Agency and the Landmark Information Group with respect to:

- Surface water quality
- Recorded pollution incidents
- Licensed abstractions (groundwater & surface waters)
- Licensed discharge consents
- Site susceptibility to flooding

The EA have set **water quality** targets for all rivers. These targets are known as River Quality Objectives (RQOs). The water quality scheme used to set RQO planning targets is known as the River Ecosystem scheme. The scheme comprises five classes (RE1 to RE5) which reflect the chemical quality requirements of communities of plants and animals occurring in our rivers.

General Quality Assessment (GQA) grades reflect actual water quality. They are based on the most recent analytical testing undertaken by the EA. There are six GQA grades (denoted A to F) defined by the concentrations of biochemical oxygen demand, total ammonia and dissolved oxygen.

The susceptibility of a site to **flooding** is assessed by reference to a Flood Map on the Environment Agency's website. These maps provide shows natural floodplains – areas potentially at risk of flooding if a river rises above its banks or high tides and stormy seas cause flooding in coastal areas.

There are different kinds of area shown on the Flood Map:

1. Dark blue areas could be flooded by the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or by a river by a flood that has a 1% (1 in 200) or greater chance of happening each year.
2. Light blue areas show the additional extend of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance or occurring each year.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

The maps also show all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The Agency's assessment of the likelihood of flooding from rivers and the sea at any location is based on the presence and effect of all flood defences, predicted flood levels and ground levels.

It should also be noted that as the floodplain shown is the 1 in 100 year (or 1 in 200 year as appropriate) areas outside this may be flooded by more extreme floods (e.g. the 1 in 1000 year flood). Also, parts of the areas shown at risk of flooding will be flooded by lesser floods (e.g. the 1 in 5 year flood). In some places due to the shape of the river valley the smaller floods will flood a very similar extent to larger floods but to a lesser depth.

If a site falls within a floodplain, it is recommended that a flood survey be undertaken by a specialist consultant who can advise on appropriate mitigating measures; i.e. raising slab levels, provision of storage etc.

COMAH & Explosive Sites

Sutcliffe Investigations obtain information from the Landmark Information Group with respect to COMAH or explosive sites within 1km of the proposed development site. Sutcliffe Investigations' report refers to any that are present and recommends that the Client seeks further advice from the HSE.

Areas around COMAH sites (chemical plants etc) are zoned with respect to the implementation of emergency plans. The HSE are a statutory consultee to the local planning authority for all COMAH sites. The COMAH site may have to revise its emergency action plan if development occurs. This might be quite straightforward or could entail significant expenditure. Consequently, the COMAH site may object to a proposed development (although it is the Local Authority who have final say and they are likely to place more weight on advice from the HSE).

Preliminary Conceptual Ground Model

The site's environmental setting (and proposed end use) is used by Sutcliffe Investigations to assess the significance of any contamination encountered during the subsequent ground investigation.

Generic Notes – Sutcliffe Geoenvironmental Investigations

2. Ground Investigation Fieldwork

General

Sutcliffe Ground Investigations are undertaken in accordance with current UK guidance including:

- BS5930:1999 “Code of practice for site investigation”
- BS10175:2001 “Code of practice for the identification of potentially contaminated sites”
- Contaminated Land Reports 1 to 6, most notably CLR Report No. 4 “Sampling strategies for contaminated land”
- “Guidance on the protection soil sampling strategies for land contamination” – EA R&D Technical report P5-066/TR (2001)
- AGS: 1996 “Guide to the selection of Geotechnical Soil Laboratory Testing”

Exploratory hole logs are represented in Appendices to this Geoenvironmental Report. These logs include details of the:

- Investigation technique adopted
- Samples taken
- Descriptions of the solid strata and any groundwater encountered
- Results of any insitu testing
- Any gas/groundwater monitoring well installed

Exploratory Hole Locations

Exploratory hole locations are selected by Sutcliffe Investigations, prior to commencement of fieldwork, to provide a representative view of the strata beneath the site and to target potential contaminant sources identified during the preliminary investigation (desk study). Additional exploratory locations are often determined by the site engineer in light of the ground conditions actually encountered; this enables better delineation of the depth and lateral extent of organic contamination, poor ground, relict structures etc.

Investigation Techniques

Ground conditions can be investigated by a number of techniques; the procedures used are in general accordance with BS5930: 1999 and BS1377: 1990. Techniques most commonly used by Sutcliffe Investigations include:

- Machine excavated trial pits, usually equipped with a backactor and a 0.6m wide bucket
- Cable percussive (Shell & Auger) boreholes, typically using 150mm diameter tools and casing
- Window or windowless sampling boreholes. Constraints associated with existing buildings, operations and underground service runs can render some sites partly or wholly inaccessible to a mechanical excavator. In such circumstances, window sampling is often the most appropriate technique. A window sampling drilling rig can be manoeuvred in areas of restricted access and results in minimal disturbance of the ground (a 150mm diameter tarmac/concrete core can be lifted and put to one side). However, it should be noted that window sampling allows only a limited inspection of the ground (especially made ground with a significant proportion of coarse material).
- Rotary percussive open-hole probeholes are typically drilled using a tricone rock roller bit with air as the flushing medium. Probeholes are generally lined through made ground with temporary steel casing to prevent hole collapse.

Where installed, gas/groundwater monitoring wells typically comprise a lower slotted section, surrounded by a filter pack of 10mm non-calcareous gravel and an upper plain section surrounded in part by a bentonite seal and in part by gravel or arisings. The top of the plain pipe is cut off below ground level and the monitoring well protected by a square, stopcock type manhole cover set in concrete, or the plain pipe is cut off just above ground level and the well protected by 100mm diameter steel borehole helmet set in concrete.

Monitoring well details, including the location of the response zone and bentonite seal are presented on the relevant exploratory hole logs.

Insitu Testing

Where relative densities of granular materials given on the trial pit and window sample logs are based on visual inspection only, they do not relate to any specific bearing capacities. However, wherever possible, Sutcliffe Investigations employ a mackintosh probe to assess relative density. Mackintosh probe results can be related to approximate allowable bearing capacities.

The relative densities of granular materials encountered in cable percussive boreholes are based on Standard Penetration Test (SPT) results. SPTs are carried out boreholes, in accordance with BS 1377 1990, Part 9 Section 3.3. Where full penetration (600mm) is not possible, N values are calculated by linear extrapolation and are shown on the logs as $N^* = x$.

The strength of cohesive deposits is determined using a hand shear vane.

Shear strength test results reported on trial pit logs are considered to be more reliable than those reported on window sample logs. Significant sample disturbance occurs during window sampling and consequently shear strength results on disturbed window samples are generally lower than results obtained during trial pitting, in-situ or in large excavated blocks.

Sampling

Representative soil/fill samples are taken at regular intervals from the exploratory holes to assist in description of the ground and to allow selected laboratory testing to be performed. The type of sample taken is dependent on the nature of the stratum and the purpose of the analysis.

Where the soils encountered contain a significant proportion of coarse grained material, truly representative samples are not typically obtained – only the finer fraction is placed in sample containers. However, a visual estimate of the amount of coarse material is made on site.

NB: Coarse constituents not sampled are defined as: coarse gravel, cobble and boulder (i.e. any 'particles' with an average diameter greater than 20mm).

Occasionally, unrepresentative 'spot' samples are also taken from some exploratory locations for contaminant analysis, typically where unusual, localised pockets of materials are encountered.

Samples of soil for chemical testing are placed into 1 litre plastic tubs prior to delivery to the selected laboratory. Samples of water are taken in one litre brown glass bottles and stored in cool boxes, at a temperature of approximately 4°C, until delivery to the selected laboratory. Soil/fill samples for organic analysis are also stored in cool boxes.

Groundwater

Where encountered during fieldwork, groundwater is recorded on exploratory hole logs. If monitoring wells are installed, groundwater levels are also recorded on one or more occasions after completion of the fieldwork.

It should be borne in mind that the rapid excavation rates used during a ground investigation may not allow the establishment of equilibrium water levels. Water levels are likely to fluctuate with season/rainfall and could be substantially higher at wetter times of the year than those found during this investigation.

Long term monitoring of standpipes or piezometers is always recommended if water levels are likely to have a significant effect on earthworks or foundation design.

Description of Strata

The soils encountered during an Sutcliffe's ground investigation are described (logged) in general accordance with BS 5930. The descriptions and depth of strata encountered are presented on the exploratory hole logs and summarised in the Ground Conditions section within the main body of text.

The materials encountered in the trial pits are logged, samples taken and tests performed on the in-situ materials in the excavation faces, to depths of up to 1.2m; below this depth these operations are conducted at the surface on disturbed samples recovered from the excavation.

Key to Exploratory Hole Logs

Keys to logs are presented in the Appendix(ces) containing the logs. These are two keys – Symbols and Legends and Terms and Definitions.

Health and Safety

All work was carried out in accordance with the procedures detailed in the DGEL Health and Safety Manual and SUKD health and Safety Procedures.

Generic Notes – Sutcliffe Geoenvironmental Investigations

3. Geotechnical Laboratory Tests

General

Soil Samples are delivered to the laboratory for testing along with a schedule of testing drawn up by Sutcliffe Investigations. All tests are carried out in accordance with BS 1377:1990.

The test results are presented as received in an Appendix to this Geoenvironmental Report.

The following laboratory testing are routinely carried out on a selection of samples:

- Atterberg limits & moisture contents
- Soluble sulphate & pH

The additional tests are typically only scheduled where significant earthworks regrade is anticipated:

- Grading
- Compaction tests
- Particle density

Atterberg Limits & Moisture Content

The Liquid and Plastic Limits of samples of natural in-situ clay are determined using the cone penetrometer method and the rolling thread test. These tests enable determination of an average Plasticity Index (PI) for each “type” of clay, although judgement is applied where variable results are reported.

PI can be related to shrinkability (low, medium or high) and then to minimum founding depth. Sutcliffe Investigations typically only consider a soil to be shrinkable if the proportion finer than 63µm is > 35%.

PI results are compared against guidance given in the NHBC Standards, Chapter 4.2 (revised April 2003) which advocates the use of modified Plasticity Index (I'p) defined as:

$$I'p = Ip * (\% < 425\mu m / 100)$$

ie if PI is 30%, but the soil contains 80% < 425µm, then I'p = 30 * 80/100 = 24%

It should be noted that in accordance with the requirements of BS 1377, the % passing the 425µm sieve is routinely reported by testing labs.

Sutcliffe Investigations apply engineering judgement where PI results are spread over a range of classifications. Consideration is given to:

- The average values for each particular soil type (ie differentiate between residual soil and alluvium)
- The number of results in each class and
- The actual values

Unless the judgement strongly indicates otherwise, Sutcliffe Investigations typically adopt a conservative approach and recommend assumption of the higher classification.

Soluble Sulphate and pH

Sulphates in soil and groundwater are the chemical agents most likely to attack sub-surface concrete, resulting in expansion and softening of the concrete to a mush. Another common cause of concrete deterioration is groundwater acidity.

The rate of chemical attack depends on the concentration of aggressive ions and their replenishment at the reaction surface. The rate of replenishment is related to the presence and mobility of groundwater.

Sutcliffe Investigations refer to BRE Special Digest 1 (SD1) "Concrete in aggressive ground. Part 1: Assessing the aggressive chemical environment" (2001). SD 1 provides definitions of:

- The nature of the site (Greenfield, brownfield or pyretic)
- The groundwater regime (static, mobile or highly mobile)
- The Design Sulphate Class (DC Class) and
- The Aggressive Chemical Environment for Concrete (ACEC Class)

Sutcliffe reports clearly state each of the above for the site being considered.

The concentrations of sulphate in aqueous soil/fill extracts are determined in the laboratory using the gravimetric method. The results are expressed in terms of SO_4 for direct comparison with BS 5328:1997. The pH value of each sample was determined by the electrometric method.

SD1 also discusses determination of "representative" sulphate concentration from a number of tests. Essentially if <10 samples of a given soil-type have been tested, the highest measured sulphate concentration should be taken. If >10 samples have been tested, the mean of the highest 20% of the sulphate test can be taken. With respect to groundwater, the highest sulphate concentration should always be taken.

With respect to pH (soil & groundwater) the value used is the lowest value if <10 samples have been tested and the mean of the lowest 20% if >10 samples have been tested.

Generic Notes – Sutcliffe Investigations Geoenvironmental Investigations

4. Contamination Laboratory Analysis & Interpretation (including WAC)

General

An assessment of potential contaminants associated with the former usages of the site is undertaken with reference to CLR 8 “*Potential contaminants for the assessment of land*” and the relevant DETR Industry Profile(s).

Common Inorganic Contaminants

These include:

- Metals, most notably cadmium, copper, chromium, mercury, lead, nickel and zinc
- Semi-metals, most notably arsenic, selenium and (water soluble) boron
- Non-metals, most notably sulphur
- Inorganic anions, most notably cyanides (free & complex), sulphates, sulphides and nitrates

With respect to the terminology used by most analytical laboratories:

Total cyanide = Free cyanide + Complex cyanide

Total cyanide (CN) is determined by acid extraction; whereas free cyanide is the water soluble fraction.

Complex cyanide is “bound” in compounds and is hard to breakdown. Laboratory determination of complex CN involves subjecting the sample to uv digestion for determination of both free and total CN.

Thiocyanate (SCN) is a different species combined with sulphur.

Elemental sulphur (S) and free sulphur are the same. Total sulphur is all forms, including that present in sulphates (SO₄) sulphates etc.

There are 2 forms of chromium (Cr), chromium VI and chromium III. Chromium VI is the more toxic of these. In soils, total chromium is determined by a strong aqua regia acid digestion. Chromium VI is an empirical method based on a water extract test.

Common Organic Contaminants

Petroleum hydrocarbons are a mixture of hydrocarbons produced from the distillation of crude oil. They include aliphatics (alkanes, alkenes and cycloalkanes), aromatics (single or multi benzene ringed compounds) and hydrocarbon-like compounds containing minor amounts of oxygen, sulphur or nitrogen.

Petroleum hydrocarbons can be grouped based on the carbon number range:-

GRO – Gasoline Range Organics (typically C₆ to C₁₀). Also referred to as PRO – Petroleum Range Organics

DRO – Diesel Range Organics (typically C₁₀ to C₂₈)

LRO – Lubricating Oil Range Organics (typically C₂₈ to C₄₀)

MRO – Mineral Oil Range Organics (typically C₁₈ to C₄₄)

However, it should be borne in mind that the terms “GRO” and “DRO” analysis are purely descriptive terms, the exact definition of which varies.

Total Petroleum Hydrocarbons (TPH) is also a poorly defined term; some testing laboratories regard TPH as hydrocarbons ranging from C₅ – C₄₀, whereas others define TPH as C₁₀ – C₃₀.

The composition of a TPH plume migrating through the ground can vary significantly; this is primarily dictated by the nature of the source (eg petrol, diesel, engine oil etc). Furthermore, different hydrocarbons are affected differently by weathering processes and this can result in further variation in the chemical composition of the TPH.

Gasoline contains light aliphatic hydrocarbons rapidly (especially within the C4 to C5 range) that will evaporate. The aromatic hydrocarbons in gasoline are primarily benzene, toluene, ethylbenzene and xylenes, referred to as BTEX. Small amounts of polyaromatic hydrocarbons (PAHs) such as benzo(a)pyrene may also be present.

Diesel and light fuel oils have higher molecular weights than gasoline. Consequently, they are less volatile and less water soluble. About 25 to 35% is composed of aromatic hydrocarbons. BTEX concentrations are generally low.

Heavy Fuel Oils are typically dark in colour and considerably more viscous than water. They contain 15 to 40% aromatic hydrocarbons. Polar NSO compounds are also present.

Lubricating Oils are relatively viscous and insoluble in groundwater. They may contain 10 to 30% aromatics, including the heavier PAHs. NSO compounds are also common.

Polycyclic Aromatic Hydrocarbons (PAHs) have more than two fused benzene rings as a structural characteristic. PAH compounds are present in both petrol and diesel, although insignificantly lower concentrations than in coal tars. Certain PAH compounds are carcinogenic (Benzo(a)pyrene) and/or mobile in the environment (naphthalene).

Polychlorinated Biphenyls (PCBs)

Volatile Organic Compounds (VOCs) The volatile organic compound (VOC) headspace concentration of all soil samples was made with a photoionization detector (PID) fitted with a 10.2 eV lamp. This gives a semi-quantitative VOC concentration record as parts per million (ppm) (Vol/Vol). Prior to the VOC headspace reading, the background levels of VOCs were recorded. The PID was recalibrated with standard isobutylene in zero air after every 10 headspace readings.

Semi-Volatile Organic Compounds (sVOCs)

Phenols

Solvents, pesticides, herbicides

Dioxins & furans

Methods of Analysis (Organic Compounds)

Toluene Extractable Matter (TEM) results provide a screening test for organic contamination. The sample is air dried at 30°C and ground prior to addition of the solvent (toluene). The solvent extraction is aggressive and most organic compounds (fuels, oils, tars, humic material, animal fats and vegetable oil) are dissolved, as are some other inorganic contaminants such as sulphur. However, the volatiles (lighter fuel fraction etc) are lost during evaporation of the solvent.

Total Petroleum Hydrocarbon (TPH) by IR (also known as mineral oil by some testing laboratories) is undertaken on "as received" samples. Tetrachloroethylene is the solvent, and fluorosil is used to removed humic material, animal fats and vegetable oil. Consequently this analysis detects a wide range of "mineral" organics from volatiles (BTEX and gasoline) through diesel and oils to tars (including the very heavy, stable tars such as asphalt and bitumen).

TPH by GC-FID is more refined analytical technique which only detects hydrocarbons (aliphatic and aromatic) in the range C₁₀ to C₄₀ (volatiles, heavy tars, humic material and sulphur are not detected). The laboratory can provide a breakdown of the TPH results into diesel range organics (**DRO**) and heavier lubricating oil range organics (**LRO**).

GRO (PRO) by GC-FID analysis detects the more volatile C₆ – C₉ hydrocarbons (aliphatic and aromatic) including those organic compounds present in petrol.

Speciated VOC (by GC-MS) analysis quantifies the concentrations of 30 USA-EPA priority compounds. These include chlorinated alkanes and alkenes (in the molecular weight range chloroethane to tetrachloroethane); trimethylbenzenes; and the 4 BTEX compounds (benzene, ethyl-benzene, toluene & xylene).

Speciated sVOC by (GC-MS) analysis quantifies the concentration of a variety of organic compounds, including the 16 USA-EPA priority PAHs, phenols, 7 USA EPA priority PCB congeners, herbicides & pesticides.

Note: PAHs are hydrocarbons and consequently (where present) will be picked up when scheduling TPH by GC-FID. Naphthalene (the lightest PAH) is also one of the 58 US EPA VOCs.

Speciated TPH by GC-FID provides a “banded” TPH, initially split into aromatic and aliphatic fractions and then further divided into fraction specific carbon bandings based upon behavioural characteristics.

Note: Risk assessment models require physiochemical properties (solubilities, toxicities etc) of compounds in order to model their behaviour in the environment. These physiochemical properties cannot be derived from a single “TPH”, “GRO” or “DRO” value. However, the carbon banded fractions can be used in risk assessment models.

If the relative proportion of each carbon banding within the “TPH” impact at a site is known, the risks posed by each individual fraction can be assessed and a simple back calculation applied to calculate an overall “TPH” screening value based upon the percentage weight fraction of each banding present in the “TPH”. Specialised analytical techniques and data interpretation skills are required to identify each carbon banding.

Current Guidance

The UK approach to the consideration of contaminated land is based upon the principles of risk assessment. This in turn is founded upon the use of so called source⇒ pathway⇒ target principles in order to establish the presence or potential presence of a pollutant linkage.

Sutcliffe Investigations adopt a tiered approach to risk assessment, consistent with UK guidance and best practice. The initial step of such a risk assessment (or Tier 1) is the comparison of site data with appropriate guidance levels, intervention levels or remedial targets.

In March 2002 DEFRA and the Environment Agency published a series of technical research papers (R & D Publications CLR 7, 8, 9 and 10) introducing the UK approach to the assessment of risk to **human health** from land contamination. This methodology and approach represents current scientific knowledge and thinking. The overall methodology also included the Contaminated Land Exposure Model (CLEA) and some Soil Guidance Values (SGV's).

At the time of writing this report, these guidelines only address seven contaminants and the development of both the CLEA model and additional SGV's is ongoing. Where published, SGV's have been utilised as intervention values for the purpose of an initial Tier 1 assessment.

Where SGV's were not published at the time of writing this report, appropriate Tier 1 human health related assessment have been based upon information that was best available at the time of the study.

With respect to the assessment of potential **phytotoxic effects** of contaminants, Sutcliffe Investigations refer to “The Soil Code” (Maff, 1998) for copper and zinc. The CLEA SGV is adopted for nickel.

The potential risk to **building materials** is considered through reference to relevant BRE Digests, with particular emphasis on BRE Special Digest 1, ‘Sulphate and Acid Resistance of Concrete in the Ground’, 2001.

With respect to the interpretation of the calorific values, at present there are no accepted methods to assess whether a sample is combustible and under what circumstances it might smoulder. Some guidance is given in ICRCL Note 61/84 “Notes on the fire hazards of contaminated land” which states that:

“In general it seems likely that materials whose CV's exceed 10MJ/kg are almost certainly combustible, while those with values below 2MJ/kg are unlikely to burn”.

Tier 1 **groundwater** risk assessments are undertaken by comparing leachate concentrations with the appropriate water quality standard. Depending upon the specific characteristics and environmental setting of the site the appropriate standard is likely to be one of the following:

- Water Supply (Water Quality) Regulations 1989
- Environmental Quality Standards (for Freshwater)
- The Surface Waters (Abstraction for Drinking Water) Regulations

The tier 1 risk assessment of **landfill gas** is undertaken through reference to the following documents:

- Approved Document C, Building Regulations 1991
- CIRIA Report 149, “Protecting Development from Methane”, 1995

Should any Tier 1 criteria be exceeded, then three potential courses of action are available. (The first is only applicable in terms of human health, but the second and third could also be applied to groundwater or landfill gas).

- Undertake further statistical following the approach set out in Appendix A of CLR 7 in order to determine whether contaminant concentrations of inorganic contaminants within soil/fill actually present a risk (only applicable to assessing the risk to human health).
- Based on a qualitative risk assessment, advocate an appropriate level of remediation to “break” the pollutant linkage – for example the removal of the contaminated materials or the provision of a clean cover.
- Carry out a more detailed quantitative risk assessment in order to determine whether contamination risks actually exist.

However, the issue of **averaging area** requires further consideration. CLR 7 is ambiguous and could be interpreted as advocating the concept of a single garden as an appropriate averaging area.

This concept has massive implications with respect to ground investigation design and cost. To comply, investigations for residential development on brownfield sites would need to recover and analyse about 6 samples from each garden; this implies exploratory locations on a very tight grid, perhaps 5m to 10m spacings, with a huge increase in the number of samples analysed (cf test schedules currently issued by most practitioners).

In any case, Sutcliffe Investigations consider the concept of a single garden as an averaging area to be inappropriate. Statistical analysis of sample results by fill type, and/or by former use in a given sub-area of the site (i.e. with reference to the Conceptual Site Model), is considered a more appropriate methodology.

Analysis by soil/fill type is appropriate for essentially immobile contaminants associated with a particular fill type, for example arsenic in colliery spoil, metals in ash & clinker, sulphate in plaster-rich demolition rubble etc.

Analysis by former use is appropriate where more mobile contaminants have entered the ground, for example diesel associated with leakage from a former fuel tank, downward migration of leachable metals through granular materials, various soluble contaminants present in a wastewater leaking into the ground via a fractured sewer etc. In these circumstances, it may be appropriate to undertake statistical analysis of sample results from a variety of different soil/fill types. However, consideration would have to be given to factors such as porosity which might influence impregnation of a mobile contaminant into the soil mass; ie contamination would be normally be more pervasive and significant in granular soils than cohesive soils.

There is a suggestion in para 4.7 of CLR 7 that the approach outlined above was intended and the Environment Agency have confirmed that an averaging area can be larger than a single garden, if:

- Contaminant concentrations are within the same statistical population as determined using the maximum value test. The sample data being representative of the averaging area and the mean concentration of the averaging area.
- “Hot spots” are treated as separate zones or averaging areas (as defined by the maximum value test).
- The sampling strategy takes into account uncertainty (spatial heterogeneity) in contaminant concentration

Waste Classification & WAC

In the context of waste soils generated by remediation and/or groundworks activities on brownfield sites, the following definitions (from the Landfill Regulations 2002) apply:

- Inert (e.g. uncontaminated ‘natural soil, bricks, concrete, tiles & ceramics)
- Non-Hazardous (e.g. soil excavated from a contaminated site which contains dangerous substances, but at concentrations below prescribed thresholds).
- Hazardous (e.g. soil excavated from a contaminated site which contains dangerous substances at concentrations above prescribed thresholds).

Dangerous substances include compounds containing a variety of determinants commonly found in contaminated soils on brownfield sites, for example arsenic, lead, chromium, benzene etc.

From 16th July 2005, landfill operators will require Waste Acceptance Criteria (WAC) laboratory data, if soil is classified as **hazardous** and such waste must have been subjected to pre-treatment. However, subject to WAC testing it may be possible to classify it as stable, non-reactive hazardous waste, which can be placed within a dedicated cell within the non-hazardous landfill.

Sutcliffe Investigations typically only include WAC analysis in site investigation proposals and reports, if significant off-site disposal (of soil classified as hazardous waste) is anticipated for example where redevelopment proposals include basement construction etc.

If off-site disposal of soils classified as hazardous waste were undertaken during redevelopment, then WAC analysis should be scheduled at an early stage in the remediation programme.

However, organic compounds (BTEX, TPH, PAH etc) are the most common contaminants that result in soils being classed as hazardous. These contaminants can often be dealt with by alternative technologies (eg by bioremediation or stabilisation) and consequently retention on site is often possible.

It should be noted that **non-hazardous** soil waste can go to a non-hazardous landfill facility; no further testing (eg WAC) is required.

Generic Notes – Sutcliffe Investigations

5. Hazardous Gas

General

Hazardous gas is considered to be any mixture of potentially explosive, toxic or asphyxiating gases, most notably methane, carbon dioxide and oxygen (deficiency).

In addition, radon, a naturally occurring radioactive gas is also considered. Further information about radon is included in Notes 1 – Environmental Setting.

Assessment of potential risks associated with hazardous gas are based on a review of data obtained from the Landmark information Group, the Environment Agency and the Local Authority and the British Geological Survey.

Reference is also made to historical OS plans, which are inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Where landfilling has occurred within 250m of the site boundary, the Local Planning Authority may request a landfill gas investigation in accordance with the Town and Country Planning General Development Order, 1988.

Sources

Potential sources of hazardous gas are:

- Landfill sites
- Made ground, especially where significant depths are present
- Shallow mineworks associated with coal extraction
- Geological strata, including peat, organic silts, coal-bearing strata and limestone (reaction with acidic waters), granite (radon)
- Groundwater can sometimes act as a “carrier” for hazardous gas
- Leakages from pipelines or storage tanks
- Sewers, septic tanks and cess pits

Generation

Wherever biodegradable material is deposited, landfill gas (principally a mixture of methane and carbon dioxide) is likely to be generated by microbial activity. Carbon dioxide is an asphyxiant and toxic; methane is flammable and a mixture containing between 5% and 15% methane by volume in air is explosive. Landfill gas in the ground is unlikely in itself to pose a significant risk, though it may damage vegetation. However, infiltration of landfill gas into confined spaces (e.g. cellars, services, etc) may give rise to considerable risk.

There is no typical figure for the length of time that landfill gas will be evolved, but at many sites significant gas generation continues for at least 15 years after the last deposit of waste.

Migration

Gas migration from a landfill site may occur in several ways. It may migrate through adjacent strata; the distance of migration being dependent on the pressure gradients, volume of gas and permeability of the strata. Where there are faults, cavities and fissures within the strata, gas may move considerable distances. Other migration pathways for gas include man-made features such as mine shafts, roadways and underground services.

Gas migration is influenced by a number of climatic factors, such as atmospheric pressure variations, water table level variations and the influence of a covering of snow or ice over the surface of the site and surrounding area.

Current Guidance

Guidance on landfill gas monitoring control at landfill sites is given two technical memoranda, Waste Management Paper Nos. 26 and 27 published by the Department of the Environment.

Waste Management Paper 27, 1991 recommends that no dwellings should be constructed within 50m of any landfill that has the capacity to produce large volumes of landfill gas. No garden should extend to within 10m of the landfilled waste. However, development closer to landfill has been permitted where a comprehensive gas risk assessment has been completed (typically based on a minimum of 6 to 12 month monitoring programme) and appropriate gas exclusion measures designed.

The current advice with regard to monitoring for landfill gas is that if the trigger value of 1% volume (20% LEL) for methane and 1.5% volume for carbon dioxide is exceeded then remedial/control measures will be required.

It should be noted that the guideline limit for carbon dioxide of 1.5% volume recommended in Waste Management paper No. 27 is the short term (10 minute) occupational exposure limit for carbon dioxide quoted by the Health and Safety Executive in their publication EH40. The long term (8 hour) occupational exposure limit for carbon dioxide is 0.5% volume.

Approved Document C to the Department of the Environment's Building Regulations 1992 requires what where there may be gaseous contamination of the ground but the level of methane is unlikely to exceed 1% by volume, the ground floor of any house or similar small building shall be constructed of suspended concrete and ventilated as described in BRE Digest Report "Construction of New Buildings on Gas Contaminated Land". The document also requires specific design measures to be taken if a level of 5% volume carbon dioxide exists or is exceeded within the ground.

Although the above guidance is still relevant it has been more recently updated within the following documents published by the Construction Industry Research and Information Association (CIRIA).

CIRIA Report 149	'Protecting Development from Methane' (1995)
CIRIA Report 150	'Methane Investigation Strategies' (1995)
CIRIA Report 151	'Interpreting Measurement of Gas in the Ground' (1995)
CIRIA Report 152	'Risk Assessment for Methane and other gases from the ground' (1995)

The above documents are intended to provide advice on how to investigate and deal with the gas contaminated ground with respect to development.

CIRIA Report 149 characterised sites based on the recorded methane/carbon dioxide concentration and emission rates recorded during a suitable gas investigation. Characteristic situation 1 is deemed to be the lowest risk scenario with the risk rating increasing up to 6. The characteristic situations are classified as follows:

Gassing regime in ground			
Methane (% by volume in air)	Carbon dioxide (% by volume in air)	Emission rate ¹ (m/s)	Characteristic situation ²
< 0.1	< 1.5	not detected	1
> 0.1 – 1	> 1.5 – 5	not detected	2
> 1 - 5	< 5	not detected	3
> 5 – 20	< 20	< 0.01	4
> 20	> 20	> 0.01 – 0.05	5
> 20	> 20	> 0.05	6

Notes:

1. Emission rate values measures as equivalent total gas flow velocity from a 50mm diameter borehole: for methods of measurement see Crowhurst and Manchester (1992).
2. Highest measures parameter used as determining factor.

CIRIA Report 151 (1995) identified that there is currently inadequate guidance on trigger concentrations for ground gases. The current emphasis on using gas concentrations for trigger values particularly in Waste Management Paper 27 and the Building Regulations, should be revised to consider gas pressures, borehole flow rates and estimated surface emission rates.

It was concluded that the most important aspect of relating the gas regime below or adjacent to a site, to the risk it poses to any development, is the surface emission rate i.e. how quickly the gas is coming out of the ground. The lower the surface emission rate the lower the risk. This is considered further in the DETR Partners in Technology Report 'Passive venting of soil gases beneath buildings' (September 1997).

CIRIA Report 149 (1995), reference Table 28, reviewed over 100 case studies of development affected by gas to establish current UK practices for gas control. The report classified the gassing regimes found within 6 Characteristic Situations. The highest measures parameter, either methane or carbon dioxide concentration and/or emission rate were used to define the Characteristic Situation for each case history site. The report then related the typical range of mitigation measures that has been adopted at each study site to the characteristic gas situation.

To achieve a more consistent design of protection measures Table 28 of CIRIA 149 was rewritten (Wilson and Card, 1999) in terms of borehole gas volume flow rate and gas concentrations, as reproduced in the table below. This was done to reflect the importance of recognising the gas surface emission rate.

Characteristic situations based on Gas Flux

Characteristic Situation	Limiting CH ₄ Concentration (% v/v)	Limiting CO ₂ Concentrations (% v/v)	Limiting Borehole Flow Velocity (m/s)	Limiting Borehole Gas Volume Flow (litre/hour)	
				CH ₄	CO ₂
1	< 0.1	< 0.1	< 0.005	< 0.035	< 0.035
2	< 1.0	< 1.5	< 0.005	< 0.35	< 0.5
3	< 5.0	< 5.0	< 0.005	< 1.75	< 1.75
4	< 20	< 20	< 0.01	< 14	< 14
5	> 20	> 20	< 0.05	< 70	< 70
6	> 20	> 20	< 0.05	> 70	> 70

Gas Monitoring Procedure

Sutcliffe Investigations adopt a standard gas monitoring procedure, in accordance with CIRIA guidance. This procedure involves the measurement, in the following order of:

- Atmospheric temperature, pressure and ambient oxygen concentration on site immediately prior to and on completion of monitoring.
- Gas emission rate.
- Methane, oxygen and carbon dioxide concentrations using an infra-red gas analyser.
- Standing water level using a dipmeter.

In addition, ground conditions at each sampling location are recorded together with prevailing weather conditions and any other observations such as any vandalism.

Where samples of gas are required for laboratory analysis, Gresham Tubes are used. Gas concentrations in the well are typically recorded immediately before and after retrieval of a sample.

Appendix B – Ciria Guidance Document C552 2001

RISK ASSESSMENT FOR THE WATER ENVIRONMENT

The risk assessment has been developed to provide a greater level of standardisation. It includes relevant elements from TAG (Transport Analysis Guidance) Table 1 relating to the features described as river, floodplain, groundwater and stillwaters, including their attributes/services and selected/modified indicators of quality and possible measures. Two additional columns have been added for 'grading' and 'importance level'. These columns expand on the limited number of examples provided in TAG Table 2. Table 1 has been developed with reference to TAG, Highways Agency's 'New Approach to Appraisal' (NATA), the Water Framework Directive and other sources as referenced in the table.

Table 1 here relies on easily available data to avoid unnecessary data collection. Should inadequate data be available a 'worst case' should be assumed. The table is designed to act as a guide to determining importance and to raise the level of compatibility in predicting the significance of impacts on the water environment.

Once Table 1 has been used to determine the importance of the environmental attributes that may be affected by a particular development project, Tables 3 and 4 of TAG Unit 3.3.11 can be used to estimate the significance of potential impacts. These tables are reproduced here as Tables 2 and 3 respectively. Table 2 provides a methodology for determining impact magnitude. Table 3 is a matrix that allows the significance of the impact to be calculated based on the impact magnitude and the importance of the attribute. The significance of impacts can range from 'insignificant' to 'very significant'.

**Table 1: Water features, their attributes, indicators of quality, grading and importance
(adapted from Table 1 of TAG unit 3.3.11)**

Feature	Attribute / Service	Indicator of Quality	Measure	Grading	Importance Level
River	Water Supply	Chemical water quality	Environment Agency's Chemical General Quality Assessment (GQA)	A B C-D E-F	Very High High Medium Low
		Industrial / agricultural abstractions	Location and volume of abstraction	All abstractions within 2km downstream: >1000m ³ /day 500-1000m ³ /day 50-499m ³ /day <50m ³ /day	Very High High Medium Low
		Drinking water supply	Classification defined within The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996. No 3001 ²	Classification: DW1 or DW2 within critical travel time for pollution downstream DW3 within critical time downstream Not designated	Very High High Medium - Low
	Biodiversity ³	Biological Water Quality	Environment Agency's Biological GQA ¹	A B C-D E-F	Very High High Medium Low
		Fisheries Quality	Fisheries status as defined within the Freshwater Fish Directive 78/659/EEC	Designated salmonid fishery Designated cyprinid fishery Undesignated fishery Not a fishery	Very High High Medium Low

Feature	Attribute / Service	Indicator of Quality	Measure	Grading	Importance Level
River	Transport and dilution of waste product	Surface Water / effluent discharges	Type of discharges with reference to the EC Dangerous Substances Directive (76/464/EEC and Daughter Directives)	All discharges within 2km up or downstream: List I List II Other discharge / no discharge	Very High - High Medium Medium - Low
	Recreation	Riverside access	Presence / absence of route and importance	National trail / cycleway Regional trail Definitive footpath / bridleway No route	Very High High Medium Low
		Presence of clubs/ recreation use	Presence / absence	Club recreation use present No club / recreation use	Very High - High - Medium Low
	Conveyance of flow and material	Presence of water courses	Size of watercourses ⁵	Main River > 10m wide Main River < 10m wide Ordinary watercourse >5m wide Other	Very High High Medium Low
Floodplain	Flood defence	Importance in relation to flood defence	Status of flood plain area	Designated washland Active floodplain Existing defended area Does not flood	Very High High Medium Low
			Return period	> (ie more frequent then) 1 in 25 years < 1 in 25 years <1 in 100 years (urban) <1 in 50 years <1 in 200 years	Very High High Medium Medium Low
Groundwater	Water supply	Industrial / agricultural abstractions	Location and volume of abstraction	All abstraction points within zone of influence of development: >1000m3/day >500-1000m3/day 50-499m3/day <50m3/day	Very High High Medium Low
		Drinking water supply	Presence of potable public supply or private water supply within zone of influence of development	Public supply Private water supply >10m3/day or serves >50 people ⁶ Other private water supply No supply	Very High High Medium Low
		Groundwater vulnerability	Source protection status	Within zone 1,2 or 3 of a source protection zone Not within a source protection zone	Very High High Medium Low
			Classification of aquifer vulnerability	Major aquifer with H soils or I soils or U soils. Minor aquifer with H soils or U soils Major aquifer with L soils. Minor aquifer with L soils or non aquifer	Very High High Medium Low
	Conveyance of flood flows	Acceptance potential of flood flows	Soil type / groundwater table levels ⁸	Gravels with low water table (>1m below infiltration point) Sands with low water table All soil types with high water table Clay	Very High High Medium Low
Stillwaters (lakes and ponds)	Biodiversity ³	Biological water quality	Classification system to be developed under the Water Framework Directive for ecological status / potential		
		Fisheries quality	Fisheries status as defined within the Freshwater Fish Directive 78/659/EEC	Designated salmonid fishery Designated cyprinid fishery Undesignated fishery Not a fishery	Very High-high High - medium Medium - low Low
	Water supply	Use for abstraction	Presence / absence	Abstraction	Very High - High – Medium ⁹
				No abstraction	Low
	Recreation	Presence of clubs / recreation use	Presence / absence	Club recreation use present No club / recreation use	Very High - High - Medium ⁴ Low

Notes to Table 1

- 1 If the river is unclassified and hence has no GQA grade, the quality can be measured or assumptions can be made based on the grade of the nearest classified stretch.
- 2 An importance level of high or very high must also be awarded if the water feature provides more than 10m³/day of drinking water, or serves more than 50 people, which is the definition used in the Water Framework Directive to define drinking water protected areas.
- 3 Conservation value is not included, as this should be included within an ecology/nature conservation assessment.
- 4 This required judgement on a case by case basis because the importance of use by people is being assessed, and they are sensitive to being categorised as unimportant. Careful assessment is thus required, using as much data as possible eg on the facilities, their scale and frequency of use, membership levels and economic value.
- 5 An importance level of 'Medium' or greater must also be awarded if a river has a catchment greater than 10km², as this means that it will be classified as a water body under the Water Framework Directive. Other measures are available for describing the ability of watercourses to convey flow and material (such as the carrying capacity of the channel for flood flows) and could if necessary be substituted.
- 6 Based on criteria given within the Water Framework Directive for features to be designated as drinking water protected areas.
- 7 Adapted from NRA Policy and Practice for the Protection of Groundwater, Groundwater Vulnerability Sheets, NRA 1994. Because soil information in urban areas is less reliable and based on fewer observations than in rural areas, the worst case is assumed and such land is classified as being high of leaching potential. H = high, I = Intermediate, L = Low and U = Unclassified leaching potential.
- 8 This uses a coarse basis of permeability together with the ability of the existing ground conditions to accept additional flows. For example, gravels in a river floodplain are unlikely to have a high acceptance potential because of raised water table due to river flows. Sands above a relatively dry substrata would have a high potential, however caution is required in areas such as chalk with highly fluctuating groundwater levels.
- 9 Depends on use of water, volume abstracted etc. An importance level of 'High' or 'Very high' must be awarded if the water feature provides more than 10m³/day of drinking water, or serves more than 50 people, which is the definition used in the Water Framework Directive to define drinking water protected areas.

Table 2: Criteria for determining impact magnitude (reproduced from Table 3 of TAG unit 3.3.11)

Magnitude	Criteria	Example
Major	Results in loss of attribute	- Loss of EC designated Salmonid fishery - Compromise employment source - Pollution of potable source of abstraction - Change in GQA grade of river reach - Loss of flood storage / increased flood risk
Moderate	Results in impact on integrity of attribute or loss of part of attribute	- Loss in productivity of a fishery - Contribution of a significant proportion of the effluent in the receiving river, but insufficient to change its GQA grade - Reduction in the economic value of the feature
Minor	Results in minor impact on attribute	Measurable change in attribute, but of limited size and/or proportion
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use / integrity	- Discharges to watercourse but no significant loss in quality, fishery productivity or biodiversity - No significant impact on the economic value of the feature - No increase in flood risk

**Table 3: Significance Criteria of Potential Impacts
(Reproduced from Table 4 of TAG unit 3.3.11)**

Magnitude of Potential impact	Importance of Attribute			
	Very High	High	Medium	Low
Major	Very Significant	Very Significant	Significant	Low Significant
Moderate	Very Significant	Significant	Low Significant	Insignificant
Minor	Significant	Low Significant	Insignificant	Insignificant
Negligible	Low Significant	Insignificant	Insignificant	Insignificant

Table 4: Proposed impact assessment summary table

Feature	Attribute / Service	Importance Level	Magnitude of Impact	Significance of Impact
River	Water Supply	Very High	Minor	Significant

References

- 1 The Highways Agency et al, Design Manual for Roads and Bridges, Vol 11. Environmental Assessment, 1993.
- 2 DETR 'Guidance on the New Approach to Appraisal, 1998.
- 3 Department for Transport, Transport Analysis Guidance (TAG) 2003

RISK ASSESSMENT METHODOLOGY

GENERAL

The purpose of this appendix is to describe in detail the concepts underlying the risk based approach to assessing potentially contaminated land, introduce the roles of key legislation and describe the qualitative methodology adopted for evaluating and characterising risk.

Current best practice in the UK promotes a risk-based approach to dealing with both soil and groundwater contamination. The principal aim of the approach is to ensure protection of human health and the environment in a thorough, transparent and cost-effective manner.

Fundamental to the risk-based approach is the concept that for 'Contaminated Land' to be designated, as a consequence of historic activities, a pathway for contamination must be shown to exist between a source of contamination and a receptor. The combined presence of a source, pathway and a receptor is described as a 'pollutant linkage'.

The concepts associated with a contaminant source, pathway and receptor are defined in DETR Circular 02/2000 'Contaminated Land Environmental Protection Act 1990: Part II A'. A **source** of contamination may be considered as a 'substance, which is in, on or under land that has the potential to cause harm or to cause pollution of controlled waters'. A **receptor** can be considered as either 'a living organism, a group of living organisms, an ecological system or a piece of property which is being, or could be harmed, by a contaminant or controlled waters which are being, or could be, polluted by a contaminant'. A **pathway** may be considered as one or more routes by, or through, which a receptor is being, or could be, exposed to or affected, by a contaminant. Typical pathways may include migration in groundwater, surface water run-off or infiltration, inhalation, dermal contact and ingestion.

The risks posed by an identified pollutant linkage can often be mitigated by removing the source of contamination, treating the source of contamination, blocking the relevant pathway(s) or by protecting the receptor.

PRINCIPLES OF RISK EVALUATION

The risk evaluation methodology presented below is qualitative in nature, and is therefore a subjective method. It is based upon guidance presented in CIRIA publication referenced C552, 'Contaminated land risk assessment - A guide to good practice', 2001 and involves the classification of the following.

The magnitude of the potential **consequence** (severity) of risks occurring (Table 1).

The magnitude of the **probability** (likelihood) of the risk occurring (Table 2).

These are then considered in conjunction to give a risk matrix (Table 3)

Table 1 - Classification of consequence

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in “significant harm” as defined by the Environmental Protection Act 1990, Part IIA. Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note the definitions of ecological systems within the Draft Circular on Contaminated Land, DETR, 2000).	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health (“significant harm” as defined in DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (Note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000).	Concentrations of a contaminant from site exceed the generic or site-specific assessment criteria. Leaching of contaminants from a site to a major or minor aquifer. Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services (“significant harm” as defined in the <i>Draft Circular on Contaminated Land</i> , DETR, 2000). Damage to sensitive buildings/structures/ services or the environment.	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discolouration of concrete.

Table 2 - Classification of probability

Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Table 3 - Comparison of consequence against probability

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Table 4 - Description of the classified risks and likely action required

Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Table 5 - Response action likely to be required in relation to estimated risk

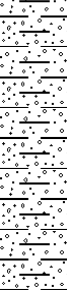
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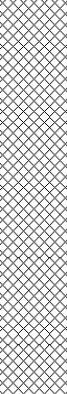
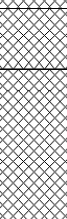
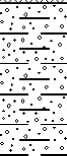
	Mitigation and remedial measures required
	Mitigation and remedial measures likely
	Remedial measures unlikely
	Remedial measures not required

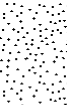
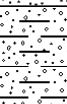
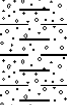
Appendix C – Exploratory Logs

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Number WS101	
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location		Dates 13/06/2019		Engineer AT		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.20-0.60 0.20-0.60	ES1 F1				0.10 (1.10)	Grass over brown sandy CLAY with root material. Sand is fine (TOPSOIL) MADE GROUND (brown slightly ashy fine to medium grained SAND with fine to coarse brick concrete fragments)			
1.20-1.65	SPT N=8		1,1/1,1,3,3		1.20 (0.15) (0.15) 1.50	MADE GROUND (light brown slightly sandy CLAY. Sand is fine) MADE GROUND (black ashy fine to coarse grained SAND with fine to coarse cinder fragments)			
2.00-2.45	SPT N=4		Water strike(1) at 2.00m, no rise after 20 mins. 1,1/1,1,1,1		(1.10)	MADE GROUND (soft dark grey slightly sandy CLAY with fine to medium concrete and gravel fragments)		▼1	
3.00-3.45 3.00-3.50	SPT N=6 ES2		1,1/1,1,2,2		2.60 (0.90)	MADE GROUND (loose dark grey ashy fine to coarse grained SAND with clay bands)			
4.00-4.45	SPT N=12		1,2/2,3,3,4		3.50 (1.95)	Stiff brown slightly silty slightly sandy slightly gravelly CLAY. Sand is fine Gravel is fine subangular and of mixed lithology			
5.00-5.45	SPT N=14		2,2/3,3,4,4		5.45	Complete at 5.45m			
Remarks Minimal recovery from 1.00m to 5.00m							Scale (approx) 1:50	Logged By AT	
							Figure No. 30186LG.WS101		

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Number WS102	
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location		Dates 13/06/2019		Engineer AT		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.30-0.70 0.30-0.70	ES1 F1				0.10 (0.20) 0.30	Grass over brown sandy CLAY with root material. Sand is fine (TOPSOIL)			
					(0.70)	MADE GROUND (dark brown fine to medium grained SAND with fine to medium concrete fragments)			
1.20-1.65	SPT N=8		1,1/2,2,2,2		1.00	MADE GROUND (brown sandy CLAY with fine to medium sand bands and fine to medium brick concrete glass fragments)			
					(1.00)	MADE GROUND (brown ashy sandy CLAY with fine to medium cinder fragments. Sand is fine)			
2.00-2.45	SPT N=4		1,1/1,1,1,1		2.00 (0.20) 2.20	MADE GROUND (dark brown grey slightly sandy CLAY. Sand is fine)			
					(0.40)	Loose orange brown clayey fine to medium grained SAND			
					2.60	Very soft light brown silty slightly sandy CLAY. Sand is fine			
					(0.90)				
					3.50	Stiff light brown slightly sandy CLAY. Sand is fine			
					(1.40)				
5.00-5.45	SPT N=19		3,3/4,5,5,5		4.90 (0.55) 5.45	Medium dense brown fine to medium grained SAND			
						Complete at 5.45m			
Remarks Borehole dry							Scale (approx) 1:50	Logged By AT	Figure No. 30186LG.WS102

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Number WS103					
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client Interserve		Job Number 30186LG					
		Location		Dates 13/06/2019		Engineer AT		Sheet 1/1					
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water					
0.20-0.60 0.20-0.60	ES1 F1		2,2/2,1,1,2		0.10	Grass over brown sandy CLAY with root material. Sand is fine (TOPSOIL)							
					(1.10)	MADE GROUND (dark grey fine to coarse grained SAND and fine to medium subangular to angular GRAVEL with some fine to medium brick fragments)							
1.20-1.65	SPT N=6				2,2/2,1,1,2	1.20 (0.60)			MADE GROUND (crushed brick fragments)				
2.00-2.45	SPT N=9				2,2/1,3,2,3	1.80 (0.20) 2.00			MADE GROUND (light brown slightly sandy CLAY. Sand is fine)				
3.00-3.45	SPT N=12				2,3/3,3,3,3	(1.40)			3.40	Firm to stiff brown grey slightly silty slightly sandy slightly gravelly CLAY. Sand is fine Gravel is fine subangular and of mixed lithology			
													5.00-5.45
Remarks									Scale (approx) 1:50	Logged By AT			
									Figure No. 30186LG.WS103				

Sutcliffe Investigations						Site	Number		
Excavation Method Drive-in Windowless Sampler						Prospect House Primary School, Blackley, Manchester		WS104	
						Client Interserve		Job Number 30186LG	
						Engineer AT		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
1.20-1.65	SPT N=4		1,2/1,1,1,1		(0.20)	Grass over brown sandy CLAY with root material. Sand is fine (TOPSOIL)			
					0.20	MADE GROUND (brown fine to medium grained SAND with plastic brick tile metal glass fragments)			
2.00-2.45	SPT N=5		1,0/0,1,2,2		(2.80)				
3.00-3.45	SPT N=8		2,2/2,2,2,2		3.00	MADE GROUND (dark grey ashy slightly clayey fine to medium grained SAND with fine to medium cinder fragments)			
					(0.40)				
4.00-4.45	SPT N=9		2,2/2,2,2,3		3.40	MADE GROUND (brown fine to medium grained SAND)			
					(1.00)				
4.40-4.90	ES1				4.40	Stiff to very stiff grey brown silty slightly sandy CLAY. Sand is fine			
5.00-5.45	SPT N=15		3,3/3,4,4,4		(1.05)				
					5.45	Complete at 5.45m			
Remarks Borehole dry							Scale (approx) 1:50	Logged By AT	
							Figure No. 30186LG.WS104		

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Number WS105	
Excavation Method Drive-in Windowless Sampler		Dimensions		Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location		Dates 13/06/2019		Engineer AT		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.20-0.70 0.20-0.70	ES1 F1		3,7/4,2,3,3		0.10	MADE GROUND (tarmac)			
					(0.60)	MADE GROUND (grey fine to coarse grained SAND and graded granular limestone hardcore with some limestone cobbles)			
0.70	MADE GROUND (dark brown grey fine to medium grained SAND and fine to medium subangular GRAVEL)								
(0.50)									
1.20-1.65	SPT N=12				1.20	MADE GROUND (orange brown sandy CLAY with fine to medium brick fragments. Sand is fine)			
(0.20)									
2.00-2.45	SPT N=13				1.40	MADE GROUND (dark brown ashy slightly sandy CLAY with fine to medium brick fragments. Sand is fine)			
(0.40)									
3.00-3.45	SPT N=14				1.80	Medium dense orange brown fine to medium grained SAND			
(1.60)									
4.00-4.45	SPT N=20	3.40	Very stiff brown slightly silty sandy slightly gravelly CLAY. Sand is fine Gravel is fine to medium subangular and of mixed lithology						
(2.05)									
5.00-5.45	SPT N=19	5.45	Complete at 5.45m						
Remarks Minimal recovery 2.00m to 3.00m Borehole dry							Scale (approx) 1:50	Logged By AT	Figure No. 30186LG.WS105



Prospect House Primary School, Blackley, Manchester

**Trial Pit
Number**
TP101

Trial Pit

Dimensions

Ground Level (mOD)

Interserve

**Job
Number**
30186LG

Location

Dates

12/06/2019

Engineer

AT

Sheet
1/1

Depth
(m)

Sample / Tests

Water
Depth
(m)

Field Records

Level
(mOD)Depth
(m)
(Thickness)

Description

Legend

Water

0.60-1.00

ES1

Water strike(1) at 3.10m,
no rise after 20 mins.

3.00
(0.30)
3.30

Grass over brown sandy CLAY with root material. Sand is fine (TOPSOIL)

MADE GROUND (brown fine to medium grained SAND)

MADE GROUND (brown fine to coarse grained SAND with plastic wood metal glass and brick fragments, tyres, bottles and jars)

(2.40)

MADE GROUND (black ashy fine to coarse grained SAND with plastic bags metal glass and wood fragments)

Complete at 3.30m



Scale (approx)

1:50

Logged By

AT

Figure No.

30186LG.TP101



Prospect House Primary School, Blackley, Manchester

Trial Pit Number
TP102

Trial Pit

Dimensions

Ground Level (mOD)

Interserve

**Job
Number**
30186LG

Location

Dates

12/06/2019

Engineer

AT

Sheet
1/1

Depth
(m)

Sample / Tests

Water
Depth
(m)

Field Records

Level
(mOD)Depth
(m)
(Thickness)

Description

Legend

Water

0.30-0.70

ES1

(0.30)
0.30

Grass over brown sandy CLAY with root material. Sand is fine (TOPSOIL)

MADE GROUND (brown fine to coarse grained SAND with bottles and fine to coarse wood glass plastic wire and brick fragments)

MADE GROUND (grey and dark grey slightly ashy fine to coarse grained SAND with bottle jars and fine to coarse rags glass wood and plastic fragments)

2.00-2.50

ES2

$$\begin{array}{l} \text{---} \\ | \\ \text{---} \\ | \\ \text{---} \\ | \\ \text{---} \end{array} \quad (2.60)$$

Complete at 3.90m



Remarks

Water seepage at 3.90m

Scale (approx)

1:50

Logged By

AT

Figure No.

30186LG.TP102

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP103			
Excavation Method Trial Pit		Dimensions		Ground Level (mOD)		Client Interserve		Job Number 30186LG			
		Location		Dates 12/06/2019		Engineer AT		Sheet 1/1			
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water			
1.10-1.60	ES1				(0.35)	Grass over brown sandy CLAY with root material. Sand is fine (TOPSOIL)					
					0.35						
					(0.35)	MADE GROUND (light brown cream and grey fine to coarse grained SAND and graded granular limestone hardcore)					
					0.70						
2.40-3.00	ES2				(0.40)	MADE GROUND (brown fine to coarse grained SAND with brick rags plastic and wood fragments)					
					1.10						
						MADE GROUND (dark grey slightly ashy fine to coarse grained SAND with jars bottles rags paper leaders metal wood and plastic fragments)					
					(1.30)						
					2.40						
					(0.60)	Brown with grey veining friable slightly sandy slightly gravelly CLAY. Sand is fine Gravel is fine to medium subangular and of mixed lithology					
					3.00						
						Complete at 3.00m					
						Remarks Trial pit dry					
						Scale (approx) 1:50		Logged By AT		Figure No. 30186LG.TP103	

 Sutcliffe Investigations					Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP104		
Excavation Method Trial Pit		Dimensions		Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location		Dates 12/06/2019		Engineer AT		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.30-0.80	ES1				0.10	Grass over brown sandy CLAY with root material. Sand is fine (TOPSOIL)	 		
					(2.10)	MADE GROUND (brown fine to coarse grained SAND with fine to coarse brick wood plastic glass fragments and rags and bottles)			
2.40-2.70	ES2				2.20 (0.20)	MADE GROUND (dark grey slightly ashy fine to coarse grained SAND with jars bottles rags paper leaders metal wood and plastic fragments)			
					2.40 (0.30)				
					2.70 (0.40)	Light brown with grey bands friable slightly sandy slightly gravelly CLAY. Sand is fine Gravel is fine to medium subangular to subrounded and of mixed lithology			
					3.10	Red brown with grey veining friable slightly sandy slightly gravelly CLAY. Sand is fine Gravel is fine subangular and of mixed lithology			
						Complete at 3.10m			
					Remarks Water ingress at 2.20m				
					Scale (approx) 1:50		Logged By AT		Figure No. 30186LG.TP104

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number SA101	
Excavation Method BRE 365 Soakaway		Dimensions		Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location		Dates 13/06/2019		Engineer AT		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
					0.10 0.20 (0.50) 0.70 (1.10) 1.80	MADE GROUND (macadam) MADE GROUND (red brown gravelly fine to medium grained SAND with frequent cobbles fine to coarse brick fragments and whole bricks) MADE GROUND (black gravelly fine to coarse grained SAND with frequent cobbles and fine to medium brick fragments) Firm to stiff light brown with yellow orange brown very sandy slightly gravelly CLAY. Sand is fine Gravel is fine to medium subangular and of mixed lithology	   		
						Complete at 1.80m			
Plan .						Remarks 			
						Scale (approx) 1:50	Logged By AT	Figure No. 30186LG.SA101	



Prospect House Primary School, Blackley, Manchester

**Trial Pit
Number**
SA102

BRE 365 Soakaway

Dimensions

Dates	13/06/2019
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Interserve

**Job
Number**
30186LG

Dates	13/06/2019
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AT

Sheet
1/1

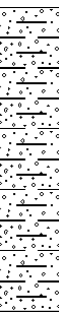
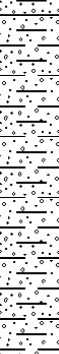
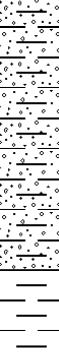
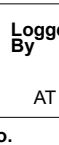
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	MADE GROUND (macadam)		
					0.20			
					(0.20)	MADE GROUND (dark brown very gravelly fine to medium grained SAND with frequent cobbles)		
					0.40			
					(0.50)			
					0.90	Firm to stiff light brown and orange brown very sandy slightly gravelly CLAY with grey silty fine to medium grained sand pockets. Sand is fine to medium Gravel is fine to medium subangular to subrounded and of mixed lithology		
					(0.90)	Light brown and orange brown slightly clayey fine to medium grained SAND		
					1.80			
					(0.70)	Stiff to very stiff brown slightly sandy CLAY. Sand is fine to medium		
								
					2.50			
						Complete at 2.50m		

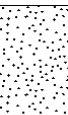
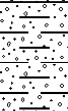
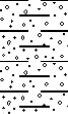
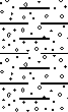
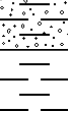
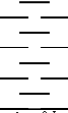
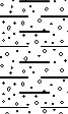
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AT

30186LG.SA102

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH101	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 13/06/2019		Engineer AT		Sheet 1/3	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
2.00-2.45	SPT N=10			1,2/2,2,3,3		(0.10)	MADE GROUND (macadam)			
						(0.20)	MADE GROUND (graded granular limestone hardcore)			
						0.30	MADE GROUND (grey fine to coarse grained SAND and graded granular limestone hardcore with some limestone cobbles)			
3.00-3.45	SPT N=8			1,2/2,2,2,2		(1.60)	MADE GROUND (orange brown sandy CLAY with fine to medium brick fragments. Sand is fine) - reworked material			
						1.90				
						(1.70)				
4.00-4.45	SPT N=10			1,2/2,2,3,3		3.60	Stiff brown slightly silty slightly sandy gravelly CLAY. Sand is fine Gravel is fine to medium subangular to subrounded and of mixed lithology			
						(2.40)				
Remarks Borehole dry Water added from 0.00m to 15.00m.								Scale (approx) 1:25	Logged By AT	
								Figure No. 30186LG.BH101		

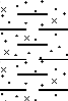
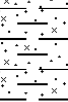
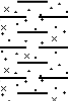
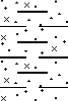
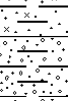
 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH101	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 13/06/2019		Engineer AT		Sheet 2/3	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
5.00-5.45	U1			16 blows						
6.00-6.45	SPT N=12			3,3/3,4,2,3		6.00	Stiff brown very sandy gravelly CLAY. Sand is fine Gravel is fine to medium subangular to subrounded and of mixed lithology			
						(1.20)				
						7.20	Very stiff brown slightly silty slightly sandy gravelly CLAY with fine to medium grained sand bands. Sand is fine Gravel is fine to medium subangular to subrounded and of mixed lithology			
7.50-7.95	SPT N=24			2,3/3,6,7,8						
						(2.00)				
9.00-9.45	SPT N=18			1,4/5,6,4,3						
						9.20	Very stiff brown very sandy CLAY. Sand is fine to medium			
						(0.30)				
						9.50	Medium dense brown slightly gravelly fine to medium grained SAND. Gravel is fine to medium subangular and of mixed lithology			
Remarks								Scale (approx)	Logged By	
								1:25	AT	
								Figure No. 30186LG.BH101		

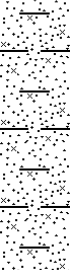
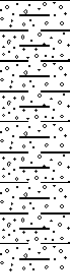
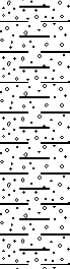
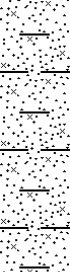
 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH101	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 13/06/2019		Engineer AT		Sheet 3/3	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
10.50-10.95	SPT N=34			3,3/6,9,9,10		(0.90)				
						10.40	Very stiff brown slightly sandy gravelly CLAY with fine to medium grained sand bands. Sand is fine Gravel is fine to medium subangular to subrounded and of mixed lithology			
12.00-12.45	SPT N=34			3,4/7,8,9,10		(2.20)				
						12.60	Very stiff brown slightly laminated slightly silty slightly sandy CLAY. Sand is fine			
13.50-13.95	SPT N=32			1,5/6,8,8,10		(0.60)				
						13.20	Very stiff brown sandy gravelly CLAY. Sand is fine Gravel is fine to medium subangular to subrounded and of mixed lithology			
14.50-14.95	SPT N=40			3,6/7,10,10,13		14.50	Very stiff brown sandy gravelly CLAY with fine to medium sand bands. Sand is fine Gravel is fine to medium subangular to subrounded and of mixed lithology			
						(0.50)				
						15.00				
Remarks								Scale (approx)	Logged By	
								1:25	AT	
								Figure No. 30186LG.BH101		

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH102	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 14/06/2019		Engineer AT		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
1.20-1.65	SPT N=5			1,1/1,1,1,2		(0.20)	MADE GROUND (macadam)			
						0.20	MADE GROUND (graded granular limestone hardcore)			
2.00-2.45	SPT N=7			1,1/2,1,2,2		(0.70)	Soft brown silty slightly sandy CLAY. Sand is fine			
						0.90				
3.00-3.45	SPT N=6			1,0/1,1,2,2		(1.40)	Soft brown silty sandy CLAY. Sand is fine			
						2.30				
4.00-4.45	SPT N=13			2,3/3,3,3,4		(1.50)	Medium dense brown fine to medium grained SAND			
						3.80				
5.00-5.45	U*1			13 blows		(0.90)	Stiff brown sandy gravelly CLAY. Sand is fine Gravel is fine to medium subrounded to subangular and of mixed lithology			
						4.70				
6.00-6.45	U2			29 blows		(0.50)	Medium dense brown fine to medium grained SAND			
						5.20				
7.50-7.95	SPT N=22			3,4/5,5,6,6		(0.70)	Very stiff brown sandy gravelly CLAY. Sand is fine Gravel is fine to medium subrounded to subangular and of mixed lithology			
						5.90				
9.00-9.45	SPT N=23			3,3/5,5,6,7		(0.60)	Medium dense brown fine to medium grained SAND			
						6.50				
						(2.30)	Very stiff brown slightly sandy gravelly CLAY. Sand is fine Gravel is fine to medium subrounded to subangular and of mixed lithology			
						8.80				
Remarks Borehole Dry								Scale (approx) 1:50	Logged By AT	
								Figure No. 30186LG.BH102		

Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH102	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 14/06/2019		Engineer AT		Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
10.50-10.95	U3			19 blows		(3.20)	Very stiff brown slightly sandy gravelly CLAY. Sand is fine Gravel is fine to medium subrounded to subangular and of mixed lithology			
12.00-12.45	SPT N=21			3,4/4,5,6,6		12.00	Very stiff brown very sandy gravelly CLAY. Sand is fine Gravel is fine to medium subrounded to subangular and of mixed lithology			
13.50-13.95	SPT N=21			2,4/4,5,5,7		(3.45)				
15.00-15.45	SPT N=23			2,4/4,6,6,7		15.45	Complete at 15.45m			
Remarks								Scale (approx) 1:50	Logged By AT	
								Figure No. 30186LG.BH102		

Sutcliffe Investigations							Site	Borehole Number	
							Prospect House Primary School, Blackley, Manchester	BH201	
Boring Method		Casing Diameter			Ground Level (mOD)		Client	Job Number	
Cable Percussion							Interserve	30186LG	
		Location			Dates		Engineer	Sheet	
					09/03/2020-10/03/2020		AT	1/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.30-0.60	ES1					(0.25)	MADE GROUND: CONCRETE.		
						0.25	MADE GROUND: Dark brown slightly sandy clayey subrounded to subangular fine to coarse GRAVEL of concrete, limestone, metal, ceramics and sandstone.		
0.80-1.00	ES2					(0.45)			
						0.70	MADE GROUND: Soft dark brown very gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of limestone, metal, glass and ceramics. Sand is fine to coarse		
1.20-1.65	SPT(C) N=11			1,1/2,3,3,3					
1.20-1.65	CD3					(1.75)			
2.00-2.45	SPT(C) N=4			1,1/1,1,1,1					
2.00-2.45	CD4								
2.50-2.80	B5					2.45	Firm to stiff orangish brown mottled grey gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of coal and sandstone.		
						(0.35)			
						2.80	Brownish orange gravelly slightly clayey fine to coarse SAND. Gravel is subrounded to subangular fine to coarse of sandstone and quartz. Sand is fine to coarse.		
3.00-3.45	SPT N=7			1,1/2,2,2,1		(0.20)			
3.00-3.45	S6					3.00	Soft to firm brown sandy CLAY. Sand is fine to coarse. Occasional organic staining.		
									
									
4.00-4.45	U7 100%			14 blows					
						(2.40)			
4.45-5.00	UD8								
									
5.00-5.45	SPT N=15			3,3/3,4,4,4					
Remarks Continuous water strike encountered however unable to record due to addition of own water for drilling. Borehole was terminated at 17.45m bgl due to inability to drill any further.							Scale (approx)	Logged By	
							1:25	CO	
							Figure No. 30186LG.BH201		

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH201
Boring Method Cable Percussion		Casing Diameter		Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location		Dates 09/03/2020-10/03/2020		Engineer AT		Sheet 2/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
5.00-5.45	S9					5.40	Soft to firm brownish orange very sandy very silty CLAY.		
6.00-6.45 6.00-6.45	SPT N=17 SB10			3,3/4,4,4,5		(1.60)			
7.00-7.45 7.00-7.45	SPT N=20 S11			3,4/5,5,5,5		7.00	Firm CLAY band.		
8.00-8.45 8.00-8.45	SPT N=21 S12			3,4/5,5,5,6		(3.00)	Firm to stiff orangish brown mottled grey gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of limestone and sandstone. Frequent cobbles of subangular to rounded limestone.		
9.00-9.45	UB13 0% (NR)			16 blows					
10.00-10.45	SPT N=15			3,3/3,3,4,5			Bands of fine to coarse SAND.		
Remarks								Scale (approx)	Logged By
								1:25	CO
								Figure No. 30186LG.BH201	

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH201	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 09/03/2020-10/03/2020		Engineer AT		Sheet 3/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
10.00-10.40	S15					10.00	Orangish brown slightly clayey silty SAND with bands of clay. Sand is fine to coarse.			
11.00-11.45	SPT N=18 S16			3,3/4,4,4,6		(1.00)	Stiff brown sandy sligtly gravelly CLAY. Sand is fine to coarse. Gravel is occasional fine.			
11.00-11.45										
12.00-12.45	SPT N=16 S17			1,2/3,3,5,5		(2.50)				
12.00-12.45										
13.00-13.45	UD18 10%			19 blows		13.50	Brown slightly clayey silty SAND with bands of clay. Sand is fine to coarse.			
14.00-14.45	SPT N=39 S19			5,7/7,10,10,12		(2.50)				
14.00-14.45										
15.00-15.45	SPT N=44			6,10/10,10,11,13						
Remarks								Scale (approx)	Logged By	
								1:25	CO	
								Figure No. 30186LG.BH201		

Sutcliffe Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH201	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
							Engineer AT		Sheet 4/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
15.00-15.45	S20									
16.00-16.45	U21 50%			16 blows		16.00	Stiff brown sandy CLAY. Sand is fine to coarse.			
17.00-17.45	SPT N=44			7,7/10,10,10,14		(1.45)				
17.00-17.45	S22					17.45	Complete at 17.45m			
Remarks								Scale (approx)	Logged By	
								1:25	CO	
								Figure No. 30186LG.BH201		

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH202	
Boring Method Cable Percussion		Casing Diameter 6.00mm cased to Continuous water strike encountered however unable to record due to addition of own water for drilling. 15.00mm cased to Borehole was terminated at 17.45m bgl due to inability to drill any further.			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 10/03/2020-11/03/2020		Engineer AT		Sheet 1/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
1.20-1.65 1.20-1.65	SPT N=4 S1			1,1/1,1,1,1		(0.25)	MADE GROUND: CONCRETE.			
						0.25 (0.55)	MADE GROUND: Yellowish brown clayey slightly sandy subrounded to subangular fine to coarse GRVAEL of limestone and concrete. (SUBASE)			
2.00-2.45	U2 25%			9 blows		0.80 (1.70)	Soft to firm orangish brown mottled grey very sandy CLAY. Sand is fine to coarse. (DEVENSIAN TILL)			
						2.50	Soft to firm orangish brown mottled grey very sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine.			
3.00-3.75 3.00-3.45	SPT N=4 SB3			1,0/1,1,1,1		(1.30)				
						3.80	Firm orangish brown mottled grey very sandy CLAY. Sand is fine to coarse.			
4.00-4.45	U4 70%			11 blows						
5.00-5.45	SPT N=10			1,2/2,2,3,3						
Remarks Water strike encountered at 6.60m however unable to record due to addition of own water for drilling. Borehole was terminated at 17.45m bgl due to inability to drill any further.								Scale (approx)	Logged By	
								1:25	CO	
								Figure No. 30186LG.BH202		

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH202		
Boring Method Cable Percussion		Casing Diameter 6.00mm cased to Continuous water strike encountered however unable to record due to addition of own water for drilling. 15.00mm cased to Borehole was terminated at 17.45m bgl due to inability to drill any further.			Ground Level (mOD)			Client Interserve		Job Number 30186LG	
		Location			Dates 10/03/2020-11/03/2020		Engineer AT		Sheet 2/4		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water		
5.00-5.45	S5					(2.70)					
5.50-6.00	B6										
6.00-6.45	U7 75%			30 blows							
6.45-6.50	UD8					6.50	Orangish brown clayey silty fine to coarse SAND.				
7.00-7.45 7.00-7.45	SPT N=18 S9			Water strike(1) at 6.60m. 3,3/4,4,5,5			Bands of soft to firm CLAY.				
8.00-8.45 8.00-8.45	SPT N=21 S10			3,4/5,5,5,6		(3.30)	Bands of soft to firm CLAY.				
9.00-9.45 9.00-9.45	SPT N=18 S11			1,4/4,4,4,6		9.80	Firm to stiff orangish brown sandy CLAY. Sand is fine to coarse.				
Remarks								Scale (approx)		Logged By	
								1:25		CO	
								Figure No. 30186LG.BH202			

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH202	
Boring Method Cable Percussion		Casing Diameter 6.00mm cased to Continuous water strike encountered however unable to record due to addition of own water for drilling. 15.00mm cased to Borehole was terminated at 17.45m bgl due to inability to drill any further.			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 10/03/2020-11/03/2020		Engineer AT		Sheet 3/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
10.00-10.45	UB12 0% (NR)			22 blows		(0.50)	Firm to stiff brown very silty very sandy CLAY. Sand is fine to coarse.			
						10.30				
11.00-11.45	U13 0% (NR)			20 blows						
										
12.00-14.45 12.00-12.45	SPT N=28 S14			3,3/5,7,8,8		(3.70)	Brown slightly clayey fine to coarse SAND with frequent bands of firm clay.			
										
										
										
13.00-13.45 13.00-13.45	SPT N=27 S15			1,3/4,6,8,9			Bands of firm CLAY.			
										
										
										
14.00-14.45 14.00-14.45	SPT N=17 S16			1,1/2,3,6,6		14.00	Bands of firm CLAY.			
										
										
										
15.00-15.45	SPT N=19			2,2/3,3,6,7						
Remarks								Scale (approx)	Logged By	
								1:25	CO	
								Figure No. 30186LG.BH202		

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH202	
Boring Method Cable Percussion		Casing Diameter 6.00mm cased to Continuous water strike encountered how 15.00mm cased to Borehole was terminated at 17.45m bgl due to inability to drill any further.		Ground Level (mOD)		Client Interserve		Job Number 30186LG		
		Location		Dates 10/03/2020- 11/03/2020		Engineer AT		Sheet 4/4		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
15.00-15.45	S17					(1.90)				
16.00-16.45	SPT N=34			3,3/5,7,10,12		15.90	Firm to stiff orangish brown sandy CLAY. Sand is fine to coarse.			
16.00-16.45	S18					(1.55)				
17.00-17.45	SPT N=44			3,6/8,10,12,14						
17.00-17.45	S19					17.45	Complete at 17.45m			
Remarks							Scale (approx)	Logged By		
							1:25	CO		
							Figure No. 30186LG.BH202			

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH203									
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG									
							Engineer AT		Sheet 1/5									
		Location			Dates 25/03/2020-27/03/2020													
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water									
1.20-1.65	SPT N=6			1,2/1,1,2,2		(0.20)	MADE GROUND: Soft dark brown gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of brick, glass and quartz. Sand is fine to coarse. (TOPSOIL)											
						0.20												
						(0.30)				MADE GROUND: Orangish brown gravelly slightly clayey fine to coarse SAND. Gravel is subrounded to subangular fine to coarse of ash, brick, glass, sandstone, quartz and coal.								
						0.50												
						(0.20)	MADE GROUND: Soft dark grey very gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of metal and rubber wires, plastic tubes, plastic sheeting, coal, sandstone, glass, plastic bottles, rubber, wood, paper, material mesh, ceramics and polystyrene. (LANDFILL MATERIAL)											
						0.70												
						2.00-2.45 2.00				SPT N=4 D1			1,2/1,1,1,1		(2.30)	Soft to stiff orangish brown gravelly CLAY. Gravel is subrounded to subangular fine to coarse of sandstone. Occasional organic staining.		
3.20 3.20-3.65	D2 U3 90% Recovery			87 blows		3.00	Firm to stiff brown slightly gravelly sandy CLAY with frequent bands of fine to coarse sand. Gravel is subrounded to subangular fine to coarse of sandstone.											
3.70-4.15 3.70 3.70-4.15	SPT N=20 D4 SD5			2,2/4,4,6,6		(1.50)												
4.80 5.00-5.45	D6 SPT N=15			1,2/3,3,4,5		4.50	Orangish brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is fine.											
Remarks Groundwater strike encountered at 7.00m rising to 6.90mbgl and 14.20m rising to 14.10mbgl. Borehole refused at 24.16mbgl.								Scale (approx) 1:25	Logged By CO									
								Figure No. 30186LG.BH203										

Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester	Borehole Number BH203	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve	Job Number 30186LG	
		Location			Dates 25/03/2020- 27/03/2020		Engineer AT	Sheet 2/5	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
5.00-5.45	B7-8						Bands of soft to firm CLAY.		
						(1.90)			
5.80	D9								
6.00-6.45	SPT N=15			3,3/3,3,4,5					
6.00-6.45	SD10					6.40	Firm to stiff brown slightly sandy slightly silty CLAY. Sand is fine to coarse.		
6.80	D11								
7.00-7.45	SD12			Water strike(1) at 7.00m, rose to 6.90m in 20 mins. 1,2/2,2,3,3					
7.00-7.45	SPT N=10								
						(2.10)			
7.50-7.95	U13 100& Recovery			47 blows					
8.00-8.45	SPT N=9			2,2/2,2,2,3					
8.00	D14								
8.00-8.45	DS15					8.50	Band of brown slightly clayey slightly silty fine to coarse SAND.		
							Soft to firm brown gravelly slightly sandy very silty CLAY. Gravel is angular to subrounded fine to medium of siltstone and sandstone.		
8.80	D16								
9.00-9.45	SPT N=8			1,1/2,2,2,2					
9.00-9.45	B17-18					(1.95)			
9.80	D19								
10.00-10.45	SPT N=9			1,2/2,2,2,3					
Remarks								Scale (approx) 1:25	Logged By CO
								Figure No. 30186LG.BH203	

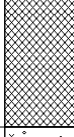
Sutcliffe Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH203		
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG		
		Location			Dates 25/03/2020- 27/03/2020		Engineer AT		Sheet 3/5		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water		
10.00-10.45	SD20			1,2/2,2,3,4			Firm to stiff brown slightly gravelly sandy CLAY with frequent bands of fine to coarse sand. Gravel is subrounded to subangular fine to coarse of sandstone.				
						10.45					
10.80	D21					(0.85)					
11.00-11.45	SPT N=11						Firm brown laminated CLAY with frequent bands of fine to coarse sand.				
11.00-11.45	SD22					11.30					
11.80	D23					(1.20)					
12.00-12.45	U24 100% Recovery						Brown slightly silty fine to coarse SAND.				
12.50-12.95	SPT N=7					1,2/2,1,2,2	12.50				
12.50	D25										
12.50-12.95	SD26										
							(1.70)				
13.80	D27										
14.00-14.45	SPT N=14	2,3/4,4,,6	14.20	Brown cobbly slightly silty slightly clayey subrounded to subangular fine to coarse SAND AND GRAVEL of sandstone and limestone.							
14.00-14.45	SD28	Water strike(2) at 14.20m, rose to 14.10m in 20 mins.									
14.80	D29										
15.00-15.45	SPT N=12			1,2/2,3,3,4							
Remarks								Scale (approx)	Logged By		
								1:25	CO		
								Figure No. 30186LG.BH203			

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH203	
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location			Dates 25/03/2020- 27/03/2020		Engineer AT		Sheet 4/5	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
15.00-15.45	B30-31			2,3/5,7,7,11		(3.40)	Stiff brown gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of sandstone.			
15.80	D32									
16.00-16.45 16.00-16.45	SPT N=30 SD33									
16.80	D34									
17.00-17.45 17.00-17.45	SPT N=34 SD35			2,4/5,8,9,12						
17.80	D36			3,5/5,7,10,12						
18.00-18.45 18.00-18.45	SPT N=34 SD37									
18.80	D38									
19.00-19.45 19.00-19.45	SPT N=43 B39									4,5/7,10,12,14
20.00-20.45	SPT N=50			5,7/9,13,14,14						
Remarks								Scale (approx) 1:25	Logged By CO	
								Figure No. 30186LG.BH203		

 Sutcliffe Investigations							Site Prospect House Primary School, Blackley, Manchester		Borehole Number BH203																																								
Boring Method Cable Percussion		Casing Diameter			Ground Level (mOD)		Client Interserve		Job Number 30186LG																																								
		Location			Dates 25/03/2020- 27/03/2020		Engineer AT		Sheet 5/5																																								
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water																																								
20.00-20.45	SD41			5,8/11,14,17,8		(6.56)																																											
21.00-21.45	SPT N=50							6,9/12,15,17,6		6,8/12,15,19,4																																							
21.00-21.45	SD43													25/50	41/37																																		
22.00-22.45	SPT N=50																		24.16																														
22.00-22.45	SD45																							Complete at 24.16m																									
23.00-23.45	SPT N=50																																																
23.00-23.45	SD47																																																
24.00-24.08	SPT 25*/80																																																
24.00-24.16	50/0																																																
24.00-24.16	SD48																																																
24.08-24.16	SPT 41*/80																																																
24.08-24.16	37/0																																																
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
																																																	
Remarks								Scale (approx)	Logged By																																								
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								Figure No. 30186LG.BH203																																									

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP201		
Machine : JCB 3CX Method : Trial Pit		Dimensions 1.9 x 0.9 x 1.30		Ground Level (mOD)		Client Interserve		Job Number 30186LG		
		Location								Dates 11/03/2020
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description			Legend	Water
0.15-0.25	ES1				(0.15)	MADE GROUND: CONCRETE.				
					0.15	MADE GROUND: Dark brown sandy clayey subrounded to subangular fine to coarse GRAVEL of limestone and concrete (SUBASE).				
					(0.20)					
					0.35	Firm orangish brown mottled grey gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of coal and sandstone.				
					(0.95)					
										
										
										
					1.30	Complete at 1.30m				
										
										
										

	Remarks Trial pit remained dry.		
	Scale (approx) 1:25	Logged By CO	Figure No. 30186LG.TP201

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP202			
Machine : JCB 3CX Method : Trial Pit		Dimensions 1.9 x 0.9 x1.30		Ground Level (mOD)		Client Interserve		Job Number 30186LG			
		Location		Dates 11/03/2020		Engineer AT		Sheet 1/1			
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water			
0.00-0.20	ES1				(0.20)	MADE GROUND: Soft dark brown gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of glass, brick, metal and quartz. Sand is fin to coarse. (TOPSOIL)					
0.50-0.90	ES2				(0.30)	MADE GROUND: Yellowish cream very sandy very clayey subrounded to subangular fine to coarse GRAVEL of limestone. (SUBBASE)					
1.00-1.10	ES3				(0.50)	MADE GROUND: Soft brown gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of metal, brick, glass, ceramics, limestone, sandstone and coal. Frequent whole and half bricks. (LANDFILL MATERIAL)					
1.00-1.30	WA1				1.00	Soft orangish brown mottled yellow slightly gravelly silty CLAY. Gravel is subrounded to subangular fine to coarse of sandstone and coal. Liquid pouring in, very strong hydrocarbon odour and red in colour, possibly red diesel.					
					(0.30)						
					1.30	Complete at 1.30m					
						Remarks					
						Possible red diesel contamination.					
						Scale (approx)		Logged By		Figure No.	
						1:25		CO		30186LG.TP202	



Prospect House Primary School, Blackley, Manchester

**Trial Pit
Number**
TP203

Job	Rate	Time	Cost
1	10	10	100
2	20	20	400
3	30	30	900
4	40	40	1600
5	50	50	2500
6	60	60	3600
7	70	70	4900
8	80	80	6400
9	90	90	8100
10	100	100	10000

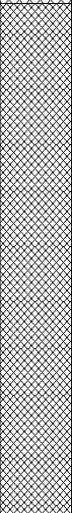
Interserve

30186LG

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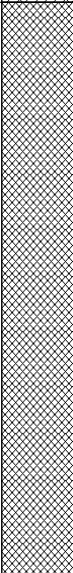
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	ES1				(0.25)	MADE GROUND: Soft dark brown gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of glass, brick, metal and quartz. Sand is fine to coarse. (TOPSOIL)		
0.50-1.00	ES2				0.25 (0.15) 0.40	MADE GROUND: Dark brown sandy clayey subrounded to subangular fine to coarse GRAVEL of limestone and concrete (SUBBASE).		
					(1.70)	Soft dark greyish brown very gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of glass, bottles, papers , newspapers, plastic, metal, foil wrappers, plastic bags, mesh materials, wood and concrete. (LANDFILL MATERIAL)		
					2.10 (0.40)	Soft to firm orangish brown mottled grey sandy CLAY. Sand is fine to coarse.		
					2.50	Complete at 2.50m		



Trial pit remained dry.

Figure No.

30186LG.TP203

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP204	
Machine : JCB 3CX Method : Trial Pit		Dimensions 2 x 0.9 x 2.20		Ground Level (mOD)		Client Interserve		Job Number 30186LG	
		Location		Dates 11/03/2020		Engineer AT		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.00-0.20	ES1				(0.30)	MADE GROUND: Soft dark brown gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of glass, brick, metal and quartz. Sand is fine to coarse. (TOPSOIL)			
0.50-0.90 0.50-1.00	ES2 ES3				0.30	MADE GROUND: Soft dark brown gravelly very sandy CLAY. Gravel is subrounded to subangular fine to coarse of coal, material, ceramics, metal, wood, plastic, plastic bags, metal cans, rubber, glass and limestone. (LANDFILL MATERIAL)			
			Water strike(1) at 2.10m.		(1.90)				
					2.20	Complete at 2.20m			
						Remarks Perched water encountered at 2.10mbgl.			
						Scale (approx) 1:25		Logged By CO	



Prospect House Primary School, Blackley, Manchester

**Trial Pit
Number**
TP205

Dimensions
2.0 x 0.9 x 2.8

Ground Level (mOD)

Interserve

Job Number 30186LG

Location

Dates	11/03/2020
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AT

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	ES1					MADE GROUND: Soft dark brown gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of glass, brick, metal and quartz. Sand is fine to coarse. (TOPSOIL)		
0.30-0.80	ES2				0.50	MADE GROUND: Soft dark brown gravelly very sandy CLAY. Gravel is subrounded to subangular fine to coarse of coal, material, ceramics, metal, wood, plastic, plastic bags, metal cans, rubber, glass and limestone. (LANDFILL MATERIAL)		
					(2.20)			
					2.70 (0.10) 2.80	Firm orangish brown mottled grey gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of coal and sandstone.		
						Complete at 2.80m		



Remarks

Trial pit remained dry.

Scale (approx)

1:25

Logged By

CO

Figure No.

30186|a.TP205



Prospect House Primary School, Blackley, Manchester

**Trial Pit
Number**
TP206

Method : Trial Pit

Dimensions
2.0 x 0.9 x 1.9

Ground Level (mOD)

Client	
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Interserve

Job Number
30186LG

Location

Dates	11/03/2020
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Engineer

AT

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PROSPECT HOUSE
301861ST
TP206
10/02/2020
D.O - 1.90m

Remarks

Trial pit terminated at 1.90mbgl due to collapsing sides and inability to excavate any further.
Trial pit remained dry.

Scale (approx)

1:25

Logged By

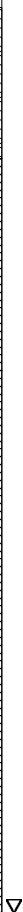
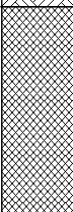
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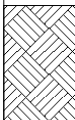
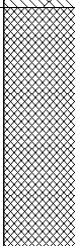
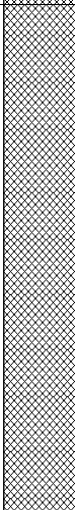
Figure No.

30186lg.TP206

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP207			
Machine : JCB 3CX Method : Trial Pit		Dimensions 2.2 x 1.3 x 1.20		Ground Level (mOD)		Client Interserve		Job Number 30186LG			
		Location		Dates 11/03/2020		Engineer AT		Sheet 1/1			
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water			
					(0.10) 0.10	MADE GROUND: MACADAM.					
					(0.50)	MADE GROUND: Grey sandy very clayey subrounded to subangular fine to coarse GRAVEL of limestone. (SUBASE)					
					0.60	MADE GROUND: Dark reddish brown very gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of brick, metal and glass.					
					(0.55)						
					1.15 1.20	MADE GROUND: Brownish red subrounded to subangular fine to coarse clayey sandy GRAVEL of brick. Frequent whole and half bricks. Occasional glass and wood. Sand is fine to coarse. (DEMOLITION MATERIAL)					
						Complete at 1.20m					
						Remarks Trial pit terminated at 1.20mbgl due to collapsing sides and inability to excavate any further. Trial pit remained dry.					
						Scale (approx) 1:25		Logged By CO		Figure No. 30186lg.TP207	

 Sutcliffe Investigations					Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP208	
Excavation Method Trial Pit		Dimensions 1.8 x 0.9 x 2		Ground Level (mOD)		Client Interserve		Job Number 30186LG
		Location		Dates 11/03/2020		Engineer AT		Sheet 1/1
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50-1.10	ES1				(0.10)	MADE GROUND: MACADAM.		
					(0.20)	MADE GROUND: Grey sandy very clayey subrounded to subangular fine to coarse GRAVEL of limestone. (SUBASE)		
					0.30			
					(0.20)	MADE GROUND: Dark reddish brown very gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of brick, metal and glass.		
					0.50	MADE GROUND: Brownish red subrounded to subangular fine to coarse clayey sandy GRAVEL of brick. Frequent whole and half bricks. Occasional glass and wood. Sand is fine to coarse. (DEMOLITION MATERIAL)		
					(1.40)			
					1.90			
					(0.10)	Firm orangish brown mottled grey gravelly sandy CLAY. Gravel is subrounded to subangular fine to coarse of coal and sandstone.		
					2.00	Complete at 2.00m		
					Remarks Trial pit remained dry.			
					Scale (approx) 1:25	Logged By CO	Figure No. 30186lg.TP208	

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP209			
Machine : JCB 3CX Method : Trial Pit		Dimensions 2.1 x 1 x 3		Ground Level (mOD)		Client Interserve		Job Number 30186LG			
		Location		Dates 11/03/2020		Engineer AT		Sheet 1/1			
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water			
0.00-0.20	ES1				(0.50)	MADE GROUND: Soft dark brown gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of glass, brick, metal and quartz. Sand is fine to coarse. (TOPSOIL)					
0.50-1.00	ES2				0.50 (0.70)	MADE GROUND: Soft dark brown very gravelly very sandy CLAY. Gravel is subrounded to subangular fine to coarse of brick, plastic, mesh material, clothing material, glass, plastic sheeting, and foil. Sand is fine to coarse. (LANDFILL MATERIAL)					
1.50-2.00	ES3				1.20 (1.80)	MADE GROUND: Soft dark grey very gravelly very sandy CLAY. Gravel is subrounded to subangular fine to coarse of brick, plastic, mesh material, clothing material, glass, plastic sheeting, and foil. Sand is fine to coarse. Strong hydrocarbon odour and sheen. (LANDFILL MATERIAL)					
2.50-3.00	ES4				3.00	Complete at 3.00m					
			Water strike(1) at 3.00m.								
						Remarks Perched water encountered at 3.00mbgl.					
						Scale (approx) 1:25		Logged By CO		Figure No. 30186lg.TP209	

 Sutcliffe Investigations						Site Prospect House Primary School, Blackley, Manchester		Trial Pit Number TP210			
Machine : JCB 3CX Method : Trial Pit		Dimensions 2 x 0.9 x 2.90		Ground Level (mOD)		Client Interserve		Job Number 30186LG			
		Location		Dates 11/03/2020		Engineer AT		Sheet 1/1			
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water			
0.00-0.20	ES1				(0.40)	MADE GROUND: Soft dark brown gravelly slightly sandy CLAY. Gravel is subrounded to subangular fine to coarse of glass, brick, metal and quartz. Sand is fine to coarse. (TOPSOIL)			▽1		
0.50-1.00	ES2				0.40 (0.80)	MADE GROUND: Soft dark brown very gravelly very sandy CLAY. Gravel is subrounded to subangular fine to coarse of brick, plastic, mesh material, clothing material, glass, plastic sheeting, and foil. Sand is fine to coarse. (LANDFILL MATERIAL)					
1.50-2.00	ES3				1.20 (1.70)	MADE GROUND: Soft dark grey very gravelly very sandy CLAY. Gravel is subrounded to subangular fine to coarse of brick, plastic, mesh material, clothing material, glass, plastic sheeting, and foil. Sand is fine to coarse. Strong hydrocarbon odour and sheen. (LANDFILL MATERIAL)					
					2.90	Complete at 2.90m					
						Remarks Perched water encountered at 2.90mbgl.					
						Scale (approx) 1:25		Logged By CO		Figure No. 30186lg.TP210	



Prospect House Primary School, Blackley, Manchester

**Trial Pit
Number**
TP211

Dimensions
2.00 x 0.9 x 3.00

Interserve

**Job
Number**
30186LG

Dates	11/03/2020
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Sheet
1/1

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Remarks

Perched water encountered at 2.80mbgl.

Figure No.

30186LG.TP211

Appendix D – Piling Risk Assessment

Piling Risk Assessment

Based on the ground conditions on site a piling foundation option is proposed for the development and will comprise Driven Piles progressed to an approximate depth of circa 20 - 25mbgl. Final pile design to completed by the appointed Piling Contractor.

The depth of the Aquifer is currently unknown. Given the piles depth is approximately 20 - 25m bgl and given the intervening ground conditions it is considered unlikely that the aquifer would be at risk from proposed piling operations.

In terms of ground gas migration the piling operation will ensure to not generate a pathway by filing any voids with concrete which will be poured in while recovering the auger, therefore blocking the pathway.

General applicability

Non-displacement piling methods involve the extraction of soil prior to the placing of the pile. Theoretically therefore there is no disturbance of the surrounding soil and provided that the pile is formed or placed in intimate contact with the surrounding soil there should be no formation of preferential pathways.

Specific problems and uncertainties

Avoidance of disturbance to the surrounding soil does, however, require a high standard of workmanship in the construction process. Any lack of support due to poor working practices, however short term, during boring or augering could lead to collapse of soil or piping into the hole, leading to loss of density in the surrounding soil and possibly void formation. The result of poor workmanship could be the creation of preferential flow pathways. Under-reaming of pile bases has particular potential for the collapse of soil into the bore and the formation of voids if not correctly executed. Appropriate QA/QC methods should be incorporated into the works to enable workmanship to be monitored and verified.

Where a hole is pre-formed through a body of contaminated groundwater, leachate or source of ground gas to allow the subsequent formation of a pile there is a possibility of short term rapid liquid and/or gas flow through the pre-formed hole during the pile installation. This situation would be undesirable from a geotechnical as well as an environmental standpoint, as the water and/or gas flow would be likely to soften or weaken the soil as well as cause gaseous escape. In most conventional piling, a positive hydrostatic head is maintained in the pre-formed hole to avoid water flowing from the ground into the hole. Additionally, as aforementioned, upon drilling a pile and whilst recovering the auger concrete will be poured in.

In some circumstances maintenance of this positive head may not be possible. In such a situation, if the area of the pile cannot be completely dewatered prior to installation the selection of an alternative piling method should be considered.

Subject to these caveats relating to supply and workmanship, it is considered that there is a negligible risk of creating preferential pathways by the use of the non-displacement piling methods.

Piling method variations

Partially preformed piles involve the placing of a preformed section within a larger hole and the grouting of the annulus between the preformed hole and the soil. Because this grout is non-load-bearing it is likely to be regarded as less critical during installation

Appendix E - Ground Gas & Groundwater Monitoring Data

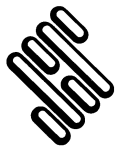
	SUTCLIFFE INVESTIGATIONS					GAS MEASUREMENTS AND WATER LEVELS		Sheet No.: 1 of 1		
	TEL: 0151 227 3155							Atmospheric Pressure: 1008mb		
	FAX: 0151 227 3156							Weather: Sunny		
								Pressure Trend: Steady		
	VISIT No.: 2									
	CLIENT: Interserve					SITE: Prospect House Primary School				
Date of Fieldwork: 22.07.19					Logged By: JS		Job No.: 30186LG			
B/H REF	CH ₄		CO ₂	O ₂	Relative Pressure	Flow Rate	P.I.D	Base of Borehole	Water Level	Reduced Water
	%LEL	%by vol	%by vol	%by vol	(mb)	(l/h)		(mbgl)	(mbgl)	(m) A.O.D
WS1		0.2	0.4	17.6	0.12	-0.7		3.85	3.63	
		0.1	2	15.3						
		0.1	6.7	12.4						
		0.1	7.3	11.5						
WS3		0.1	3.1	15.7	0.08	0		4.5	2.78	
		0.1	0.9	19						
		0.1	0.8	19.5						
		0.1	0.8	19.6						
WS7		0.2	0.6	18.6	0.01	0		5	4.33	
		0.1	7.7	12						
		0.1	9.1	10.5						
		0.1	9.4	10						
COMMENTS:										
INSTRUMENT USED:				ACCURACY OF INSTRUMENT (% by volume)	CH ₄		CO ₂		O ₂	
					± 0.5% @ 5%		± 0.5% @ 5%			
					± 1.0% @15%		± 1.0% @15%		± 1.0%	
					±3.0% @>15%		±3.0% @>15%			

A = Accumulated Type Sample
l/h = Litres per hour
%LEL = Lower Explosive Limit (for CH4 in air 100% = 5% by volume)

SS = Steady State Type Sample
mb = Millibar

P = Peak Type Sample
mbgl = Metres Below Ground Level

Appendix F – Geotechnical Laboratory Certificates



STRUCTURAL SOILS LTD
TEST REPORT



Report No. 783951 R1

Date 03-July-2019 Contract 19/05846

Client Envirolab Ltd
Address Units 7 & 8 Sandpits Business Park
Mottram Road
Hyde
SK14 3AR

For the Attention of Iain Haslock

Samples submitted by client 19/06/2019
Testing Started 26/06/2019
Testing Completed 03/07/2019

Client Reference 19/05846
Client Order No. PO741253
Instruction Type Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests Undertaken

Moisture Content (oven drying method) BS1377:Part 2:1990,clause 3.2
Liquid Limit (one point method) BS1377:Part 2:1990,clause 4.4
Plastic Limit BS1377:Part 2:1990,clause 5.3
Plasticity Index Derivation BS1377:Part 2:1990,clause 5.4
Undrained shear strength triaxial compression without pore pressure measurement
(multistage loading) BS1377:Part 7:1990,clause 8.5

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.

Test were undertaken on samples 'as received' unless otherwise stated.

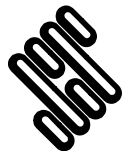
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd, The Potteries, Pottery Street, Castleford, WF10 1NJ Tel.01977 552255. E-mail mark.athorne@soils.co.uk

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH101	19/05846/1	U	5.00	13	33	17	16	78	Dark brown slightly sandy slightly gravelly CLAY
WS102	19/05846/2	D	3.50	18	34	18	16	93	Brown slightly sandy slightly gravelly CLAY
WS103	19/05846/3	U	4.00	23	40	18	22	81	Dark brown grey slightly sandy slightly gravelly CLAY
WS105	19/05846/4	D	3.50	21	31	16	15	98	Brown slightly sandy slightly gravelly CLAY



**STRUCTURAL
SOILS LTD**

Contract:

19/05846

Contract Ref:

783951



GININT_LIBRARY_V8_07.GLB LibVersion: v8_07_001 PjVersion: v8_07 | Graph L - ALINE STANDARD - A4P | 783951 - 19-05846.GPJ - v8_07.
The Potteries, Pottery Street, Castleford, West Yorkshire, WF10 1NJ. Tel: 01977-552255. Fax: 01977-552299. Web: www.solis.co.uk. Email: ask@solis.co.uk | 03/07/19 - 16:54 | SM7

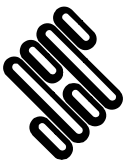
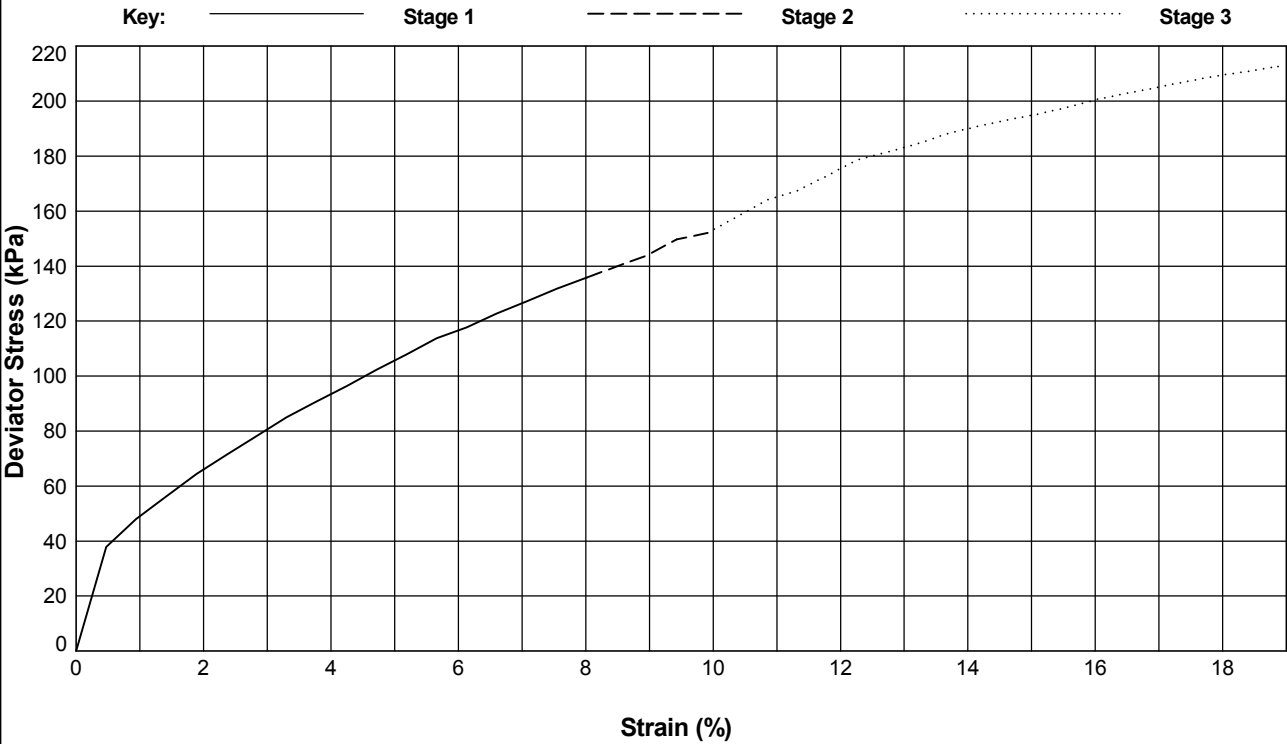
UNCONSOLIDATED QUICK UNDRAINED (MULTI-STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 9

Borehole: **BH101** Sample Ref: **19/05846/1** Sample Type: **U** Depth (m): **5.00**

Description : **Dark brown slightly sandy slightly gravelly CLAY**

STAGE NUMBER		1	2	3
SAMPLE DETAILS	Sample Condition	Undisturbed		
	Orientation of sample	Vertical		
	Diameter (mm)	103.17		
	Height (mm)	212.00		
	Moisture Content (%)	16		
	Bulk Density (Mg/m ³)	2.18		
	Dry Density (Mg/m ³)	1.89		
TEST DETAILS	Membrane Thickness (mm)	0.31	0.31	0.31
	Rate of Axial Displacement (%/min)	2.00	2.00	2.00
	Cell Pressure (kPa)	50	100	200
	Membrane Correction (kPa)	0.58	0.69	1.10
	Corrected Deviator Stress (kPa)	136	152	213
	Undrained Shear Strength (kPa)	68	76	106
	Strain at Failure (%)	8.0	9.9	18.9
	Mode of Failure			Plastic



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

M. Fisher

MAUREEN FISHER

Date

03/07/19

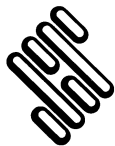
Contract

19/05846

Contract Ref:

783951





STRUCTURAL SOILS LTD
TEST REPORT



Report No. 783951 R2

Date 03-July-2019 Contract 19/05846

Client Envirolab Ltd
Address Units 7 & 8 Sandpits Business Park
Mottram Road
Hyde
SK14 3AR

For the Attention of Iain Haslock

Samples submitted by client 19/06/2019
Testing Started 26/06/2019
Testing Completed 03/07/2019

Client Reference 19/05846
Client Order No. PO741253
Instruction Type Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests Undertaken

Moisture Content (oven drying method) BS1377:Part 2:1990,clause 3.2
Liquid Limit (one point method) BS1377:Part 2:1990,clause 4.4
Plastic Limit BS1377:Part 2:1990,clause 5.3
Plasticity Index Derivation BS1377:Part 2:1990,clause 5.4
Undrained shear strength triaxial compression without pore pressure measurement
(multistage loading) BS1377:Part 7:1990,clause 8.5

Non UKAS Accredited Tests Undertaken

Hand Vane

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.

Test were undertaken on samples 'as received' unless otherwise stated.

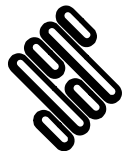
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd, The Potteries, Pottery Street, Castleford, WF10 1NJ Tel.01977 552255. E-mail mark.athorne@soils.co.uk

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
BH101	19/05846/1	U	5.00	13	33	17	16	78	Dark brown slightly sandy slightly gravelly CLAY
WS102	19/05846/2	D	3.50	18	34	18	16	93	Brown slightly sandy slightly gravelly CLAY
WS103	19/05846/3	U	4.00	23	40	18	22	81	Dark brown grey slightly sandy slightly gravelly CLAY
WS105	19/05846/4	D	3.50	21	31	16	15	98	Brown slightly sandy slightly gravelly CLAY



**STRUCTURAL
SOILS LTD**

Contract:

19/05846

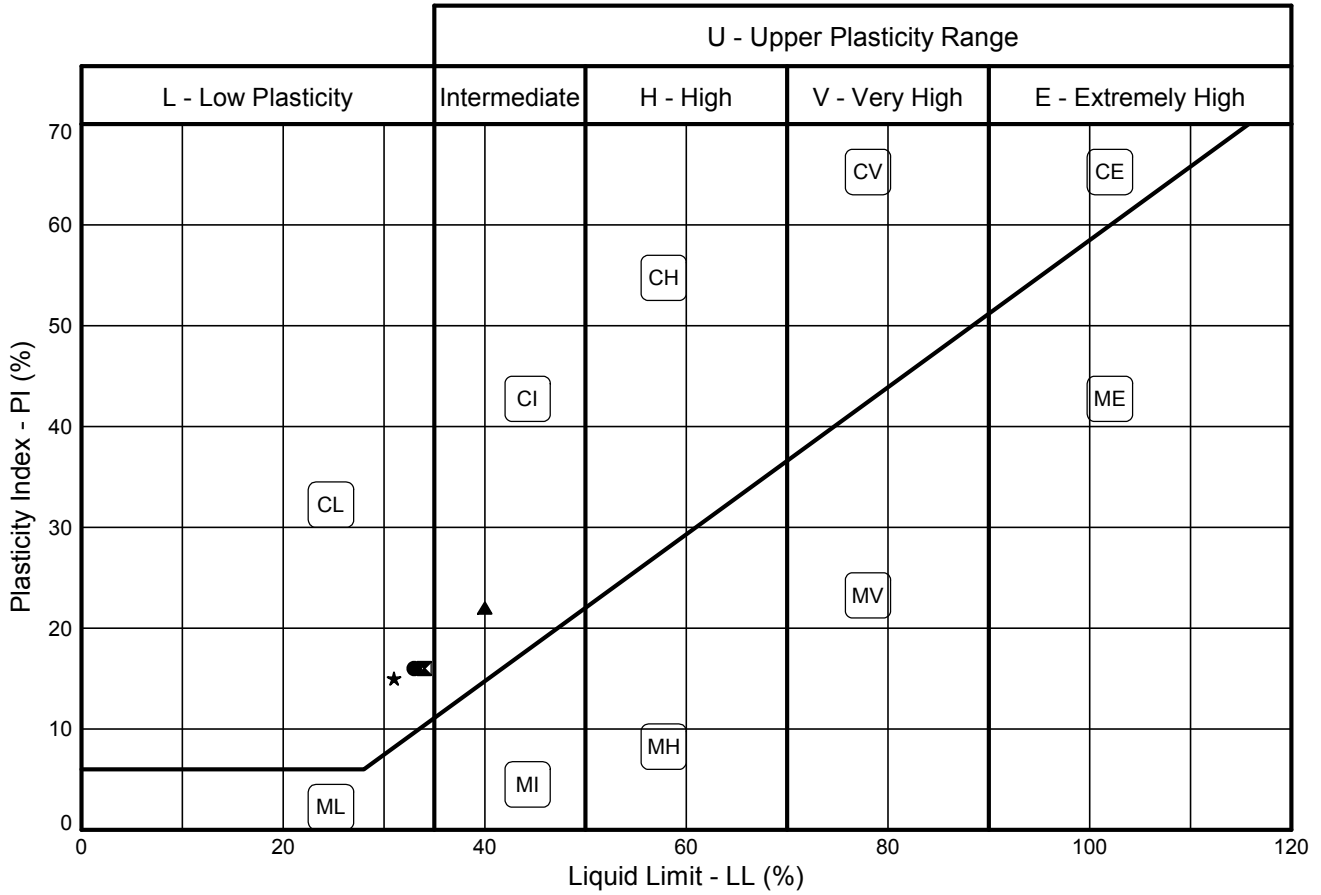
Contract Ref:

783951



PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



Sample Identification			BS Test Method #	Preparation Method +	MC %	LL %	PL %	PI %	<425um %	Lab location
Exploratory Position ID	Sample	Depth (m)								
● BH101	19/05846/1U	5.00	3.2/4.3/5.3/5.4	4.2.4	13	33	17	16	78	C
☒ WS102	19/05846/2D	3.50	3.2/4.3/5.3/5.4	4.2.4	18	34	18	16	93	C
▲ WS103	19/05846/3U	4.00	3.2/4.3/5.3/5.4	4.2.4	23	40	18	22	81	C
★ WS105	19/05846/4D	3.50	3.2/4.3/5.3/5.4	4.2.3	21	31	16	15	98	C

# Tested in accordance with the following clauses of BS1377-2:1990.	+ Tested in accordance with the following clauses of BS1377-2:1990.
3.2 - Moisture Content	4.2.3 - Natural State
4.3 - Cone Penetrometer Method	4.2.4 - Wet Sieved
4.4 - One Point Cone Penetrometer Method	
4.6 - One Point Casagrande Method	
5.3 - Plastic Limit Method	
5.4 - Plasticity Index	
	Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ	Compiled By		Date
			03/07/19
	Contract		Contract Ref:
	19/05846		783951

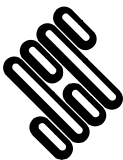
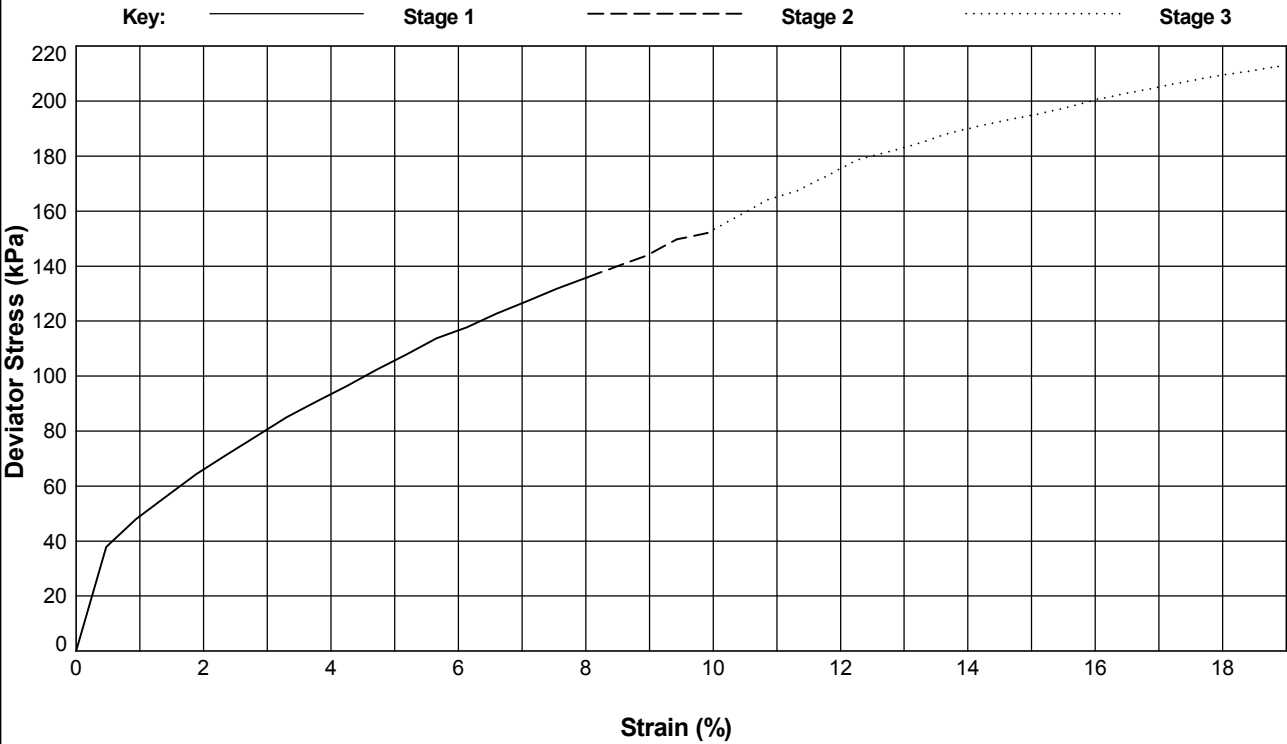
UNCONSOLIDATED QUICK UNDRAINED (MULTI-STAGE) TRIAXIAL COMPRESSION TEST

In accordance with BS1377:Part 7:1990, Clause 9

Borehole: **BH101** Sample Ref: **19/05846/1** Sample Type: **U** Depth (m): **5.00**

Description : **Dark brown slightly sandy slightly gravelly CLAY**

STAGE NUMBER		1	2	3
SAMPLE DETAILS	Sample Condition	Undisturbed		
	Orientation of sample	Vertical		
	Diameter (mm)	103.17		
	Height (mm)	212.00		
	Moisture Content (%)	16		
	Bulk Density (Mg/m ³)	2.18		
	Dry Density (Mg/m ³)	1.89		
TEST DETAILS	Membrane Thickness (mm)	0.31	0.31	0.31
	Rate of Axial Displacement (%/min)	2.00	2.00	2.00
	Cell Pressure (kPa)	50	100	200
	Membrane Correction (kPa)	0.58	0.69	1.10
	Corrected Deviator Stress (kPa)	136	152	213
	Undrained Shear Strength (kPa)	68	76	106
	Strain at Failure (%)	8.0	9.9	18.9
	Mode of Failure			Plastic



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By

M. Fisher

MAUREEN FISHER

Date

03/07/19

Contract

19/05846

Contract Ref:

783951

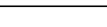


SUMMARY OF HAND PENETROMETER & HAND VANE TEST RESULTS

[illegible]

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

Key : HVP = Hand Vane (Peak), HVR = Hand Vane (Remoulded), PP = Pocket Penetrometer.

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ	Compiled By		Date	Contract Ref: 783951
	<i>M. Fisher</i>	MAUREEN FISHER	04.07.19	
	Contract: 19/05846			

Appendix G - Soil Screening Tables and Analytical Certificates

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/05826
Issue Number: 1

Date: 28 June, 2019

Client: Sutcliffe
18-20 Harrington Street
Liverpool
L2 9QA

Project Manager: Alex Tosh; Kelly Davies, Adrian Lewis; David Bowen
Project Name: Prospect House Primary School, Blackley, Manchester
Project Ref: 30186LG
Order No: 7677
Date Samples Received: 13/06/19
Date Instructions Received: 19/06/19
Date Analysis Completed: 27/06/19

Prepared by:



Holly Neary-King
Client Manager

Approved by:



Danielle Brierley
Client Manager

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
% Moisture at <40C _A	16.1	28.9	-	24.8	29.4	25.3	14.7	% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1	<0.1	-	10.4	8.8	13.5	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	7.52	7.31	-	7.38	-	7.32	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.05	0.67	-	0.79	-	1.23	-	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	930	7200	-	2500	-	3800	-	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	2	37	-	4	-	1	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	-	1.1	-	<0.2	-	mg/kg	0.2	A-T-050s
Sulphide _A	<5	<5	-	45	-	51	-	mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	710	31	-	2100	-	1300	-	mg/kg	5	A-T-029s
Organic matter _D ^{M#}	5.6	33.3	-	14.2	-	15.7	-	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	10	276	-	61	-	57	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0	1.0	-	5.6	-	2.7	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.8	3.0	-	3.6	-	2.1	-	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	48	668	-	1220	-	234	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	24	37	-	51	-	46	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	-	<1	-	<2	-	mg/kg	1	A-T-040s
Chromium (trivalent)	24	37	-	51	-	46	-	mg/kg	1	Calc
Lead _D ^{M#}	260	1650	-	332	-	243	-	mg/kg	1	A-T-024s
Mercury _D	0.65	9.66	-	0.82	-	1.65	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	19	73	-	86	-	61	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	4	-	2	-	3	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	113	1160	-	370	-	402	-	mg/kg	5	A-T-024s
Leachate Prep NRA (10:1) _A	*	*	-	-	*	-	*			A-T-001
pH (leachable) _A [#]	7.47	7.28	-	-	7.89	-	7.28	pH	0.01	A-T-031w
Sulphate (leachable) _A [#]	4.77	186.36	-	-	253.66	-	32.52	mg/l	1	A-T-026w
Cyanide (total) (leachable) _A	0.015	<0.005	-	-	<0.005	-	<0.005	mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable) _A	<0.01	<0.01	-	-	<0.01	-	<0.01	mg/l	0.01	A-T-050w
Sulphide (leachable) _A	<0.1	<0.1	-	-	<0.1	-	<0.1	mg/l	0.1	A-T-S2-w
DOC (leachable) _A [#]	3.5	1.7	-	-	3.5	-	1.7	mg/l	0.2	A-T-032w
Arsenic (leachable) _A [#]	3	2	-	-	9	-	<1	µg/l	1	A-T-025w
Boron (leachable) _A [#]	14	47	-	-	166	-	47	µg/l	10	A-T-025w
Cadmium (leachable) _A [#]	<1	<1	-	-	<1	-	<1	µg/l	1	A-T-025w
Copper (leachable) _A [#]	7	8	-	-	2	-	11	µg/l	1	A-T-025w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
Chromium (leachable) _A [#]	5	<1	-	-	<1	-	1	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable) _A	<0.05	<0.05	-	-	<0.05	-	<0.05	mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	<0.05	<0.05	-	-	<0.05	-	<0.05	mg/l	0.05	Calc
Lead (leachable) _A [#]	13	<1	-	-	<1	-	4	µg/l	1	A-T-025w
Mercury (leachable) _A [#]	<0.1	<0.1	-	-	<0.1	-	<0.1	µg/l	0.1	A-T-025w
Nickel (leachable) _A [#]	<1	9	-	-	2	-	4	µg/l	1	A-T-025w
Selenium (leachable) _A [#]	<1	2	-	-	<1	-	<1	µg/l	1	A-T-025w
Sulphur (elemental/free) (leachable) _A	<0.1	<0.1	-	-	<0.1	-	<0.1	mg/l	0.1	A-T-029w
Zinc (leachable) _A [#]	4	82	-	-	2	-	8	µg/l	1	A-T-025w
TPH total (>C6-C40) (leachable) _A	292	<80	-	-	84	-	<80	µg/l	80	A-T-007w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	Amosite	-	NAD	-	NAD	-			A-T-045
Asbestos Matrix (microscope) _D	-	Loose Fibres	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	-	N/A	-	N/A	-			
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _D	-	<0.001	-	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
PAH-16MS										
Acenaphthene _A ^{M#}	4.72	<0.01	-	7.51	-	0.10	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.36	<0.01	-	0.07	-	0.03	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	18.6	0.08	-	2.80	-	0.28	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	29.3	0.41	-	3.90	-	0.91	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	18.3	0.34	-	2.90	-	0.80	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	22.4	0.56	-	4.54	-	1.23	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	6.53	0.27	-	2.03	-	0.54	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	8.71	0.20	-	1.61	-	0.37	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	26.6	0.46	-	4.59	-	1.01	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	1.84	<0.04	-	0.48	-	0.14	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	62.7	1.00	-	12.8	-	1.84	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	5.57	<0.01	-	5.23	-	0.17	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	8.65	0.28	-	2.30	-	0.57	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.10	<0.03	-	2.49	-	0.03	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	61.9	0.46	-	12.4	-	1.11	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	50.9	0.87	-	10.9	-	1.62	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	327	4.93	-	76.5	-	10.8	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
PAH-16MS (leachable)										
Acenaphthene (leachable) _A	0.19	0.10	-	-	0.91	-	0.24	µg/l	0.01	A-T-019w
Acenaphthylene (leachable) _A	0.02	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Anthracene (leachable) _A	0.07	<0.01	-	-	0.04	-	0.06	µg/l	0.01	A-T-019w
Benzo(a)anthracene (leachable) _A	0.44	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Benzo(a)pyrene (leachable) _A	0.15	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (leachable) _A	0.20	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Benzo(ghi)perylene (leachable) _A	0.05	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (leachable) _A	0.08	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Chrysene (leachable) _A	0.33	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (leachable) _A	<0.01	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Fluoranthene (leachable) _A	1.71	<0.01	-	-	0.03	-	0.10	µg/l	0.01	A-T-019w
Fluorene (leachable) _A	0.11	<0.01	-	-	0.34	-	0.19	µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (leachable) _A	0.06	<0.01	-	-	<0.01	-	<0.01	µg/l	0.01	A-T-019w
Naphthalene (leachable) _A	<0.01	0.10	-	-	1.97	-	0.06	µg/l	0.01	A-T-019w
Phenanthrene (leachable) _A	0.03	<0.01	-	-	0.25	-	0.11	µg/l	0.01	A-T-019w
Pyrene (leachable) _A	1.48	<0.01	-	-	0.02	-	0.08	µg/l	0.01	A-T-019w
Total PAH-16MS (leachable) _A	4.92	0.20	-	-	3.56	-	0.84	µg/l	0.01	A-T-019w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<5	<1	-	12	-	2	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<5	<1	-	112	-	5	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	13	<1	-	160	-	6	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	30	3	-	236	-	10	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A	231	21	-	1020	-	59	-	mg/kg	1	A-T-055s
Ali >C35-C44 _A	45	10	-	405	-	35	-	mg/kg	1	A-T-055s
Total Aliphatics _A	273	24	-	1540	-	83	-	mg/kg	1	A-T-055s
Total Aliphatics _A	318	34	-	1950	-	118	-	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<5	1	-	<5	-	3	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<5	<1	-	37	-	5	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	106	3	-	101	-	6	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	1160	18	-	193	-	32	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	2680	62	-	438	-	159	-	mg/kg	1	A-T-055s
Aro >C35-C44 _A	33	8	-	49	-	20	-	mg/kg	1	A-T-055s
Total Aromatics _A	3950	84	-	769	-	206	-	mg/kg	1	A-T-055s
Total Aromatics _A	3980	93	-	819	-	226	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	4220	108	-	2310	-	289	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	4300	127	-	2770	-	343	-	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.05	-	<0.01	-	<0.02	-	mg/kg	0.01	A-T-022s
Forensic Description										
% of total sample Inert >10mm	26.65	-	6.71	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Wood >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/1	19/05826/2	19/05826/3	19/05826/4	19/05826/5	19/05826/6	19/05826/7	Units	Limit of Detection	Method ref
Client Sample No	1	1	2	1	2	1	2			
Client Sample ID	BH101	TP101	TP101	TP102	TP102	TP103	TP103			
Depth to Top	0.20	0.60	3.00	0.30	2.00	1.10	2.40			
Depth To Bottom	0.60	1.00	3.30	0.70	2.50	1.60	3.00			
Date Sampled	13-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19	12-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	4ABE	4AE	4ABE	4AE	4ABE	6AE			
% of total sample Vegetation >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Cloth >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Other Inert Material >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Paper >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Other Degradable Material >10mm	<0.10	-	<0.10	-	-	-	-	% w/w	0.1	Calc-no stones
% of total sample Fine Soil and Gravel <10mm	73.35	-	93.29	-	-	-	-	% w/w	0.1	Calc-no stones
Total Organic Carbon (Fine Soil) [#]	2.71	-	7.43	-	-	-	-	% w/w	0.03	Calc-no stones

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Client Project Name: Prospect House Primary School,
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Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
% Moisture at <40C _A	20.9	18.2	11.7	24.6	21.4	17.7	18.2	% w/w	0.1	A-T-044
% Stones >10mm _A	13.4	<0.1	<0.1	4.5	<0.1	<0.1	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	7.67	-	8.20	7.17	7.91	8.15	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.78	-	<0.01	0.21	0.02	0.01	-	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	2800	-	280	1100	390	690	-	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	3	-	<1	<1	<1	<1	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	mg/kg	0.2	A-T-050s
Sulphide _A	<5	-	<5	<5	<5	<5	-	mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	45	-	8	330	<5	<5	-	mg/kg	5	A-T-029s
Organic matter _D ^{M#}	8.6	-	7.8	4.9	1.9	9.4	-	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	29	-	11	12	16	29	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	1.5	-	<1.0	<1.0	<1.0	<1.0	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	2.2	-	0.5	1.3	0.8	42.3	-	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	333	-	37	67	55	46	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	40	-	14	29	23	41	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	-	<1	<1	<1	<1	-	mg/kg	1	A-T-040s
Chromium (trivalent)	40	-	14	29	23	41	-	mg/kg	1	Calc
Lead _D ^{M#}	193	-	89	72	112	72	-	mg/kg	1	A-T-024s
Mercury _D	1.06	-	<0.17	<0.17	<0.17	0.74	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	46	-	14	27	23	34	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	-	<1	<1	<1	2	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	2240	-	77	131	115	4140	-	mg/kg	5	A-T-024s
Leachate Prep NRA (10:1) _A	-	*	*	-	*	*	*			A-T-001
pH (leachable) _A [#]	-	6.82	7.17	-	7.33	7.43	6.91	pH	0.01	A-T-031w
Sulphate (leachable) _A [#]	-	75.20	5.01	-	4.17	1.79	44.09	mg/l	1	A-T-026w
Cyanide (total) (leachable) _A	-	<0.005	0.017	-	0.011	<0.005	<0.005	mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	mg/l	0.01	A-T-050w
Sulphide (leachable) _A	-	0.1	<0.1	-	<0.1	<0.1	0.1	mg/l	0.1	A-T-S2-w
DOC (leachable) _A [#]	-	6.4	3.3	-	3.3	2.5	5.7	mg/l	0.2	A-T-032w
Arsenic (leachable) _A [#]	-	7	3	-	3	6	2	µg/l	1	A-T-025w
Boron (leachable) _A [#]	-	54	14	-	12	<10	62	µg/l	10	A-T-025w
Cadmium (leachable) _A [#]	-	<1	<1	-	<1	<1	<1	µg/l	1	A-T-025w
Copper (leachable) _A [#]	-	11	11	-	10	6	29	µg/l	1	A-T-025w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
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Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
Chromium (leachable) _A [#]	-	<1	2	-	2	<1	<1	µg/l	1	A-T-025w
Chromium (hexavalent) (leachable) _A	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	mg/l	0.05	Calc
Lead (leachable) _A [#]	-	24	15	-	21	10	11	µg/l	1	A-T-025w
Mercury (leachable) _A [#]	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	µg/l	0.1	A-T-025w
Nickel (leachable) _A [#]	-	2	<1	-	<1	3	<1	µg/l	1	A-T-025w
Selenium (leachable) _A [#]	-	<1	<1	-	<1	<1	<1	µg/l	1	A-T-025w
Sulphur (elemental/free) (leachable) _A	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/l	0.1	A-T-029w
Zinc (leachable) _A [#]	-	10	11	-	6	10	4	µg/l	1	A-T-025w
TPH total (>C6-C40) (leachable) _A	-	<80	<80	-	<80	126	<80	µg/l	80	A-T-007w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	-	Amosite	NAD	NAD	NAD	-			A-T-045
Asbestos Matrix (microscope) _o	-	-	Loose Fibres	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	-	N/A	N/A	N/A	N/A	-			
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _o	-	-	<0.001	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
PAH-16MS										
Acenaphthene _A ^{M#}	0.01	-	0.12	0.13	<0.01	0.01	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	-	0.03	0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.03	-	0.43	0.25	<0.02	0.04	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.22	-	1.05	0.49	0.11	0.09	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.21	-	0.91	0.39	0.14	0.07	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.23	-	1.14	0.60	0.20	0.11	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.11	-	0.51	0.22	0.11	<0.05	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.11	-	0.44	0.20	<0.07	<0.07	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.18	-	0.96	0.51	0.14	0.11	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	-	0.12	<0.04	<0.04	<0.04	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.34	-	2.21	1.62	0.24	0.21	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	-	0.12	0.13	<0.01	<0.01	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.12	-	0.57	0.25	0.13	0.05	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	-	<0.03	<0.03	<0.03	<0.03	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.14	-	1.45	0.79	0.10	0.13	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.31	-	1.99	1.29	0.23	0.19	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	2.01	-	12.1	6.88	1.40	1.01	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
PAH-16MS (leachable)										
Acenaphthene (leachable) _A	-	0.27	0.22	-	0.08	0.19	0.93	µg/l	0.01	A-T-019w
Acenaphthylene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	0.23	µg/l	0.01	A-T-019w
Anthracene (leachable) _A	-	0.09	0.05	-	0.02	0.05	0.19	µg/l	0.01	A-T-019w
Benzo(a)anthracene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Benzo(a)pyrene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Benzo(ghi)perylene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Chrysene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Fluoranthene (leachable) _A	-	0.15	0.09	-	0.04	0.08	0.21	µg/l	0.01	A-T-019w
Fluorene (leachable) _A	-	0.26	0.15	-	0.07	0.15	0.70	µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (leachable) _A	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	µg/l	0.01	A-T-019w
Naphthalene (leachable) _A	-	0.08	0.13	-	0.06	0.04	0.22	µg/l	0.01	A-T-019w
Phenanthrene (leachable) _A	-	0.36	0.23	-	0.14	0.20	0.54	µg/l	0.01	A-T-019w
Pyrene (leachable) _A	-	0.11	0.06	-	0.03	0.05	0.12	µg/l	0.01	A-T-019w
Total PAH-16MS (leachable) _A	-	1.32	0.93	-	0.44	0.76	3.14	µg/l	0.01	A-T-019w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	-	<1	<1	<1	124	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	-	<1	1	<1	334	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	7	-	<1	4	<1	13	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	31	-	2	5	<1	2	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A	31	-	7	58	13	10	-	mg/kg	1	A-T-055s
Ali >C35-C44 _A	10	-	5	25	4	1	-	mg/kg	1	A-T-055s
Total Aliphatics _A	69	-	9	68	13	484	-	mg/kg	1	A-T-055s
Total Aliphatics _A	78	-	14	95	17	486	-	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	3	-	1	4	1	67	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	2	-	1	3	<1	128	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	5	-	3	8	1	27	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	27	-	15	22	4	16	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	48	-	59	73	20	63	-	mg/kg	1	A-T-055s
Aro >C35-C44 _A	12	-	6	16	10	4	-	mg/kg	1	A-T-055s
Total Aromatics _A	85	-	80	109	27	300	-	mg/kg	1	A-T-055s
Total Aromatics _A	97	-	85	124	37	304	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	154	-	89	177	39	785	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	176	-	99	219	53	790	-	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Forensic Description										
% of total sample Inert >10mm	-	-	-	-	14.58	37.61	-	% w/w	0.1	Calc-no stones
% of total sample Wood >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/8	19/05826/9	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/14	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	2	1	1	1			
Client Sample ID	TP104	TP104	WS101	WS101	WS102	WS103	WS104			
Depth to Top	0.30	2.40	0.20	3.00	0.30	0.20	4.40			
Depth To Bottom	0.80	2.70	0.60	3.50	0.70	0.60	4.90			
Date Sampled	12-Jun-19	12-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19	13-Jun-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6AE	4AE	6AE	5AE	4AE	5E			
% of total sample Vegetation >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Cloth >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Other Inert Material >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Paper >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Other Degradable Material >10mm	-	-	-	-	<0.10	<0.10	-	% w/w	0.1	Calc-no stones
% of total sample Fine Soil and Gravel <10mm	-	-	-	-	85.42	62.39	-	% w/w	0.1	Calc-no stones
Total Organic Carbon (Fine Soil) [#]	-	-	-	-	0.88	4.50	-	% w/w	0.03	Calc-no stones

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15									
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
% Moisture at <40C _A	9.2							% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1							% w/w	0.1	A-T-044
pH _D ^{M#}	8.61							pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.03							g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	390							mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2							mg/kg	0.2	A-T-050s
Sulphide _A	<5							mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	310							mg/kg	5	A-T-029s
Organic matter _D ^{M#}	6.4							% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	6							mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0							mg/kg	1	A-T-027s
Cadmium _D ^{M#}	0.8							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	23							mg/kg	1	A-T-024s
Chromium _D ^{M#}	39							mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1							mg/kg	1	A-T-040s
Chromium (trivalent)	39							mg/kg	1	Calc
Lead _D ^{M#}	29							mg/kg	1	A-T-024s
Mercury _D	0.54							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	36							mg/kg	1	A-T-024s
Selenium _D ^{M#}	1							mg/kg	1	A-T-024s
Zinc _D ^{M#}	61							mg/kg	5	A-T-024s
Leachate Prep NRA (10:1) _A	*									A-T-001
pH (leachable) _A [#]	7.31							pH	0.01	A-T-031w
Sulphate (leachable) _A [#]	3.86							mg/l	1	A-T-026w
Cyanide (total) (leachable) _A	<0.005							mg/l	0.005	A-T-042wTCN
Phenols (total by HPLC) (leachable) _A	<0.01							mg/l	0.01	A-T-050w
Sulphide (leachable) _A	<0.1							mg/l	0.1	A-T-S2-w
DOC (leachable) _A [#]	1.7							mg/l	0.2	A-T-032w
Arsenic (leachable) _A [#]	2							µg/l	1	A-T-025w
Boron (leachable) _A [#]	<10							µg/l	10	A-T-025w
Cadmium (leachable) _A [#]	<1							µg/l	1	A-T-025w
Copper (leachable) _A [#]	6							µg/l	1	A-T-025w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
Chromium (leachable) _A [#]	<1							µg/l	1	A-T-025w
Chromium (hexavalent) (leachable) _A	<0.05							mg/l	0.05	A-T-040w
Chromium (trivalent) (leachable)	<0.05							mg/l	0.05	Calc
Lead (leachable) _A [#]	7							µg/l	1	A-T-025w
Mercury (leachable) _A [#]	<0.1							µg/l	0.1	A-T-025w
Nickel (leachable) _A [#]	<1							µg/l	1	A-T-025w
Selenium (leachable) _A [#]	<1							µg/l	1	A-T-025w
Sulphur (elemental/free) (leachable) _A	<0.1							mg/l	0.1	A-T-029w
Zinc (leachable) _A [#]	5							µg/l	1	A-T-025w
TPH total (>C6-C40) (leachable) _A	355							µg/l	80	A-T-007w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A									

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
PAH-16MS										
Acenaphthene _A ^{M#}	2.61							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.57							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	8.57							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	23							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	18.7							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	22							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	8.30							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	9.10							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	20.9							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	2.21							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	43							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	2.53							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	10.6							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.03							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	25.5							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	35.8							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	233							mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
PAH-16MS (leachable)										
Acenaphthene (leachable) _A	2.19							µg/l	0.01	A-T-019w
Acenaphthylene (leachable) _A	0.09							µg/l	0.01	A-T-019w
Anthracene (leachable) _A	1.04							µg/l	0.01	A-T-019w
Benzo(a)anthracene (leachable) _A	1.22							µg/l	0.01	A-T-019w
Benzo(a)pyrene (leachable) _A	0.47							µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (leachable) _A	0.61							µg/l	0.01	A-T-019w
Benzo(ghi)perylene (leachable) _A	0.16							µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (leachable) _A	0.25							µg/l	0.01	A-T-019w
Chrysene (leachable) _A	1.02							µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (leachable) _A	0.04							µg/l	0.01	A-T-019w
Fluoranthene (leachable) _A	5.26							µg/l	0.01	A-T-019w
Fluorene (leachable) _A	1.06							µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (leachable) _A	0.19							µg/l	0.01	A-T-019w
Naphthalene (leachable) _A	0.28							µg/l	0.01	A-T-019w
Phenanthrene (leachable) _A	0.90							µg/l	0.01	A-T-019w
Pyrene (leachable) _A	4.09							µg/l	0.01	A-T-019w
Total PAH-16MS (leachable) _A	18.9							µg/l	0.01	A-T-019w

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15									
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<5							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<5							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	6							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	224							mg/kg	1	A-T-055s
Ali >C21-C35 _A	352							mg/kg	1	A-T-055s
Ali >C35-C44 _A	7							mg/kg	1	A-T-055s
Total Aliphatics _A	581							mg/kg	1	A-T-055s
Total Aliphatics _A	588							mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	9							mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	12							mg/kg	1	A-T-055s
Aro >C12-C16 _A	24							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	726							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	323							mg/kg	1	A-T-055s
Aro >C35-C44 _A	10							mg/kg	1	A-T-055s
Total Aromatics _A	1090							mg/kg	1	A-T-055s
Total Aromatics _A	1100							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	1670							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	1700							mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s
Forensic Description										
% of total sample Inert >10mm	55.15							% w/w	0.1	Calc-no stones
% of total sample Wood >10mm	<0.10							% w/w	0.1	Calc-no stones

Envirolab Job Number: 19/05826

Client Project Name: Prospect House Primary School,
Blackley, Manchester

Client Project Ref: 30186LG

Lab Sample ID	19/05826/15							Units	Limit of Detection	Method ref
Client Sample No	1									
Client Sample ID	WS105									
Depth to Top	0.30									
Depth To Bottom	0.70									
Date Sampled	13-Jun-19									
Sample Type	Soil - ES									
Sample Matrix Code	4AE									
% of total sample Vegetation >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Cloth >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Other Inert Material >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Paper >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Other Degradable Material >10mm	<0.10							% w/w	0.1	Calc-no stones
% of total sample Fine Soil and Gravel <10mm	44.85							% w/w	0.1	Calc-no stones
Total Organic Carbon (Fine Soil) [#]	3.38							% w/w	0.03	Calc-no stones

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

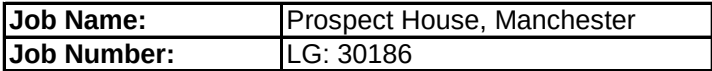
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



Job Name:	Prospect House, Manchester
Job Number:	LG: 30186

Sutcliffe		ATKINS REVISED 31/03/11, CATEGORY 4 - APRIL 2014, LQM JAN 2015					MG	MG	MG	MG	MG	MG	MG	MG	MG	MG
							19/05826	19/05826	19/05826	19/05826	19/05826	19/05826	19/05826	19/05826	19/05826	19/05826
		RESIDENTIAL WITHOUT PLANT UPTAKE					19/05826/1	19/05826/2	19/05826/4	19/05826/6	19/05826/8	19/05826/10	19/05826/11	19/05826/12	19/05826/13	19/05826/15
		Category 4 Screening Levels (6%)	Atkins Atrisk	LQM			BH101	TP101	TP102	TP103	TP104	WS101	WS101	WS102	WS103	WS105
SOM 1%	SOM 2.5%			SOM 5%	0.20 - 0.60m	0.60 - 1.00m	0.30 - 0.70m	1.10 - 1.60m	0.30 - 0.80m	0.20 - 0.60m	3.00 - 3.50m	0.30 - 0.70m	0.20 - 0.60m	0.30 - 0.70m		
Contaminant	Units															
Arsenic (Total)	mg/kg	40			40	10	276	61	57	29	11	12	16	29	6	
Boron (Soluble)	mg/kg				11000	<1.0	1	5.6	2.7	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	
Cadmium (Total)	mg/kg	149			85	0.8	3	3.6	2.1	2.2	0.5	1.3	0.8	42.3	0.8	
Chromium III	mg/kg				910	24	37	51	46	40	14	29	23	41	39	
Chromium VI	mg/kg	21			6	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	
Copper (Total)	mg/kg				7100	48	668	1220	234	333	37	67	55	46	23	
Lead (Total)	mg/kg	310				260	1650	332	243	193	89	72	112	72	29	
Mercury (Total)	mg/kg				56	0.65	9.66	0.82	1.65	1.06	<0.17	<0.17	<0.17	0.74	0.54	
Nickel (Total)	mg/kg				180	19	73	86	61	46	14	27	23	34	36	
Selenium (Total)	mg/kg				430	<1	4	2	3	<1	<1	<1	<1	2	1	
Zinc (Total)	mg/kg				40000	113	1160	370	402	2240	77	131	115	4140	61	
Cyanide (Total)	mg/kg		34			2	37	4	1	3	<1	<1	<1	<1	<1	
Phenols (Total)	mg/kg				750	<0.2	<0.2	1.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Organic matter	%					5.6	33.3	14.2	15.7	8.6	7.8	4.9	1.9	9.4	6.4	
Sulphate (Acid Soluble)	mg/kg					930	7200	2500	3800	2800	280	1100	390	690	390	
Sulphate as Water Soluble	g/l					0.05	0.67	0.79	1.23	0.78	<0.01	0.21	0.02	0.01	0.03	
Sulphide	mg/kg					<5	<5	45	51	<5	<5	<5	<5	<5	<5	
pH	pH units					7.52	7.31	7.38	7.32	7.67	8.2	7.17	7.91	8.15	8.61	
Sulphur (Elemental)	mg/kg					710	31	2100	1300	45	8	330	<5	<5	310	
Asbestos						NAD	Amosite Loose Fibres	NAD	NAD	NAD	Amosite Loose Fibres	NAD	NAD	NAD	NAD	
Asbestos Quantification						N/A	<0.001	N/A	N/A	N/A	<0.001	N/A	N/A	N/A	N/A	
>> TPH SUITE <<																
Total Aliphatic																
>C5 to C6 aliphatic	mg/kg				42	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C6 to C8 aliphatic	mg/kg				100	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C8 to C10 aliphatic	mg/kg				27	<5	<1	12	2	<1	<1	<1	<1	124	<5	
>C10 to C12 aliphatic	mg/kg				130	<5	<1	112	5	<1	<1	1	<1	334	<5	
>C12 to C16 aliphatic	mg/kg				1100	13	<1	160	6	7	<1	4	<1	13	6	
>C16 to C21 aliphatic	mg/kg				65000	30	3	236	10	31	2	5	<1	2	224	
>C21 to C35 aliphatic	mg/kg				65000	231	21	1020	59	31	7	58	13	10	352	
>C35 to C44 aliphatic	mg/kg				65000	45	10	405	35	10	5	25	4	1	7	
Total Aromatic																
>C5 to C7 aromatic (Benzene)	mg/kg				370	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C7 to C8 aromatic (Toluene)	mg/kg				860	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C8 to C10 aromatic	mg/kg				47	<5	1	<5	3	3	1	4	1	67	9	
>C10 to C12 aromatic	mg/kg				250	<5	<1	37	5	2	1	3	<1	128	12	
>C12 to C16 aromatic	mg/kg				1800	106	3	101	6	5	3	8	1	27	24	
>C16 to C21 aromatic	mg/kg				1900	1160	18	193	32	27	15	22	4	16	726	
>C21 to C35 aromatic	mg/kg				1900	2680	62	438	159	48	59	73	20	63	323	
>C35 to C44 aromatic	mg/kg				1900	33	8	49	20	12	6	16	10	4	10	
>> BTEX SUITE <<																
benzene	mg/kg	3.3			0.38	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
toluene	mg/kg				880	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
ethylbenzene	mg/kg				83	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m&p-xylene	mg/kg				79	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o-xylene	mg/kg				88	<0.01	<0.05	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>> PAH SUITE <<																
naphthalene	mg/kg				2.3	0.1	<0.03	2.49	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03
acenaphthylene	mg/kg				2900	0.36	<0.01	0.07	0.03	<0.01	0.03	0.01	<0.01	<0.01	<0.01	0.57
acenaphthene	mg/kg				3000	4.72	<0.01	7.51	0.1	0.01	0.12	0.13	<0.01	0.01	2.61	
fluorene	mg/kg				2800	5.57	<0.01	5.23	0.17	<0.01	0.12	0.13	<0.01	<0.01	2.53	
phenanthrene	mg/kg				1300	61.9	0.46	12.4	1.11	0.14	1.45	0.79	0.1	0.13	25.5	
anthracene	mg/kg				31000	18.6	0.08	2.8	0.28	0.03	0.43	0.25	<0.02	0.04	8.57	
fluoranthene	mg/kg				1500	62.7	1	12.8	1.84	0.34	2.21	1.62	0.24	0.21	43	
pyrene	mg/kg				3700	50.9	0.87	10.9	1.62	0.31	1.99	1.29	0.23	0.19	35.8	
benzo(a)anthracene	mg/kg				11	29.3	0.41	3.9	0.91	0.22	1.05	0.49	0.11	0.09	23	
chrysene	mg/kg				30	26.6	0.46	4.59	1.01	0.18	0.96	0.51	0.14	0.11	20.9	
benzo(b)fluoranthene	mg/kg				3.9	22.4	0.56	4.54	1.23	0.23	1.14	0.6	0.2	0.11	22	
benzo(k)fluoranthene	mg/kg				110	8.71	0.2	1.61	0.37	0.11	0.44	0.2	<0.07	<0.07	9.1	
benzo(a)pyrene	mg/kg	5.3			3.2	18.3	0.34	2.9	0.8	0.21	0.91	0.39	0.14	0.07	18.7	
dibenzo(ah)anthracene	mg/kg				0.31	1.84	<0.04	0.48	0.14	<0.04	0.12	<0.04	<0.04	<0.04	2.21	
benzo(ghi)perylene	mg/kg				360	6.53	0.27	2.03	0.54	0.11	0.51	0.22	0.11	<0.05	8.3	
indeno(123cd)pyrene	mg/kg				45	8.65	0.28	2.3	0.57	0.12	0.57	0.25	0.13	0.05	10.6	



Job Name:	Prospect House, Manchester
Job Number:	LG: 30186

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 20/02573
Issue Number: 1

Date: 23 March, 2020

Client: Sutcliffe
18-20 Harrington Street
Liverpool
L2 9QA

Project Manager: S Hale; A Lewis; D Bowen; A Tosh; C.Odedra
Project Name: Prospect House
Project Ref: 30186LG
Order No: 8021
Date Samples Received: 12/03/20
Date Instructions Received: 13/03/20
Date Analysis Completed: 23/03/20

Prepared by:



Sophie France
Client Service Manager

Approved by:



John Gustafson
Managing Director

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/1	20/02573/2	20/02573/3	20/02573/4	20/02573/8	20/02573/9	20/02573/10	Units	Limit of Detection	Method ref
Client Sample No	4	2	1	1	1	1	1			
Client Sample ID	TP209	TP205	TP208	TP206	TP209	TP204	TP205			
Depth to Top	2.50	0.30	0.50	0.30	0.00	0.00	0.00			
Depth To Bottom	3.00	0.80	1.10	0.60	0.20	0.20	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	6AE	6ABE	6AE	4AE	4AE			
% Moisture at <40C _A	40.3	21.0	17.4	16.2	-	-	-	% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1	5.9	11.9	5.0	-	-	-	% w/w	0.1	A-T-044
pH _D ^{M#}	7.43	8.10	8.13	8.52	-	-	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.15	0.06	<0.01	0.02	-	-	-	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	3400	1300	290	600	-	-	-	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	7	27	1	<1	-	-	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	16.2	<0.2	<0.2	<0.2	-	-	-	mg/kg	0.2	A-T-050s
Sulphide _A	250	13	<5	8	-	-	-	mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	810	26	19	38	-	-	-	mg/kg	5	A-T-029s
Organic matter _D ^{M#}	28.3	12.0	9.9	3.9	-	-	-	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	61	62	10	21	-	-	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	1.7	<1.0	<1.0	<1.0	-	-	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	3.7	2.2	0.6	1.2	-	-	-	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	205	186	26	70	-	-	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	34	73	13	24	-	-	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	-	-	-	mg/kg	1	A-T-040s
Chromium (trivalent)	34	73	13	24	-	-	-	mg/kg	1	Calc
Lead _D ^{M#}	811	1080	49	261	-	-	-	mg/kg	1	A-T-024s
Mercury _D	0.45	1.13	0.24	0.31	-	-	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	58	35	19	24	-	-	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	2	2	<1	2	-	-	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	750	1030	53	158	-	-	-	mg/kg	5	A-T-024s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/1	20/02573/2	20/02573/3	20/02573/4	20/02573/8	20/02573/9	20/02573/10	Units	Limit of Detection	Method ref
Client Sample No	4	2	1	1	1	1	1			
Client Sample ID	TP209	TP205	TP208	TP206	TP209	TP204	TP205			
Depth to Top	2.50	0.30	0.50	0.30	0.00	0.00	0.00			
Depth To Bottom	3.00	0.80	1.10	0.60	0.20	0.20	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	6AE	6ABE	6AE	4AE	4AE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	Amosite	NAD	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos Matrix (microscope) _D	Board	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	No	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _D	0.002	-	-	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/1	20/02573/2	20/02573/3	20/02573/4	20/02573/8	20/02573/9	20/02573/10	Units	Limit of Detection	Method ref
Client Sample No	4	2	1	1	1	1	1			
Client Sample ID	TP209	TP205	TP208	TP206	TP209	TP204	TP205			
Depth to Top	2.50	0.30	0.50	0.30	0.00	0.00	0.00			
Depth To Bottom	3.00	0.80	1.10	0.60	0.20	0.20	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	6AE	6ABE	6AE	4AE	4AE			
PAH-16MS										
Acenaphthene _A ^{M#}	1.52	0.06	0.02	0.45	-	-	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.22	0.01	<0.01	0.01	-	-	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.97	0.13	0.04	0.53	-	-	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	1.32	0.58	0.18	1.53	-	-	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.79	0.44	0.13	1.12	-	-	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	1.07	0.60	0.17	1.44	-	-	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.30	0.25	0.07	0.52	-	-	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.37	0.24	<0.07	0.49	-	-	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	1.51	0.67	0.22	1.92	-	-	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	0.12	-	-	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	4.17	1.20	0.35	3.45	-	-	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	1.88	0.04	0.01	0.32	-	-	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.42	0.32	0.09	0.69	-	-	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	2.73	<0.03	<0.03	0.36	-	-	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	5.73	0.66	0.20	2.48	-	-	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	3.79	1.16	0.34	3.21	-	-	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	26.8	6.36	1.82	18.6	-	-	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/1	20/02573/2	20/02573/3	20/02573/4	20/02573/8	20/02573/9	20/02573/10	Units	Limit of Detection	Method ref
Client Sample No	4	2	1	1	1	1	1			
Client Sample ID	TP209	TP205	TP208	TP206	TP209	TP204	TP205			
Depth to Top	2.50	0.30	0.50	0.30	0.00	0.00	0.00			
Depth To Bottom	3.00	0.80	1.10	0.60	0.20	0.20	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	6AE	6ABE	6AE	4AE	4AE			
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	0.13	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	104	<1	<1	<1	-	-	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	266	<1	<1	<1	-	-	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	648	<1	1	<1	-	-	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	590	4	2	1	-	-	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A	605	123	5	6	-	-	-	mg/kg	1	A-T-055s
Ali >C35-C44 _A	169	19	4	2	-	-	-	mg/kg	1	A-T-055s
Total Aliphatics _A	2380	145	13	10	-	-	-	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	111	5	1	1	-	-	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	278	2	1	<1	-	-	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	714	5	6	3	-	-	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	509	13	23	11	-	-	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	528	95	75	36	-	-	-	mg/kg	1	A-T-055s
Aro >C35-C44 _A	40	33	6	5	-	-	-	mg/kg	1	A-T-055s
Total Aromatics _A	2180	151	113	57	-	-	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	4560	297	126	67	-	-	-	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	0.07	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	0.23	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	0.13	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/12	20/02573/14	20/02573/16	20/02573/17	20/02573/18	20/02573/19	20/02573/20	Units	Limit of Detection	Method ref
Client Sample No	1	1	1	2	2	3	1			
Client Sample ID	TP201	TP202	TP203	TP204	TP203	TP202	TP210			
Depth to Top	0.15	0.00	0.00	0.50	0.50	1.00	0.00			
Depth To Bottom	0.25	0.20	0.20	0.90	1.00	1.10	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	7	6AE	6AE	4ABE	6AE	6A	4AE			
% Moisture at <40C _A	-	-	-	30.9	31.2	25.8	-	% w/w	0.1	A-T-044
% Stones >10mm _A	-	-	-	<0.1	18.1	<0.1	-	% w/w	0.1	A-T-044
pH _D ^{M#}	-	-	-	6.71	7.52	7.13	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	-	-	0.35	0.52	0.02	-	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	-	-	-	1700	7100	710	-	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	-	-	-	20	2	<1	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	-	-	-	<0.2	<0.2	<0.2	-	mg/kg	0.2	A-T-050s
Sulphide _A	-	-	-	<5	350	20	-	mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	-	-	-	12	2100	430	-	mg/kg	5	A-T-029s
Organic matter _D ^{M#}	-	-	-	13.1	16.2	1.5	-	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	-	-	-	31	205	17	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	-	-	-	1.4	1.9	<1.0	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	-	-	-	2.2	3.1	1.1	-	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	-	-	-	198	387	14	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	-	-	-	96	38	29	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	-	-	-	<1	<1	<1	-	mg/kg	1	A-T-040s
Chromium (trivalent)	-	-	-	96	38	29	-	mg/kg	1	Calc
Lead _D ^{M#}	-	-	-	412	672	41	-	mg/kg	1	A-T-024s
Mercury _D	-	-	-	0.87	0.93	<0.17	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	-	-	-	47	62	17	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	-	-	-	2	2	2	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	-	-	-	407	629	93	-	mg/kg	5	A-T-024s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/12	20/02573/14	20/02573/16	20/02573/17	20/02573/18	20/02573/19	20/02573/20	Units	Limit of Detection	Method ref
Client Sample No	1	1	1	2	2	3	1			
Client Sample ID	TP201	TP202	TP203	TP204	TP203	TP202	TP210			
Depth to Top	0.15	0.00	0.00	0.50	0.50	1.00	0.00			
Depth To Bottom	0.25	0.20	0.20	0.90	1.00	1.10	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	7	6AE	6AE	4ABE	6AE	6A	4AE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	Chrysotile	NAD	NAD	NAD			A-T-045
Asbestos Matrix (microscope) _D	-	-	-	Loose Fibres	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _D	-	-	-	0.002	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/12	20/02573/14	20/02573/16	20/02573/17	20/02573/18	20/02573/19	20/02573/20	Units	Limit of Detection	Method ref
Client Sample No	1	1	1	2	2	3	1			
Client Sample ID	TP201	TP202	TP203	TP204	TP203	TP202	TP210			
Depth to Top	0.15	0.00	0.00	0.50	0.50	1.00	0.00			
Depth To Bottom	0.25	0.20	0.20	0.90	1.00	1.10	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	7	6AE	6AE	4ABE	6AE	6A	4AE			
PAH-16MS										
Acenaphthene _A ^{M#}	-	-	-	0.03	0.02	0.70	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	-	-	-	<0.01	<0.01	0.18	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	-	-	-	0.07	<0.02	0.11	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	-	-	-	0.52	<0.04	<0.04	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	-	-	-	0.45	<0.04	<0.04	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	-	-	-	0.62	<0.05	<0.05	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	-	-	-	0.32	<0.05	<0.05	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	-	-	-	0.22	<0.07	<0.07	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	-	-	-	0.64	<0.06	<0.06	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	-	-	-	<0.04	<0.04	<0.04	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	-	-	-	0.87	<0.08	<0.08	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	-	-	-	0.01	0.02	1.20	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	-	-	-	0.39	<0.03	<0.03	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	-	-	-	<0.03	<0.03	3.27	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	-	-	-	0.32	0.08	2.74	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	-	-	-	0.84	<0.07	0.34	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	-	-	-	5.30	0.12	8.54	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/12	20/02573/14	20/02573/16	20/02573/17	20/02573/18	20/02573/19	20/02573/20	Units	Limit of Detection	Method ref
Client Sample No	1	1	1	2	2	3	1			
Client Sample ID	TP201	TP202	TP203	TP204	TP203	TP202	TP210			
Depth to Top	0.15	0.00	0.00	0.50	0.50	1.00	0.00			
Depth To Bottom	0.25	0.20	0.20	0.90	1.00	1.10	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	7	6AE	6AE	4ABE	6AE	6A	4AE			
TPH UKCWG										
Ali >C5-C6 _A [#]	-	-	-	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	-	-	-	<0.01	<0.01	0.16	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	-	-	-	1	10	82	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	-	-	-	3	26	206	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	-	-	-	3	18	511	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	-	-	-	10	50	461	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A	-	-	-	137	788	128	-	mg/kg	1	A-T-055s
Ali >C35-C44 _A	-	-	-	33	139	<5	-	mg/kg	1	A-T-055s
Total Aliphatics _A	-	-	-	188	1030	1390	-	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	-	-	-	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	-	-	-	<0.01	<0.01	0.07	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	-	-	-	6	18	102	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	-	-	-	3	21	280	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	-	-	-	4	27	740	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	-	-	-	22	124	371	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	-	-	-	101	558	69	-	mg/kg	1	A-T-055s
Aro >C35-C44 _A	-	-	-	38	74	9	-	mg/kg	1	A-T-055s
Total Aromatics _A	-	-	-	174	821	1580	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	-	-	-	362	1860	2970	-	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	-	-	-	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	-	-	-	<0.01	<0.01	0.07	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	-	-	-	<0.01	<0.01	0.11	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	-	-	-	<0.01	<0.01	0.43	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	-	-	-	<0.01	<0.01	0.32	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	-	-	-	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/22							Units	Limit of Detection	Method ref
Client Sample No	3									
Client Sample ID	TP210									
Depth to Top	1.50									
Depth To Bottom	2.00									
Date Sampled	10-Mar-20									
Sample Type	Soil - ES									
Sample Matrix Code	6AE									
% Moisture at <40C _A	38.0							% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1							% w/w	0.1	A-T-044
pH _D ^{M#}	7.45							pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.44							g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	4000							mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	2							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2							mg/kg	0.2	A-T-050s
Sulphide _A	56							mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	1500							mg/kg	5	A-T-029s
Organic matter _D ^{M#}	12.4							% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	52							mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	2.9							mg/kg	1	A-T-027s
Cadmium _D ^{M#}	3.5							mg/kg	0.5	A-T-024s
Copper _D ^{M#}	208							mg/kg	1	A-T-024s
Chromium _D ^{M#}	38							mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1							mg/kg	1	A-T-040s
Chromium (trivalent)	38							mg/kg	1	Calc
Lead _D ^{M#}	276							mg/kg	1	A-T-024s
Mercury _D	0.50							mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	46							mg/kg	1	A-T-024s
Selenium _D ^{M#}	2							mg/kg	1	A-T-024s
Zinc _D ^{M#}	1290							mg/kg	5	A-T-024s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/22							Units	Limit of Detection	Method ref
Client Sample No	3									
Client Sample ID	TP210									
Depth to Top	1.50									
Depth To Bottom	2.00									
Date Sampled	10-Mar-20									
Sample Type	Soil - ES									
Sample Matrix Code	6AE									
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD									A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A									A-T-045

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/22							Units	Limit of Detection	Method ref
Client Sample No	3									
Client Sample ID	TP210									
Depth to Top	1.50									
Depth To Bottom	2.00									
Date Sampled	10-Mar-20									
Sample Type	Soil - ES									
Sample Matrix Code	6AE									
PAH-16MS										
Acenaphthene _A ^{M#}	0.10							mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01							mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.13							mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.48							mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.31							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.47							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.19							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.15							mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.63							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04							mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	1.11							mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.06							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.26							mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03							mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.68							mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	1.00							mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	5.57							mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/22							Units	Limit of Detection	Method ref
Client Sample No	3									
Client Sample ID	TP210									
Depth to Top	1.50									
Depth To Bottom	2.00									
Date Sampled	10-Mar-20									
Sample Type	Soil - ES									
Sample Matrix Code	6AE									
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	0.02							mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1							mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	2							mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	3							mg/kg	1	A-T-055s
Ali >C21-C35 _A	26							mg/kg	1	A-T-055s
Ali >C35-C44 _A	11							mg/kg	1	A-T-055s
Total Aliphatics _A	42							mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01							mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	2							mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<1							mg/kg	1	A-T-055s
Aro >C12-C16 _A	3							mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	13							mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	37							mg/kg	1	A-T-055s
Aro >C35-C44 _A	6							mg/kg	1	A-T-055s
Total Aromatics _A	63							mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	105							mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01							mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01							mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Sutcliffe, 18-20 Harrington Street, Liverpool, L2 9QA

Project No: 20/02573

Project: Prospect House

Date Received: 13/03/2020 (am)

Clients Project No: 30186LG

Cool Box Temperatures (°C): 10.3 & 10.4

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.



Job Name:	Prospect House
Job Number	30186LG

Sutcliffe		ATKINS REVISED 31/03/11, CATEGORY 4 - APRIL 2014, LQM JAN 2015						TP209	TP205	TP208	TP206	TP204	TP203	TP202	TP210	TP209	TP204	TP205	TP201	TP202	TP203	TP210
								2.50	0.30	0.50	0.30	0.50	0.50	1.00	1.50	0.00	0.00	0.00	0.15	0.00	0.00	0.00
		RESIDENTIAL WITHOUT PLANT UPTAKE						3.00	0.80	1.10	0.60	0.90	1.00	1.10	2.00	0.20	0.20	0.20	0.25	0.20	0.20	0.20
		Category 4 Screening Levels (6%)	Atkins Atrisk	LQM			10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20
Contaminant	Units	SOM 1%	SOM 2.5%	SOM 5%	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	
Arsenic (Total)	mg/kg	40		40	61	62	10	21	31	205	17	52										
Boron (Soluble)	mg/kg			11000	1.7	<1.0	<1.0	<1.0	1.4	1.9	<1.0	2.9										
Cadmium (Total)	mg/kg	149		85	3.7	2.2	0.6	1.2	2.2	3.1	1.1	3.5										
Chromium III	mg/kg			910	34	73	13	24	96	38	29	38										
Chromium VI	mg/kg	21		6	<1	<1	<1	<1	<1	<1	<1	<1										
Copper (Total)	mg/kg			7100	205	186	26	70	198	387	14	208										
Lead (Total)	mg/kg	310			811	1080	49	261	412	672	41	276										
Mercury (Total)	mg/kg			56	0.45	1.13	0.24	0.31	0.87	0.93	<0.17	0.5										
Nickel (Total)	mg/kg			180	58	35	19	24	47	62	17	46										
Selenium (Total)	mg/kg			430	2	2	<1	2	2	2	2	2										
Zinc (Total)	mg/kg			40000	750	1030	53	158	407	629	93	1290										
Cyanide (Total)	mg/kg		34		7	27	1	<1	20	2	<1	2										
Phenols (Total)	mg/kg			750	1300	2300	16.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2								
Organic matter	%				28.3	12	9.9	3.9	13.1	16.2	1.5	12.4										
Sulphate (Acid Soluble)	mg/kg				3400	1300	290	600	1700	7100	710	4000										
Sulphate as Water Soluble	g/l				0.15	0.06	<0.01	0.02	0.35	0.52	0.02	0.44										
Sulphide	mg/kg				250	13	<5	8	<5	350	20	56										
pH	pH units				7.43	8.1	8.13	8.52	6.71	7.52	7.13	7.45										
Sulphur (Elemental)	mg/kg				810	26	19	38	12	2100	430	1500										
Asbestos					Amosite Board	NAD	NAD	NAD	NAD	Chrysotile Loose Fibres	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	
Asbestos in soil % composition (hand picking and weighing)	% w/w				0.002					0.002												
>> TPH SUITE <<																						
TPH (Total)																						
Total Aliphatic																						
>C5 to C6 aliphatic	mg/kg			42	78	160	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01									
>C6 to C8 aliphatic	mg/kg			100	230	530	0.13	<0.01	<0.01	<0.01	<0.01	0.16	0.02									
>C8 to C10 aliphatic	mg/kg			27	65	150	104	<1	<1	<1	1	10	82	<1								
>C10 to C12 aliphatic	mg/kg			130	330	770	266	<1	<1	<1	3	26	206	<1								
>C12 to C16 aliphatic	mg/kg			1100	2400	4400	648	<1	1	<1	3	18	511	2								
>C16 to C35 aliphatic	mg/kg			65000	92000	110000	1195	4	3	1	147	838	589	29								
>C35 to C44 aliphatic	mg/kg			65000	92000	110000	169	19	4	2	33	139	<5	11								
Total Aromatic																						
>C5 to C7 aromatic (Benzene)	mg/kg			370	690	1400	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01								
>C7 to C8 aromatic (Toluene)	mg/kg			860	1800	3900	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.07	<0.01								
>C8 to C10 aromatic	mg/kg			47	110	270	111	5	1	1	6	18	102	2								
>C10 to C12 aromatic	mg/kg			250	590	1200	278	2	1	<1	3	21	280	<1								
>C12 to C16 aromatic	mg/kg			1800	2300	2500	714	5	6	3	4	27	740	3								
>C16 to C21 aromatic	mg/kg			1900	1900	1900	509	13	23	11	22	124	371	13								
>C21 to C35 aromatic	mg/kg			1900	1900	1900	528	95	75	36	101	558	69	37								
>C35 to C44 aromatic	mg/kg			1900	1900	1900	40	33	6	5	38	74	9	6								
>> BTEX SUITE <<																						
benzene	mg/kg	3.3		0.38	0.7	1.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01								
toluene	mg/kg			880	1900	3900	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.07	<0.01								
m-xylene	mg/kg			82	190	450	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	0.11	<0.01								
m&p-xylene	mg/kg			79	180	430	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	0.43	<0.01								
o-xylene	mg/kg			88	210	480	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	0.32	<0.01								
>> PAH SUITE <<																						
naphthalene	mg/kg			2.3	5.6	13	2.73	<0.03	<0.03	0.36	<0.03	<0.03	3.27	<0.03								
acenaphthylene	mg/kg			2900	4600	6000	0.22	0.01	<0.01	0.01	<0.01	<0.01	0.18	<0.01								
acenaphthene	mg/kg			3000	4700	6000	1.52	0.06	0.02	0.45	0.03	0.02	0.7	0.1								
fluorene	mg/kg			2800	3800	4500	1.88	0.04	0.01	0.32	0.01	0.02	1.2	0.06								
phenanthrene	mg/kg			1300	1500	1500	5.73	0.66	0.2	2.48	0.32	0.08	2.74	0.68								
anthracene	mg/kg			31000	35000	37000	0.97	0.13	0.04	0.53	0.07	<0.02	0.11	0.13								
fluoranthene	mg/kg			1500	1600	1600	4.17	1.2	0.35	3.45	0.87	<0.08	<0.08	1.11								
pyrene	mg/kg			3700	3800	3800	3.79	1.16	0.34	3.21	0.84	<0.07	0.34	1								
benzo(a)anthracene	mg/kg			11	14	15	1.32	0.58	0.18	1.53	0.52	<0.04	<0.04	0.48								
chrysene	mg/kg			30	31	32	1.51	0.67	0.22	1.92	0.64	<0.06	<0.06	0.63								
benzo(b)fluoranthene	mg/kg			3.9	4	4	1.07	0.6	0.17	1.44	0.62	<0.05	<0.05	0.47								
benzo(k)fluoranthene	mg/kg			110	110	110	0.37	0.24	<0.07	0.49	0.22	<0.07	<0.07	0.15								
benzo(a)pyrene	mg/kg	5.3		3.2	3.2	3.2	0.79	0.44	0.13	1.12	0.45	<0.04	<0.04	0.31								
dibenzo(ah)anthracene	mg/kg			0.31	0.32	0.32	<0.04	<0.04	<0.04	0.12	<0.04	<0.04	<0.04	<0.04								
benzo(ghi)perylene	mg/kg			360	360	360	0.3	0.25	0.07	0.52	0.32	<0.05	<0.05	0.19								
indeno(123cd)pyrene	mg/kg			45	46	46	0.42	0.32	0.09	0.69	0.39	<0.03	<0.03	0.26								

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 20/02573/2

Amendments: Request for Additional Analysis

Envirolab Job Number: 20/02573
Issue Number: 3

Date: 20 April, 2020

Client: Sutcliffe
18-20 Harrington Street
Liverpool
L2 9QA

Project Manager: S Hale; A Lewis; D Bowen; A Tosh; C.Odedra
Project Name: Prospect House
Project Ref: 30186LG
Order No: 8021
Date Samples Received: 12/03/20
Date Instructions Received: 13/03/20
Date Analysis Completed: 16/04/20

Prepared by:



Holly Neary-King
Administration & Client Services Supervisor

Approved by:



Danielle Brierley
Client Manager

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/1	20/02573/2	20/02573/3	20/02573/4	20/02573/6	20/02573/8	20/02573/9	Units	Limit of Detection	Method ref
Client Sample No	4	2	1	1	2	1	1			
Client Sample ID	TP209	TP205	TP208	TP206	TP209	TP209	TP204			
Depth to Top	2.50	0.30	0.50	0.30	0.50	0.00	0.00			
Depth To Bottom	3.00	0.80	1.10	0.60	1.00	0.20	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	6AE	6ABE	4A	6AE	4AE			
Hazardous Waste Assessment	-	Appended	-	-	-	-	-			Assessment
% Moisture at <40C _A	40.3	21.0	17.4	16.2	-	-	-	% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1	5.9	11.9	5.0	<0.1	-	-	% w/w	0.1	A-T-044
pH _D ^{M#}	7.43	8.10	8.13	8.52	7.81	-	-	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.15	0.06	<0.01	0.02	-	-	-	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	3400	1300	290	600	-	-	-	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	7	27	1	<1	-	-	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	16.2	<0.2	<0.2	<0.2	-	-	-	mg/kg	0.2	A-T-050s
Sulphide _A	250	13	<5	8	-	-	-	mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	810	26	19	38	-	-	-	mg/kg	5	A-T-029s
Organic matter _D ^{M#}	28.3	12.0	9.9	3.9	-	-	-	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	61	62	10	21	-	-	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	1.7	<1.0	<1.0	<1.0	-	-	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	3.7	2.2	0.6	1.2	-	-	-	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	205	186	26	70	-	-	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	34	73	13	24	-	-	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	-	-	-	mg/kg	1	A-T-040s
Chromium (trivalent)	34	73	13	24	-	-	-	mg/kg	1	Calc
Lead _D ^{M#}	811	1080	49	261	-	-	-	mg/kg	1	A-T-024s
Mercury _D	0.45	1.13	0.24	0.31	-	-	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	58	35	19	24	-	-	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	2	2	<1	2	-	-	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	750	1030	53	158	-	-	-	mg/kg	5	A-T-024s
EPH CWG GCxGC ID (for FID characterisations) _A	-	Complex mixture of aliphatic & aromatic hydrocarbons C8-C40 plus possible PAHs + Humic substances.	-	-	-	-	-			A-T-055s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/1	20/02573/2	20/02573/3	20/02573/4	20/02573/6	20/02573/8	20/02573/9	Units	Limit of Detection	Method ref
Client Sample No	4	2	1	1	2	1	1			
Client Sample ID	TP209	TP205	TP208	TP206	TP209	TP209	TP204			
Depth to Top	2.50	0.30	0.50	0.30	0.50	0.00	0.00			
Depth To Bottom	3.00	0.80	1.10	0.60	1.00	0.20	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	6AE	6ABE	4A	6AE	4AE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	Amosite	NAD	NAD	NAD	-	NAD	NAD			A-T-045
Asbestos Matrix (microscope) _D	Board	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	No	N/A	N/A	N/A	-	N/A	N/A			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _D	0.002	-	-	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/1	20/02573/2	20/02573/3	20/02573/4	20/02573/6	20/02573/8	20/02573/9	Units	Limit of Detection	Method ref
Client Sample No	4	2	1	1	2	1	1			
Client Sample ID	TP209	TP205	TP208	TP206	TP209	TP209	TP204			
Depth to Top	2.50	0.30	0.50	0.30	0.50	0.00	0.00			
Depth To Bottom	3.00	0.80	1.10	0.60	1.00	0.20	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	6AE	6ABE	4A	6AE	4AE			
PAH-16MS										
Acenaphthene _A ^{M#}	1.52	0.06	0.02	0.45	-	-	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.22	0.01	<0.01	0.01	-	-	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.97	0.13	0.04	0.53	-	-	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	1.32	0.58	0.18	1.53	-	-	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.79	0.44	0.13	1.12	-	-	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	1.07	0.60	0.17	1.44	-	-	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.30	0.25	0.07	0.52	-	-	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.37	0.24	<0.07	0.49	-	-	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	1.51	0.67	0.22	1.92	-	-	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	0.12	-	-	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	4.17	1.20	0.35	3.45	-	-	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	1.88	0.04	0.01	0.32	-	-	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.42	0.32	0.09	0.69	-	-	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	2.73	<0.03	<0.03	0.36	-	-	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	5.73	0.66	0.20	2.48	-	-	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	3.79	1.16	0.34	3.21	-	-	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	26.8	6.36	1.82	18.6	-	-	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/1	20/02573/2	20/02573/3	20/02573/4	20/02573/6	20/02573/8	20/02573/9	Units	Limit of Detection	Method ref
Client Sample No	4	2	1	1	2	1	1			
Client Sample ID	TP209	TP205	TP208	TP206	TP209	TP209	TP204			
Depth to Top	2.50	0.30	0.50	0.30	0.50	0.00	0.00			
Depth To Bottom	3.00	0.80	1.10	0.60	1.00	0.20	0.20			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	6AE	6ABE	4A	6AE	4AE			
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	0.13	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	104	<1	<1	<1	-	-	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	266	<1	<1	<1	-	-	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	648	<1	1	<1	-	-	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	590	4	2	1	-	-	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A	605	123	5	6	-	-	-	mg/kg	1	A-T-055s
Ali >C35-C44 _A	169	19	4	2	-	-	-	mg/kg	1	A-T-055s
Total Aliphatics _A	2380	145	13	10	-	-	-	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	111	5	1	1	-	-	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	278	2	1	<1	-	-	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	714	5	6	3	-	-	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	509	13	23	11	-	-	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	528	95	75	36	-	-	-	mg/kg	1	A-T-055s
Aro >C35-C44 _A	40	33	6	5	-	-	-	mg/kg	1	A-T-055s
Total Aromatics _A	2180	151	113	57	-	-	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	4560	297	126	67	-	-	-	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	0.07	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	0.23	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	0.13	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	-	-	-	mg/kg	0.01	A-T-022s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/10	20/02573/11	20/02573/12	20/02573/13	20/02573/14	20/02573/16	20/02573/17	Units	Limit of Detection	Method ref
Client Sample No	1	3	1	2	1	1	2			
Client Sample ID	TP205	TP204	TP201	TP202	TP202	TP203	TP204			
Depth to Top	0.00	0.50	0.15	0.50	0.00	0.00	0.50			
Depth To Bottom	0.20	1.00	0.25	0.90	0.20	0.20	0.90			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	7	4ABE	6AE	6AE	4ABE			
Hazardous Waste Assessment	-	-	-	-	-	-	Appended			Assessment
% Moisture at <40C _A	-	-	-	-	-	-	30.9	% w/w	0.1	A-T-044
% Stones >10mm _A	-	9.7	-	<0.1	-	-	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	-	7.06	-	8.17	-	-	6.71	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	-	-	-	-	-	-	0.35	g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	-	-	-	-	-	-	1700	mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	-	-	-	-	-	-	20	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	-	-	-	-	-	-	<0.2	mg/kg	0.2	A-T-050s
Sulphide _A	-	-	-	-	-	-	<5	mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	-	-	-	-	-	-	12	mg/kg	5	A-T-029s
Organic matter _D ^{M#}	-	-	-	-	-	-	13.1	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	-	-	-	-	-	-	31	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	-	-	-	-	-	-	1.4	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	-	-	-	-	-	-	2.2	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	-	-	-	-	-	-	198	mg/kg	1	A-T-024s
Chromium _D ^{M#}	-	-	-	-	-	-	96	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	-	-	-	-	-	-	<1	mg/kg	1	A-T-040s
Chromium (trivalent)	-	-	-	-	-	-	96	mg/kg	1	Calc
Lead _D ^{M#}	-	-	-	-	-	-	412	mg/kg	1	A-T-024s
Mercury _D	-	-	-	-	-	-	0.87	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	-	-	-	-	-	-	47	mg/kg	1	A-T-024s
Selenium _D ^{M#}	-	-	-	-	-	-	2	mg/kg	1	A-T-024s
Zinc _D ^{M#}	-	-	-	-	-	-	407	mg/kg	5	A-T-024s
EPH CWG GCxGC ID (for FID characterisations) _A	-	-	-	-	-	-	Complex mixture of aliphatic & aromatic hydrocarbons C8-C40 plus possible PAHs + Humic substances.			A-T-055s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/10	20/02573/11	20/02573/12	20/02573/13	20/02573/14	20/02573/16	20/02573/17	Units	Limit of Detection	Method ref
Client Sample No	1	3	1	2	1	1	2			
Client Sample ID	TP205	TP204	TP201	TP202	TP202	TP203	TP204			
Depth to Top	0.00	0.50	0.15	0.50	0.00	0.00	0.50			
Depth To Bottom	0.20	1.00	0.25	0.90	0.20	0.20	0.90			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	7	4ABE	6AE	6AE	4ABE			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	-	NAD	-	NAD	NAD	Chrysotile			A-T-045
Asbestos Matrix (microscope) _D	-	-	-	-	-	-	Loose Fibres			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	-	N/A	-	N/A	N/A	N/A			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _D	-	-	-	-	-	-	0.002	% w/w	0.001	A-T-054

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/10	20/02573/11	20/02573/12	20/02573/13	20/02573/14	20/02573/16	20/02573/17	Units	Limit of Detection	Method ref
Client Sample No	1	3	1	2	1	1	2			
Client Sample ID	TP205	TP204	TP201	TP202	TP202	TP203	TP204			
Depth to Top	0.00	0.50	0.15	0.50	0.00	0.00	0.50			
Depth To Bottom	0.20	1.00	0.25	0.90	0.20	0.20	0.90			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	7	4ABE	6AE	6AE	4ABE			
PAH-16MS										
Acenaphthene _A ^{M#}	-	-	-	-	-	-	0.03	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	-	-	-	-	-	-	0.07	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	-	-	-	-	-	-	0.52	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	-	-	-	-	-	-	0.45	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	-	-	-	-	-	-	0.62	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	-	-	-	-	-	-	0.32	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	-	-	-	-	-	-	0.22	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	-	-	-	-	-	-	0.64	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	-	-	-	-	-	-	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	-	-	-	-	-	-	0.87	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	-	-	-	-	-	-	0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	-	-	-	-	-	-	0.39	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	-	-	-	-	-	-	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	-	-	-	-	-	-	0.32	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	-	-	-	-	-	-	0.84	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	-	-	-	-	-	-	5.30	mg/kg	0.01	A-T-019s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/10	20/02573/11	20/02573/12	20/02573/13	20/02573/14	20/02573/16	20/02573/17	Units	Limit of Detection	Method ref
Client Sample No	1	3	1	2	1	1	2			
Client Sample ID	TP205	TP204	TP201	TP202	TP202	TP203	TP204			
Depth to Top	0.00	0.50	0.15	0.50	0.00	0.00	0.50			
Depth To Bottom	0.20	1.00	0.25	0.90	0.20	0.20	0.90			
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20			
Sample Type	Soil - ES	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	4AE	6ABE	7	4ABE	6AE	6AE	4ABE			
TPH UKCWG										
Ali >C5-C6 _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	-	-	-	-	-	-	1	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	-	-	-	-	-	-	3	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	-	-	-	-	-	-	3	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	-	-	-	-	-	-	10	mg/kg	1	A-T-055s
Ali >C21-C35 _A	-	-	-	-	-	-	137	mg/kg	1	A-T-055s
Ali >C35-C44 _A	-	-	-	-	-	-	33	mg/kg	1	A-T-055s
Total Aliphatics _A	-	-	-	-	-	-	188	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	-	-	-	-	-	-	6	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	-	-	-	-	-	-	3	mg/kg	1	A-T-055s
Aro >C12-C16 _A	-	-	-	-	-	-	4	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	-	-	-	-	-	-	22	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	-	-	-	-	-	-	101	mg/kg	1	A-T-055s
Aro >C35-C44 _A	-	-	-	-	-	-	38	mg/kg	1	A-T-055s
Total Aromatics _A	-	-	-	-	-	-	174	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	-	-	-	-	-	-	362	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s
MTBE _A [#]	-	-	-	-	-	-	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/18	20/02573/19	20/02573/20	20/02573/21	20/02573/22	20/02573/24		Units	Limit of Detection	Method ref
Client Sample No	2	3	1	2	3	2				
Client Sample ID	TP203	TP202	TP210	TP210	TP210	BH201				
Depth to Top	0.50	1.00	0.00	0.50	1.50	0.80				
Depth To Bottom	1.00	1.10	0.20	1.00	2.00	1.00				
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	09-Mar-20				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	6AE	6A	4AE	4AE	6AE	4A				
Hazardous Waste Assessment	Appended	-	-	-	Appended	Appended				Assessment
% Moisture at <40C _A	31.2	25.8	-	-	38.0	7.5		% w/w	0.1	A-T-044
% Stones >10mm _A	18.1	<0.1	-	<0.1	<0.1	<0.1		% w/w	0.1	A-T-044
pH _D ^{M#}	7.52	7.13	-	7.46	7.45	9.78		pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.52	0.02	-	-	0.44	-		g/l	0.01	A-T-026s
Sulphate (acid soluble) _D ^{M#}	7100	710	-	-	4000	-		mg/kg	200	A-T-028s
Cyanide (total) _A ^{M#}	2	<1	-	-	2	-		mg/kg	1	A-T-042STCN
Phenols - Total by HPLC _A	<0.2	<0.2	-	-	<0.2	-		mg/kg	0.2	A-T-050s
Sulphide _A	350	20	-	-	56	-		mg/kg	5	A-T-S2-s
Sulphur (elemental) _D ^{M#}	2100	430	-	-	1500	-		mg/kg	5	A-T-029s
Organic matter _D ^{M#}	16.2	1.5	-	-	12.4	-		% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	205	17	-	-	52	9		mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	1.9	<1.0	-	-	2.9	-		mg/kg	1	A-T-027s
Cadmium _D ^{M#}	3.1	1.1	-	-	3.5	1.2		mg/kg	0.5	A-T-024s
Copper _D ^{M#}	387	14	-	-	208	19		mg/kg	1	A-T-024s
Chromium _D ^{M#}	38	29	-	-	38	16		mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	-	-	<1	<1		mg/kg	1	A-T-040s
Chromium (trivalent)	38	29	-	-	38	-		mg/kg	1	Calc
Lead _D ^{M#}	672	41	-	-	276	33		mg/kg	1	A-T-024s
Mercury _D	0.93	<0.17	-	-	0.50	1.05		mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	62	17	-	-	46	12		mg/kg	1	A-T-024s
Selenium _D ^{M#}	2	2	-	-	2	<1		mg/kg	1	A-T-024s
Zinc _D ^{M#}	629	93	-	-	1290	88		mg/kg	5	A-T-024s
EPH CWG GCxGC ID (for FID characterisations) _A	Complex mixture of aliphatic & aromatic hydrocarbons C8-C40 plus possible PAHs + Humic substances.	-	-	-	Complex mixture of aliphatic & aromatic hydrocarbons C8-C40 plus possible PAHs + Humic substances.	-				A-T-055s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/18	20/02573/19	20/02573/20	20/02573/21	20/02573/22	20/02573/24		Units	Limit of Detection	Method ref
Client Sample No	2	3	1	2	3	2				
Client Sample ID	TP203	TP202	TP210	TP210	TP210	BH201				
Depth to Top	0.50	1.00	0.00	0.50	1.50	0.80				
Depth To Bottom	1.00	1.10	0.20	1.00	2.00	1.00				
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	09-Mar-20				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	6AE	6A	4AE	4AE	6AE	4A				
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	-	NAD	-				A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	-	N/A	-				A-T-045

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/18	20/02573/19	20/02573/20	20/02573/21	20/02573/22	20/02573/24		Units	Limit of Detection	Method ref
Client Sample No	2	3	1	2	3	2				
Client Sample ID	TP203	TP202	TP210	TP210	TP210	BH201				
Depth to Top	0.50	1.00	0.00	0.50	1.50	0.80				
Depth To Bottom	1.00	1.10	0.20	1.00	2.00	1.00				
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	09-Mar-20				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	6AE	6A	4AE	4AE	6AE	4A				
PAH-16MS										
Acenaphthene _A ^{M#}	0.02	0.70	-	-	0.10	<0.01		mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.18	-	-	<0.01	<0.01		mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	0.11	-	-	0.13	<0.02		mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	<0.04	-	-	0.48	<0.04		mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	<0.04	-	-	0.31	<0.04		mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	<0.05	-	-	0.47	<0.05		mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	<0.05	-	-	0.19	<0.05		mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	-	-	0.15	<0.07		mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	<0.06	-	-	0.63	<0.06		mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	-	-	<0.04	<0.04		mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	<0.08	-	-	1.11	<0.08		mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.02	1.20	-	-	0.06	<0.01		mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	<0.03	-	-	0.26	<0.03		mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	3.27	-	-	<0.03	<0.03		mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.08	2.74	-	-	0.68	<0.03		mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	0.34	-	-	1.00	<0.07		mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	0.12	8.54	-	-	5.57	<0.08		mg/kg	0.01	A-T-019s
TPH Total with ID + GC Trace										
TPH total (>C6-C40) _A ^{M#}	-	-	-	-	-	79		mg/kg	10	A-T-007s
TPH FID Chromatogram _A	-	-	-	-	-	Appended				A-T-007s
TPH ID (for FID characterisations) _A	-	-	-	-	-	Unknown profile				A-T-007s

Envirolab Job Number: 20/02573

Client Project Name: Prospect House

Client Project Ref: 30186LG

Lab Sample ID	20/02573/18	20/02573/19	20/02573/20	20/02573/21	20/02573/22	20/02573/24		Units	Limit of Detection	Method ref
Client Sample No	2	3	1	2	3	2				
Client Sample ID	TP203	TP202	TP210	TP210	TP210	BH201				
Depth to Top	0.50	1.00	0.00	0.50	1.50	0.80				
Depth To Bottom	1.00	1.10	0.20	1.00	2.00	1.00				
Date Sampled	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	10-Mar-20	09-Mar-20				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	6AE	6A	4AE	4AE	6AE	4A				
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01	<0.01	-	-	<0.01	-		mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	0.16	-	-	0.02	-		mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	10	82	-	-	<1	-		mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	26	206	-	-	<1	-		mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	18	511	-	-	2	-		mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	50	461	-	-	3	-		mg/kg	1	A-T-055s
Ali >C21-C35 _A	788	128	-	-	26	-		mg/kg	1	A-T-055s
Ali >C35-C44 _A	139	<5	-	-	11	-		mg/kg	1	A-T-055s
Total Aliphatics _A	1030	1390	-	-	42	-		mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	-	-	<0.01	-		mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	0.07	-	-	<0.01	-		mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	18	102	-	-	2	-		mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	21	280	-	-	<1	-		mg/kg	1	A-T-055s
Aro >C12-C16 _A	27	740	-	-	3	-		mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	124	371	-	-	13	-		mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	558	69	-	-	37	-		mg/kg	1	A-T-055s
Aro >C35-C44 _A	74	9	-	-	6	-		mg/kg	1	A-T-055s
Total Aromatics _A	821	1580	-	-	63	-		mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	1860	2970	-	-	105	-		mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	-	-	<0.01	-		mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	0.07	-	-	<0.01	-		mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	0.11	-	-	<0.01	-		mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	0.43	-	-	<0.01	-		mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	0.32	-	-	<0.01	-		mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	-	-	<0.01	-		mg/kg	0.01	A-T-022s

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Final Test Report

Envirolab Job Number: 20/02573
Issue Number: 1

Date: 16-Apr-20

Client: Sutcliffe
18-20 Harrington Street
Liverpool
L2 9QA

Project Manager: S Hale; A Lewis; D Bowen; A Tosh; C.Odedra
Project Name: Prospect House
Project Ref: 30186LG
Order No: 8021

Date Samples Received: 12-Mar-20
Date Instructions Received: 13-Mar-20
Date Analysis Completed: 16-Apr-20

Notes - Soil analysis

All results are reported as dry weight (<40 °C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

Secondary Matrix Codes: A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

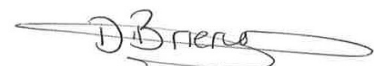
Please contact us if you need any further information.

Prepared by:



Richard Wong
Client Manager

Approved by:



Danielle Brierley
Client Manager

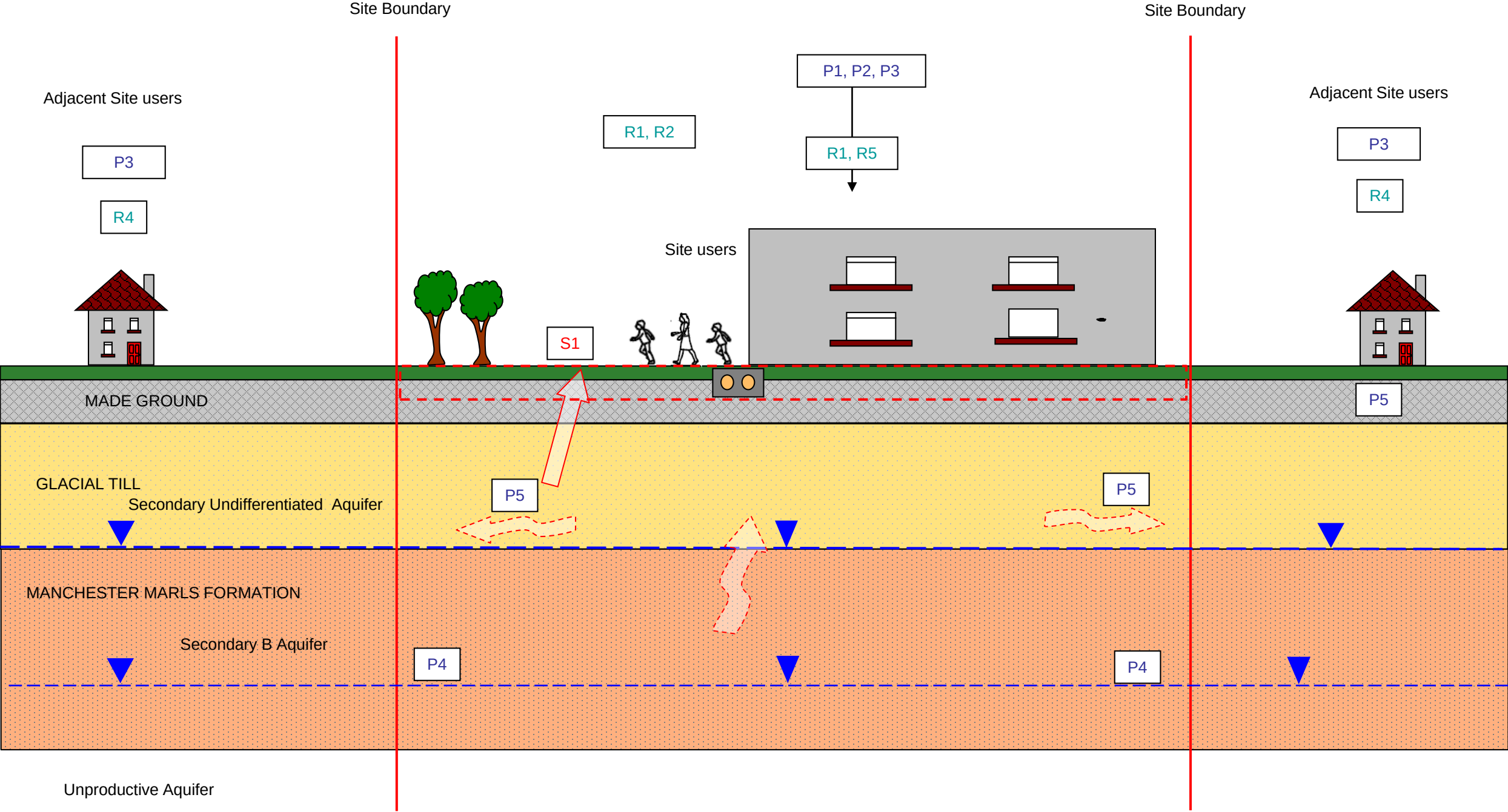
Sample Details							Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	20/02573/6						
Client Sample Number				2			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				TP209						
Depth to Top				0.5						
Depth to Bottom				1.00						
Date Sampled				10/03/2020						
Sample Type				Soil - ES						
Sample Matrix Code				4A						
Solid Waste Analysis										
pH (pH Units) _D	A-T-031	N	N	7.81				-	>6	-
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.15				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.03				-	to be evaluated	to be evaluated
Loss on Ignition (%) _D	A-T-030	N	N	22.1				-	-	10
Total Organic Carbon (%) _D	A-T-032	N	N	20.6				3	5	6
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	5.48				100	-	-
Mineral Oil (mg/kg) _A	A-T-007	N	N	139				500	-	-
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using		
				mg/l		mg/kg		BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	2	25
Barium	A-T-025	N	N	0.062	0.111	0.155	1.120	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	N	N	0.003	0.002	0.007	0.020	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.024	0.025	0.060	0.260	0.5	10	30
Nickel	A-T-025	N	N	0.005	0.002	0.012	0.020	0.4	10	40
Lead	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50
Antimony	A-T-025	N	N	0.007	0.004	0.017	0.040	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.120	0.035	0.299	0.440	4	50	200
Chloride	A-T-026	N	N	1	<1.00	3	<10	800	15000	25000
Fluoride	A-T-026	N	N	0.2	0.3	0.5	3.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	164	41	409	531	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	279	127	696	1464	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	7.6	7.9					
Conductivity (µS/cm)	A-T-037	N	N	558	254					
Mass Sample (kg)				0.262						
Dry Matter (%)	A-T-044	N	N	63.5						
Stage 1										
Volume Leachant, L ₂ (l)	A-T-046			0.350						
Filtered Eluate Volume, VE ₁ (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L ₈ (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Sample Details							Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	20/02573/11						
Client Sample Number				3			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				TP204						
Depth to Top				0.5						
Depth to Bottom				1.00						
Date Sampled				10/03/2020						
Sample Type				Soil - ES						
Sample Matrix Code				6ABE						
Solid Waste Analysis										
pH (pH Units) _D	A-T-031	N	N	7.06				-	>6	-
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.06				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.03				-	to be evaluated	to be evaluated
Loss on Ignition (%) _D	A-T-030	N	N	11.6				-	-	10
Total Organic Carbon (%) _D	A-T-032	N	N	6.84				3	5	6
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	6.33				100	-	-
Mineral Oil (mg/kg) _A	A-T-007	N	N	175				500	-	-
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	0.033				1	-	-
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using		
				mg/l		mg/kg		BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	2	25
Barium	A-T-025	N	N	0.038	0.058	0.091	0.590	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	N	N	0.006	0.003	0.014	0.030	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.003	0.002	0.007	0.020	0.5	10	30
Nickel	A-T-025	N	N	0.028	0.007	0.067	0.090	0.4	10	40
Lead	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50
Antimony	A-T-025	N	N	0.002	0.001	0.005	0.010	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.235	0.062	0.565	0.790	4	50	200
Chloride	A-T-026	N	N	2	<1.00	5	<10	800	15000	25000
Fluoride	A-T-026	N	N	<0.10	<0.10	<0.2	<1	10	150	500
Sulphate as SO ₄	A-T-026	N	N	581	112	1397	1566	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	589	166	1417	2090	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	7.1	7.4					
Conductivity (µS/cm)	A-T-037	N	N	1177	331					
Mass Sample (kg)				0.246						
Dry Matter (%)	A-T-044	N	N	71.2						
Stage 1										
Volume Leachant, L ₂ (l)	A-T-046			0.350						
Filtered Eluate Volume, VE ₁ (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L ₈ (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Sample Details								Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	20/02573/13						
Client Sample Number				2				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				TP202						
Depth to Top				0.5						
Depth to Bottom				0.90						
Date Sampled				10/03/2020						
Sample Type				Soil - ES						
Sample Matrix Code				4ABE						
Solid Waste Analysis										
pH (pH Units) _D	A-T-031	N	N	8.17				-	>6	-
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.35				-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.07				-	to be evaluated	to be evaluated
Loss on Ignition (%) _D	A-T-030	N	N	5.8				-	-	10
Total Organic Carbon (%) _D	A-T-032	N	N	1.89				3	5	6
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	<0.08				100	-	-
Mineral Oil (mg/kg) _A	A-T-007	N	N	211				500	-	-
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	<0.007				1	-	-
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01				6	-	-
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using		
				mg/l		mg/kg		BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	2	25
Barium	A-T-025	N	N	0.114	0.046	0.287	0.540	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	N	N	0.004	0.003	0.010	0.030	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.017	0.007	0.043	0.080	0.5	10	30
Nickel	A-T-025	N	N	0.001	<0.001	0.003	<0.01	0.4	10	40
Lead	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50
Antimony	A-T-025	N	N	0.002	0.001	0.005	0.010	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.005	0.004	0.013	0.040	4	50	200
Chloride	A-T-026	N	N	3	<1.00	8	<10	800	15000	25000
Fluoride	A-T-026	N	N	1.0	0.9	2.6	9.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	77	11	193	176	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	247	112	622	1294	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	7.9	8.3					
Conductivity (µS/cm)	A-T-037	N	N	494	223					
Mass Sample (kg)				0.266						
Dry Matter (%)	A-T-044	N	N	84						
Stage 1										
Volume Leachant, L ₂ (l)	A-T-046			0.350						
Filtered Eluate Volume, VE ₁ (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L ₈ (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

Sample Details							Landfill Waste Acceptance Criteria Limits			
Lab Sample ID	Method	ISO17025	MCERTS	20/02573/21						
Client Sample Number				2			Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill	
Client Sample ID				TP210						
Depth to Top				0.5						
Depth to Bottom				1.00						
Date Sampled				10/03/2020						
Sample Type				Soil - ES						
Sample Matrix Code				4AE						
Solid Waste Analysis										
pH (pH Units) _D	A-T-031	N	N	7.46			-	>6	-	
ANC to pH 4 (mol/kg) _D	A-T-ANC	N	N	0.13			-	to be evaluated	to be evaluated	
ANC to pH 6 (mol/kg) _D	A-T-ANC	N	N	0.02			-	to be evaluated	to be evaluated	
Loss on Ignition (%) _D	A-T-030	N	N	20.9			-	-	10	
Total Organic Carbon (%) _D	A-T-032	N	N	18.5			3	5	6	
PAH Sum of 17 (mg/kg) _A	A-T-019	N	N	1.35			100	-	-	
Mineral Oil (mg/kg) _A	A-T-007	N	N	89			500	-	-	
Sum of 7 PCBs (mg/kg) _A	A-T-004	N	N	0.083			1	-	-	
Sum of BTEX (mg/kg) _A	A-T-022	N	N	<0.01			6	-	-	
Eluate Analysis				2:1	8:1	2:1	Cumulative 10:1	Limit values for compliance leaching test using		
				mg/l		mg/kg		BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	2	25
Barium	A-T-025	N	N	0.059	0.071	0.134	0.720	20	100	300
Cadmium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.04	1	5
Chromium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	A-T-025	N	N	0.006	0.003	0.014	0.030	2	50	100
Mercury	A-T-025	N	N	<0.0005	<0.0005	<0.001	<0.005	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.014	0.012	0.032	0.130	0.5	10	30
Nickel	A-T-025	N	N	0.003	<0.001	0.007	<0.01	0.4	10	40
Lead	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.5	10	50
Antimony	A-T-025	N	N	0.004	0.003	0.009	0.030	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	A-T-025	N	N	0.026	0.006	0.059	0.080	4	50	200
Chloride	A-T-026	N	N	2	<1.00	6	<10	800	15000	25000
Fluoride	A-T-026	N	N	0.3	0.3	0.7	3.0	10	150	500
Sulphate as SO ₄	A-T-026	N	N	225	45	512	616	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	349	122	794	1448	4000	60000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	<20.0	<20.0	<40	<200	500	800	1000
Leach Test Information										
pH (pH Units)	A-T-031	N	N	7.6	7.9					
Conductivity (µS/cm)	A-T-037	N	N	698	243					
Mass Sample (kg)				0.223						
Dry Matter (%)	A-T-044	N	N	65.2						
Stage 1										
Volume Leachant, L ₂ (l)	A-T-046			0.350						
Filtered Eluate Volume, VE ₁ (l)	A-T-046			0.150						
Stage 2										
Volume Leachant, L ₈ (l)	A-T-046			1.400						
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation										

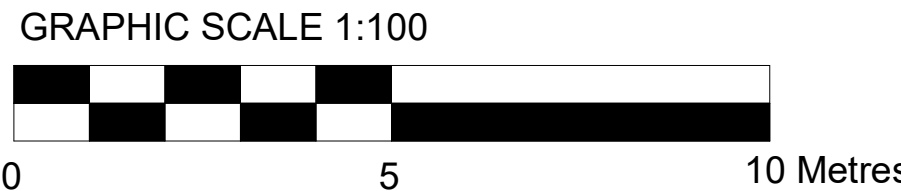
Figure 3: Revised Conceptual Model



Key		
S1 – Potentially Contaminated Soil - Onsite		
R1 Future site Users		
R2 Construction Workers		
R3 Controlled waters		
R4 Adjacent Site Users		
R5 Infrastructure & Buried services		
P1 Direct Contact		
P2 Ingestion		
P3 Inhalation		
P4 Leaching & Migration		
P5 Vertical & lateral migration of ground gas		
Ground gas migration		
Leachate migration		
Direct contact/ ingestion		
Underground railway		

	Client: Interserve		
	Project: Prospect House		
	Title: Revised Conceptual Site Model (CSM)		
Purpose: Report	Draft		Scale (at A3)
	Issue	1	Not to scale
Issuing Office: Liverpool	Drawing number 3		Version
Telephone: 0151 227 3155			A

Drawing Number FS0831-JMA-01-00-DR-A-00-0002-S4-P27 – Proposed Development
Plan

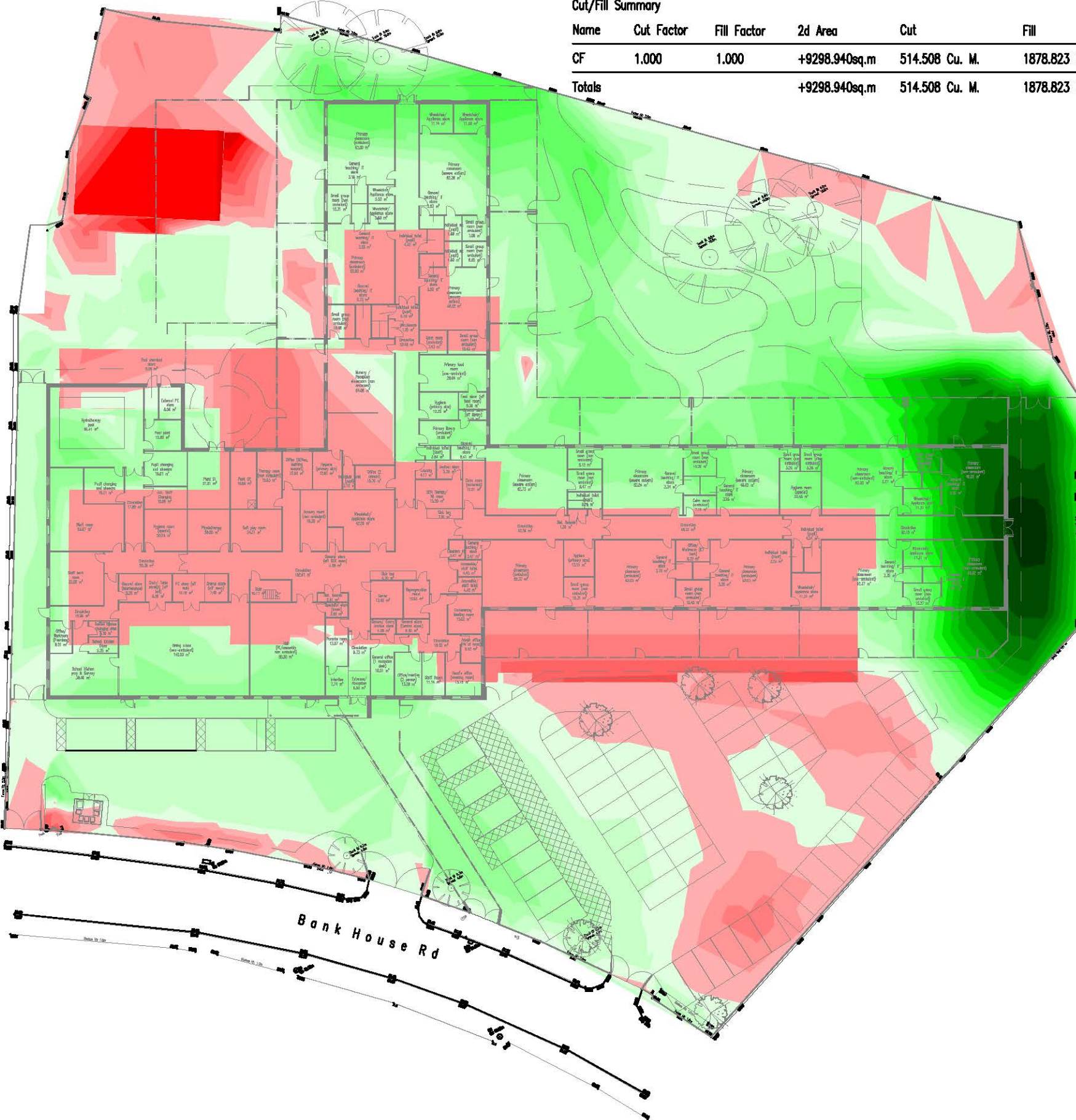


CDM Ground Floor						
Mark	Level	Description	Work Phase	Initial Risk Category	Risk Owner	Risk Category Revised
01	Level 00	High Level M&E internal maintenance	CP	Medium	Maintenance	Refer to Access& Maintenance Strategy
02	Level 00	High Level Window cleaning	CP	Medium	Maintenance	Use of telescopic pole
03	Level 00	Outwards opening doors	CP	Medium	Regular use	Door hoops provided
04	Level 00	Sink can cause slippery floor	CP	Medium	Regular use	Antislip water flooring
05	Level 00	Shower can cause slippery floor	CP	Medium	Regular use	Antislip water flooring
06	Level 00	Hydropool can cause slippery floor	CP	Medium	Regular use	Antislip water flooring
07	Level 00	Outwards opening doors	CP	Medium	Regular use	Landscape fencing next to the door
08	Level 00	Chemical delivery to hydropool	CP	Medium	Maintenance	External Access only for delivery
10	Level 00	Food preparation can cause slippery floor	CP	Medium	Regular use	Antislip water flooring
12	Level 00	Hydropool M&E maintenance	CP	Medium	Maintenance	Refer to Access& Maintenance Strategy



P27	Updated following 2A comments	18.11.18	LM	SCM
P28	Updated following 2A comments	20.10.18	LM	SCM
P29	Updated following 2A comments	20.10.18	LM	SCM
P30	Updated following 2A comments	20.10.18	LM	SCM
P31	Updated following 2A comments	20.10.18	LM	SCM
P32	Updated following 2A comments	20.10.18	LM	SCM
P33	Updated following 2A comments	20.10.18	LM	SCM
P34	Updated following 2A comments	20.10.18	LM	SCM
P35	Updated following 2A comments	20.10.18	LM	SCM
P36	Updated following 2A comments	20.10.18	LM	SCM
P37	Updated following 2A comments	20.10.18	LM	SCM
P38	Updated following 2A comments	20.10.18	LM	SCM
P39	Updated following 2A comments	20.10.18	LM	SCM
P40	Updated following 2A comments	20.10.18	LM	SCM
P41	Updated following 2A comments	20.10.18	LM	SCM
P42	Updated following 2A comments	20.10.18	LM	SCM
P43	Updated following 2A comments	20.10.18	LM	SCM
P44	Updated following 2A comments	20.10.18	LM	SCM
P45	Updated following 2A comments	20.10.18	LM	SCM
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P60	Updated following 2A comments	20.10.18	LM	SCM
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P67	Updated following 2A comments	20.10.18	LM	SCM
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P69	Updated following 2A comments	20.10.18	LM	SCM
P70	Updated following 2A comments	20.10.18	LM	SCM
P71	Updated following 2A comments	20.10.18	LM	SCM
P72	Updated following 2A comments	20.10.18	LM	SCM
P73	Updated following 2A comments	20.10.18	LM	SCM
P74	Updated following 2A comments	20.10.18	LM	SCM
P75	Updated following 2A comments	20.10.18	LM	SCM
P76	Updated following 2A comments	20.10.18	LM	SCM
P77	Updated following 2A comments	20.10.18	LM	SCM
P78	Updated following 2A comments	20.10.18	LM	SCM
P79	Updated following 2A comments	20.10.18	LM	SCM
P80	Updated following 2A comments	20.10.18	LM	SCM
P81	Updated following 2A comments	20.10.18	LM	SCM
P82	Updated following 2A comments	20.10.18	LM	SCM
P83	Updated following 2A comments	20.10.18	LM	SCM
P84	Updated following 2A comments	20.10.18	LM	SCM
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P86	Updated following 2A comments	20.10.18	LM	SCM
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P88	Updated following 2A comments	20.10.18	LM	SCM
P89	Updated following 2A comments	20.10.18	LM	SCM
P90	Updated following 2A comments	20.10.18	LM	SCM
P91	Updated following 2A comments	20.10.18	LM	SCM
P92	Updated following 2A comments	20.10.18	LM	SCM
P93	Updated following 2A comments	20.10.18	LM	SCM
P94	Updated following 2A comments	20.10.18	LM	SCM
P95	Updated following 2A comments	20.10.18	LM	SCM
P96	Updated following 2A comments	20.10.18	LM	SCM
P97	Updated following 2A comments	20.10.18	LM	SCM
P98	Updated following 2A comments	20.10.18	LM	SCM
P99	Updated following 2A comments	20.10.18	LM	SCM
P100	Updated following 2A comments	20.10.18	LM	SCM

Drawing No. FS0832-SUT-ZZ-00-DR-C-640-001 – Proposed “Cut & Fill” Exercise



Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
CF	1.000	1.000	+9298.940sq.m	514.508 Cu. M.	1878.823 Cu. M.	1364.315 Cu. M.<Fill>
Totals			+9298.940sq.m	514.508 Cu. M.	1878.823 Cu. M.	1364.315 Cu. M.<Fill>

General Notes

DO NOT SCALE OFF THIS DRAWING

THIS DRAWING TO READ IN CONJUNCTION WITH ALL RELEVANT STRUCTURAL AND ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

ALL WORKS TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE ENGINEER'S SPECIFICATIONS, RELEVANT BRITISH STANDARDS, STATUTORY HEALTH AND SAFETY/C.D.M. REGULATIONS, RELEVANT CODES OF PRACTICE AND THE CURRENT EDITION OF THE BUILDING REGULATIONS.

FOR FINAL SETTING OUT INFORMATION RELATING TO GRID LINES AND WALL POSITIONS REFER TO THE ARCHITECT'S DRAWINGS.

SURFACE COMPARISON KEY (FOR PROPOSED FINISHED LEVELS RELATIVE TO EXISTING SITE LEVELS)			
RANGE	MINIMUM ELEVATION	MAXIMUM ELEVATION	COLOUR
1	-1.000m	-0.900m	
2	-0.900m	-0.800m	
3	-0.800m	-0.700m	
4	-0.700m	-0.600m	
5	-0.600m	-0.500m	
6	-0.500m	-0.400m	
7	-0.400m	-0.300m	
8	-0.300m	-0.200m	
9	-0.200m	-0.100m	
10	-0.100m	0.000m	
11	0.000m	0.100m	
12	0.100m	0.200m	
13	0.200m	0.300m	
14	0.300m	0.400m	
15	0.400m	0.500m	
16	0.500m	0.600m	
17	0.600m	0.700m	
18	0.700m	0.800m	
19	0.800m	0.900m	
20	0.900m	1.000m	
21	1.000m	1.100m	
22	1.100m	1.200m	
23	1.200m	1.300m	
24	1.300m	1.400m	
25	1.400m	1.500m	
26	1.500m	1.600m	

VOLUMES ON THIS DRAWING ARE BASED ON PROPOSED FINISHED LEVELS RELATIVE TO THE EXISTING SURVEYED LEVELS.

FINISHED LEVELS TAKEN FROM DEP LANDSCAPING DRAWING REF FS0831-DEP-00-XX-DR-L-0010 REV D

NO SITE STRIP HAS BEEN ALLOWED FOR.

NO REDUCED LEVEL DIG VOLUMES HAVE BEEN INCLUDED IN ANY VOLUME CALCULATIONS ON THIS DRAWING.

NO EXCAVATIONS FOR ANY DRAINAGE INCLUDING ATTENUATION CELLS HAVE BEEN INDICATED ON THIS DRAWING OR ALLOWED FOR IN ANY VOLUMES.

VOLUMES LISTED ON THIS DRAWING ARE UNFACTORED. NO ALLOWANCE HAS BEEN MADE FOR ANY BULKING OR SHRINKAGE OF ANY MATERIALS.

**Sutcliffe**
Civil & Structural Engineers, Building Surveyors & Geo-Environmentalists
www.sutcliffe.co.uk



Client
Interserve

Project
**Manchester SEND
Prospect House Primary School, Blackley**

Drawing Title
**Surface Comparison Plan
Existing Site Levels & Proposed
Finished Surface Levels**

P01	PRELIMINARY DRAWING	27.08.19	CR	SB
Rev	Description	Date	By	Chkd
Date	Drawn By	Checked By		
27.08.19	CR	SB		
Scale at A1 1:500	Project Number 30186	Revision P01		
Sheet Number FS0831-SUT-ZZ-00-DR-C-640-0001				

INFORMATION

Drawing Status

Drawing No. 30186-SUT-ZZ-00-DR-G-720-0001– Site Investigation Locations (Sutcliffe & HSP)

Drawing No. 30186-SUT-ZZ-00-DR-G-720-0002– Landfill Locations and Inferred
Landfill Boundary

Client

INTERSERVE

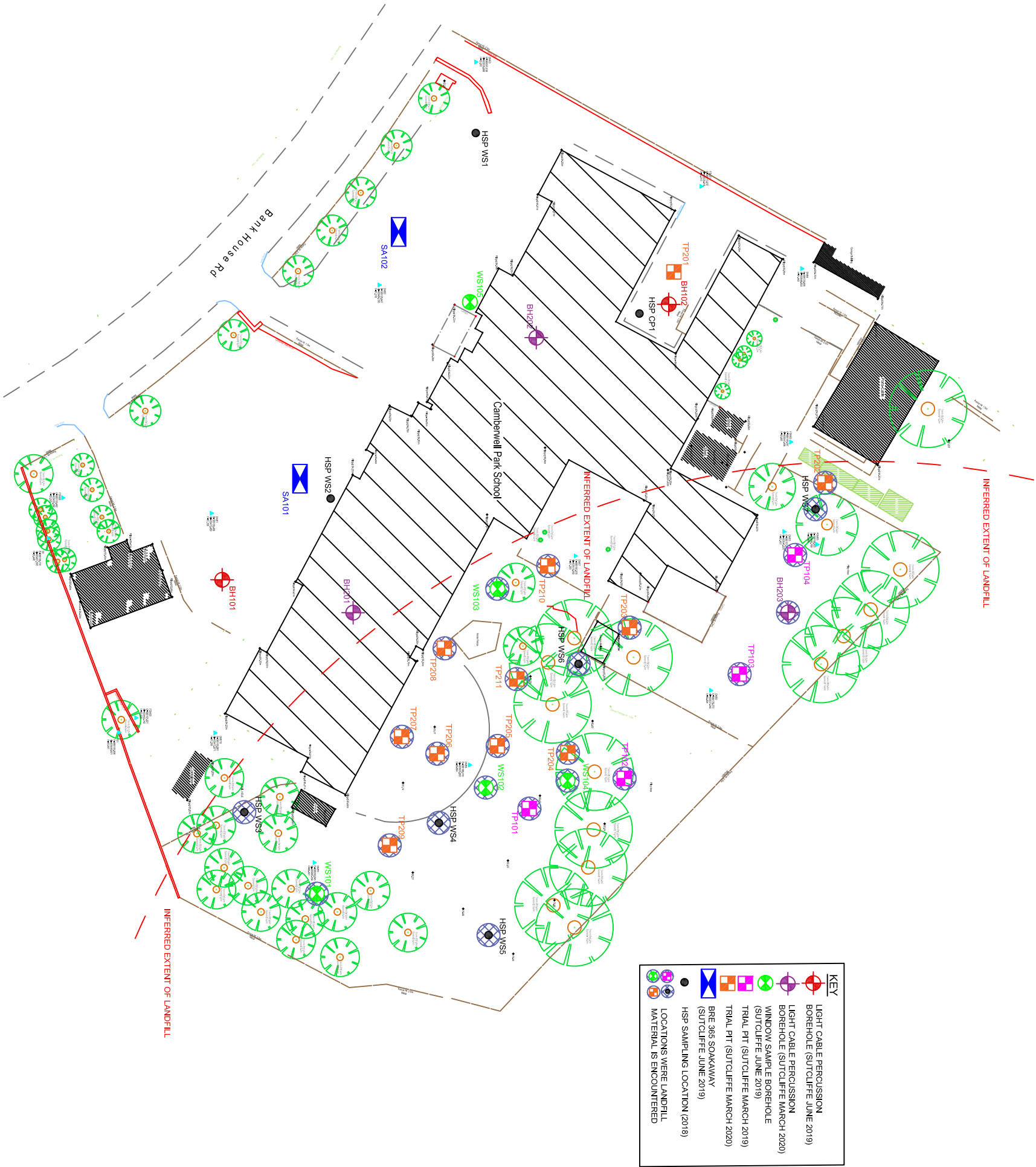
Project

PROSPECT HOUSE
MANCHESTER

Drawing Title

LOCATION OF LANDFILL BASED UPON
SAMPLE DATA ON EXISTING PLAN

Sample Reference	Depth of Material Encountered	Material Encountered
V6S3 (H&P)	3.0cm	Glass, plastic, iron, clayey loess, or alluvium and coal.
V6S4 (H&P)	3.5cm	Dred, glass, plastic and silt.
V6S5 (H&P)	5.0cm	Black ash, carbon wood glass, plastic, or red sandstone.
V6S6 (H&P)	5.0cm	Black, ash, glass, plastic and ceramics.
V6S7 (H&P)	2.3cm	Black, ash, concrete, glass and ceramics.
TP100 (SP10)	3.3cm	Black, wood, gravel, glass, bricks, tyres, clothes and paper.
TP102 (SP10)	3.5cm	Bottles, wood, gas, plastics, iron, glass and bags.
TP103 (SP10)	2.4cm	Bricks, nags, plastics, wood, iron and reeds.
TP104 (SP10)	2.4cm	Brick, wood, glass, plastics, wire, jute and metals.
V6S7 (SP10)	3.5cm	Asli center brick and concrete.
V6S8 (SP10)	2.2cm	Asli center brick, glass and concrete.
V6S9 (SP10)	3.4cm	Cracked brick.
V6S10 (SP10)	4.4cm	Plastics, brick, tiles, metals and glass.
TP102 (SP10)	1.0cm	Hard, thick, glass, ceramics and coal.
TP103 (SP10)	2.1cm	Glass and plastic, bricks, paper, plastic, wood, metal, ceramic, glass, iron, cement, red soil, wood and concrete.
TP104 (SP10)	2.2cm	Coal, mineral ceramics, gravel, wood and public, plastic, rope, metal cans, rubber and glass.
TP105 (SP10)	1.5cm	Black, glass, wood.
TP107 (SP10)	1.2cm	Black, glass, wood.
TP108 (SP10)	1.5cm	Black, glass, wood.
TP109 (SP10)	1.2cm	Black, plastic, metal, metal, clothing or metal glass, plastic, shavings and foil.
TP110 (SP10)	2.5cm	Black, plastic, metal, metal, clothing or metal glass, plastic, shavings and foil.
TP111 (SP10)	3.0cm	Black, plastic, metal, metal, clothing or metal glass, plastic, shavings and foil.
H6102 (SP10)	0.7cm	Metal and rubber, iron, plastic, tires, plastic, stone, coal, window, glass, plastic, ceramics, other wood, material mesh, ceramics and polypropylene.



KEY	
	LIGHT CABLE PERCUSSION
	BOREHOLE (SUTCLIFFE JUNE 2019)
	LIGHT CABLE PERCUSSION
	BOREHOLE (SUTCLIFFE MARCH 2020)
	WINDOW SAMPLE BOREHOLE
	(SUTCLIFFE JUNE 2019)
	TRIAL PIT (SUTCLIFFE MARCH 2019)
	TRIAL PIT (SUTCLIFFE MARCH 2020)
	BRE 365 SOAKAWAY
	HSP SAMPLING LOCATION (2018)
	LOCATIONS WERE LANDFILL MATERIAL IS ENCOUNTERED

[illegible]

Drawing No. 30186-SUT-ZZ-00-DR-G-720-0003 – Hazardous Waste Locations

Sutcliffe

Civil & Structural Engineers, Building Surveyors & Geo-Environmentalists

www.sutcliffe.co.uk

LIVERPOOL
0151 227 3155

MANCHESTER
0161 817 5180

WREXHAM
01978 664071

LONDON
020 74 584138

ACCE

Construction

BSI

BSI

Drawing Status

FOR INFORMATION

Client

INTERSERVE

Project

PROSPECT HOUSE
MANCHESTER

Drawing Title

LOCATIONS PF HAZARDOUS WASTE
ON EXISTING PLAN

P1	PRELIMINARY DRAWING			APR 20	AT	AL						
Rev	Description		Date	By	Chkd							
	Date	Drawn By	Checked By									
	APRIL 2020	A TOSH	AL									
Scale at A3		Project Number										
NTS												
Sheet Number						Revision						
30186-SUT-ZZ-00-DR-G-720-0003		P1										