

LAND AT ACORNFIELD ROAD, KNOWSLEY

GEOENVIRONMENTAL
APPRAISAL
(PHASE 2 ASSESSMENT)

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**SPIRE
GEOTECHNICAL**
Geologists & Site Investigation
Specialists



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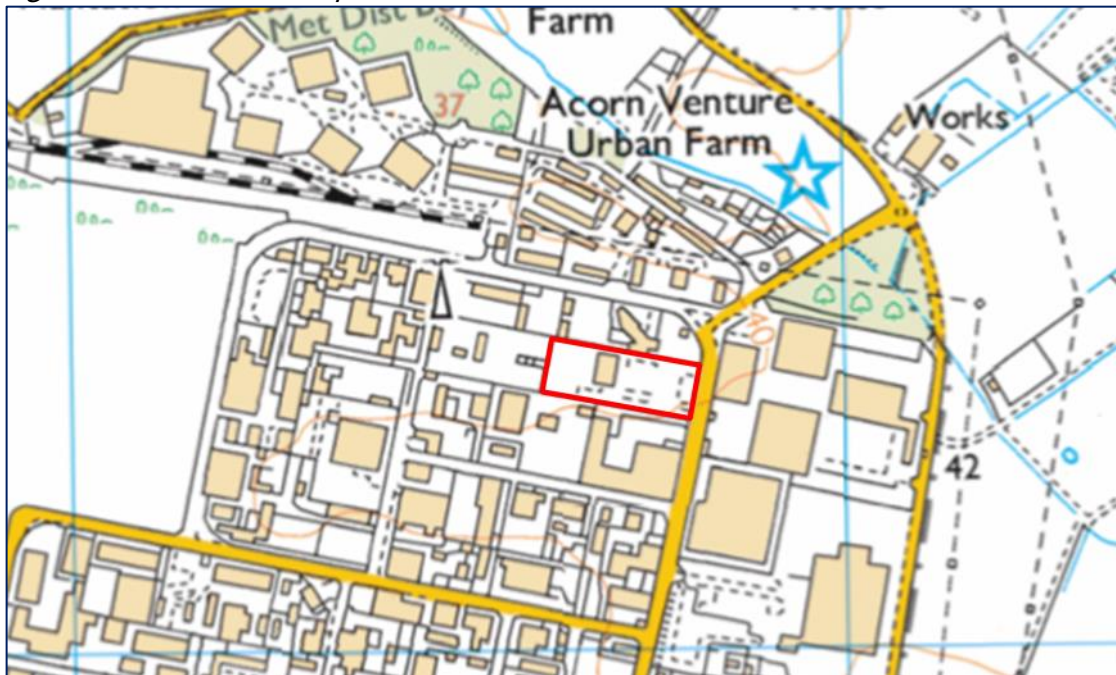


1.0 INTRODUCTION

1.1 Commission Details

- 1.1.1 Spire Geotechnical Limited (SGL) was commissioned by Building Design Northern Limited (BDN) on behalf of Applied Nutrition Limited (the Client) to prepare a Phase 2 Ground Investigation Report for a parcel of land located at Acornfield Road in Knowsley Industrial Park.
- 1.1.2 The intrusive ground investigation was undertaken following the completion of a Preliminary Risk Assessment (Phase 1 Desk Study) Report (SGL, October 2024).

Figure 1: Site Location Map



Source: www.streetmaps.co.uk

- 1.1.3 The site is currently vacant and is being considered for a future land purchase. At this stage, indicative proposals (Appendix 1) include the creation of a new commercial unit with access and areas of parking.
- 1.1.4 A number of sub-contractors have been utilised on this project, including:
- SGL – Providing geotechnical and geoenvironmental consultancy services;
 - Chemtest – Providing laboratory chemical testing of soils (UKAS and mCERTS accredited);
 - Northumberland Council Highway Laboratory – Providing laboratory geotechnical testing of soils (UKAS accredited);

1.2 Report Objectives

- 1.2.1 The purpose of this Phase 2 Ground Investigation Interpretive Report is to provide an assessment on the potential geotechnical and geoenvironmental risks to the proposed development through our assessment of the ground and groundwater conditions



beneath the site area. The geotechnical and geoenvironmental risks have been considered through the various assessments outlined within this report.

1.2.2 This report has been undertaken in general accordance with the following guidance / standards:

- BS5930:2015+A1:2020 Code of Practice for Ground Investigations;
 - BS10175:2011+A1:2013 Investigation of Potentially Contaminated Sites;
- and,

1.3 Limitations

1.3.1 The conclusions and recommendations of this report are based on the findings of the ground conditions obtained during the intrusive ground investigation undertaken by SGL. There is always the possibility of variation in the ground and groundwater condition around and between the investigation locations. Therefore, this report cannot guarantee against unexpected ground conditions occurring between the investigation locations.

1.3.2 SGL consider remedial values derived by others for recent localised “clean up” operations (remediation work). SGL offer no warranty for the accuracy of the third-party information including the recent remedial activities and verification. This report represents a standalone assessment.

2.0 SITE CONTEXT

2.1 Site Location

- 2.1.1 The site measuring approximately 1.45Ha is located at Acornfield Road, Knowsley Industrial Park, Kirkby (Figure 1). The site lies at an approximate Ordnance Survey (OS) National Grid Reference (NGR) of 343647, 399369.

Figure 2: Site Aerial Image



Source: www.google.com/maps

2.2 Site Description

Table 1: Site Details

Features/Sources	Description/Remarks
Site Description and Walkover Survey	The site is located to the west of Acornfield Road in the northern area of the existing industrial park. The central and eastern areas of the site include a flat disused area of land. Relict surface features including access routes and ground slabs are present. Areas of placed gravel are present in between the existing hard standing, and it is understood this material has been placed post-remediation of the shallow ground IN 2017. A large area of the central part of the site was ponded during the walkover, with standing water present above relict ground slabs. In the west is an existing commercial unit. To the west of the unit is a gravel surfaced yard area.

Access	Access to the site is gain via the east off Acornfield Road.
General Topography	The site includes a generally flat/level area. LiDAR data suggests that the site falls on an approximate elevation of approximately 39m AOD.
Adjacent Land-use	The site is generally surrounded by units and works, external yards and storage areas associated with the wider industrial park. Applied Nutrition is located to the east beyond Acornfield Road. DD Wilston Gas and Heating Engineers is present to the north. Stericycle is present to the south.
Invasive Species	The majority of the site is void of established vegetation. There were no obvious signs of invasive weed species (such as Japanese Knotweed) present in the sites peripheral areas, although this should be confirmed by a qualified ecologist.

2.3 Summary of Phase 1 Desk Study

- 2.3.1 The following information was presented in the Phase 1 Site Investigation (Desk Study) Report (SGL, June 2024) for the site. For more information, reference should be made to the third-party report.

Table 2: Summary of Desk Study

Features/Sources	Description/Remarks
History	The site in the 1800s was undeveloped. By the 1950s, the site is potentially part of MOD land. By the 1960s, the site is classed as a depot. By the 1970s, the site is named as an oil depot. Several tanks and structures are present on the site. By the 1990s, the site has been developed with a series of structures/works units. By 2013, the majority of the site area was cleared. Remedial work has taken place locally in the site centre in 2017 relating to clean up of shallow hydrocarbons and volatiles in the soils and perched waters. Land in the surrounding area was initially agricultural. By the 1950s, large areas of land was inferred to be MOD in use. By the 1960s, the surroundings were built up with an industrial estate/park.



Geology	Borehole records and previous ground investigation considered within the Phase 1 Desk Study recorded made ground of approximately 1m thickness across the site. The made ground is reported to overlie the glacial till drift geology, which consists of firm and stiff clays. Locally the clay is soft in nature. Bedrock geology of the Chester Sandstone Formation is present beneath the site from approximately 10m depth.
Environmental Setting	There are pollution incidents in the wider area around 2001 and 2002, however given the age of these incidents, it is highly unlikely that the site is being actively impacted. The site is considered to be at a negligible risk from shallow mining activities. No radon protection measures are required for the new development. A standalone Flood Risk Assessment is recommended for the site.
Land Contamination Assessment	The preliminary CSM and Risk Assessments concluded that the various site receptors are at a low to moderate risk. There is a risk from shallow soils/waters containing potential hydrocarbon and organic contaminants, and asbestos. Remediation has been conducted at the site, however residual or unrecorded contamination may be expected. The site may be impacted by offsite hazardous ground gas sources.

2.4 Summary of Previous Investigations

2.4.1 It is understood that previous investigation and remedial works have been completed at the site. A summary review has been provided to add context to the assessment. Reference has been made to the following documentation that has been provided to SGL:

- Amec Foster Wheeler Letter Correspondence (08/06/2016, Ref-38338/K003p/jge)
- Environment Agency Correspondence (15/06/2016)
- Amec Foster Wheeler Syntor Remediation Verification Report (November 2017)

2.4.2 For further information, the above documents should be reviewed independently.

Amec Foster Wheeler Letter Correspondence (08/06/2016)



- 2.4.3 A letter was submitted to the Environment Agency following site investigation work, and prior to remediation being carried out in 2017. Remedial targets for the protection of human health and controlled waters were presented to the Environment Agency based on site investigation considering an industrial end-use.
- 2.4.4 The report considers several Contaminants of Concern (CoC) relating to TPHs and VOC/SVOCs, and how proposed remedial activities will provide betterment to the existing site conditions. The investigation works were completed in order to derive a series of site-specific remedial target concentrations and for the design of the main remediation strategy.

Environment Agency Correspondence (15/06/2016)

- 2.4.5 The EA responded to the above letter submitted by Amec Foster Wheeler. The EA agree that by removing free product contamination within waters and soils is of primary importance. By doing so, this removed a large concentration of the priority contaminants being considered. The EA also agree to the remedial targets for the site/remedial works.
- 2.4.6 The EA refer to an earlier 2011 site investigation. SGL have not reviewed the findings of the 2011 investigation, but understand this is part of a Part IIA investigation undertaken at the site.

Amec Foster Wheeler Syntor Remediation Verification Report (November 2017)

- 2.4.7 The purpose of the remediation strategy was to provide the clean-up and betterment to the site from the elevated TPHs and VOCs/SVOCs present in the shallow waters and soils. The remedials focused on the removal and/or reduction of risks to human health and controlled waters.
- 2.4.8 As well as the removal of free phase material from the soils and waters from site, the main remedial technique being considered is ex-situ bioremediation of the upper 1m of existing made ground centrally and in the east. The contaminated perched groundwaters were to be pumped out and treated.
- 2.4.9 The approximately 1m deep excavated areas were backfilled with a combination of treated and untreated material and capping material including 6F2.
- 2.4.10 As agreed with the EA, the Remediation Strategy Report presents a series of site specific/derived Soil Remedial Treatment Criteria values. The progress of remediation testing would be compared against the agreed Remediation Treatment Criteria Values. These generally related with CoC include aliphatic and aromatic TPHs (including BTEX) and VOC/SVOC.



- 2.4.11 Remediation works were proposed to two areas of the site (referred to as Phase 1 and Phase 2 Areas). The west beyond the existing unit was not remediated. Large areas in and around the Phase 1 & Phase 2 Areas were not remediated as these included existing ground slabs and access, and it was assumed that previous investigations appropriately designated areas requiring action.
- 2.4.12 A Remediation Validation Report was provided by Celtic Technologies Ltd in May 2017. Celtic were appointed by Amec Foster Wheeler Ltd to undertake the work.
- 2.4.13 The final site conditions post-remediation are summarised by Amec Foster Wheeler.
- 2.4.14 The report concludes that contamination linkages to human health and shallow groundwater have been broken due to the completed remedial works.
- 2.4.15 Limitations associated with the works are presented, and it should be noted these may have implications for future development. Only two areas have been remediated, and the report does not provide guarantees relating to potential unrecorded contamination elsewhere.
- 2.4.16 As a whole, residual (background) contamination may be present. Further remedials to provide future clean service corridors may be required (i.e. placing future utilities in clean trenches etc.).
- 2.4.17 It is suggested that future excavations, for example for the placement of pad foundation etc., shall provide sufficient risk assessment to manage potential residual contamination in the ground (including potential asbestos containing material).



3.0 FIELDWORKS & TESTING

3.1 Scope of Investigation

- 3.1.1 The investigation undertaken by SGL has been carried out to establish the ground and groundwater conditions underlying the proposed development site. Table 3 provides a summary of the intrusive works undertaken by SGL.

Table 3: Investigation Works and Rationale

Exploratory Positions	Activity Description
Boreholes WS01 to WS06	Six dynamic (windowless) sampling boreholes to investigate the near-surface ground and groundwater conditions. A series of sampling and in-situ testing was undertaken to aid the geotechnical and geoenvironmental assessment. Boreholes were progressed via dynamic probing to capture the anticipated top of the sandstone bedrock.
Boreholes WS01, WS02 & WS03	Combined ground gas and groundwater monitoring standpipes have been installed for the completion of a ground gas risk assessment.
Trial Pits TP01 to TP08	Eight mechanic excavated trial pits to supplement the boreholes and geoenvironmental assessment.
Boreholes WS01, WS02, WS03, WS04 & WS05	Initial TRL DCP tests to establish the layer strength and characteristic CBR values of the near surface deposits.

3.2 Summary of Insitu & Laboratory Testing

- 3.2.1 As part of the assessments presented in the following sections, representative soil samples were subject to a variety of insitu testing and laboratory tests, the results of which are presented within Appendices 2, 3 and 4 respectively.

Table 4: Summary of Insitu and Laboratory Testing

GEOTECHNICAL		
Laboratory Tests	Quantity	Purpose
Atterberg Limit Determination	8	Soil classification and to aid geotechnical appraisal.
Water Content	8	
Gradings Analysis	3	
Soluble Sulphate	19	To determine the chemical aggressive nature of soils that may come into concrete with construction materials and foundation concrete.



pH	19	
Insitu Tests	Quantity	Purpose
Standard Penetration Tests	24	To determine an indicative strength of materials throughout the soil profile.
Hand Vane Shear Strength Tests	26	
CHEMICAL		
Heavy metals and inorganic chemicals	12	To assess the potential risk to human health, particularly during the construction phase.
Speciated PAH	12	
Speciated TPH	12	
BTEX	12	
Asbestos Screening	12	
SVOC & SVOC	12	
Leachate Analysis based on the above determinants	5	To assess the potential risk to controlled waters.

4.0 GROUND CONDITIONS

4.1 Record of Ground Conditions

- 4.1.1 A summary of the ground conditions encountered during the intrusive ground investigation completed by SGL are presented in Table 5. The exploratory hole record sheets are presented in Appendix 2.

Table 5: Summary of Ground Conditions

Level at top of Stratum (m bgl)	Thickness (m)	Typical Description
Ground Level	0.20 – 1.20	Generally recorded as a granular material of either sandy gravel or gravelly sand with anthropogenic deposits. [MADE GROUND]
0.20 – 1.20	1.30 ¹ – 9.10	Recorded as firm and stiff, initially soft cohesive (clay) superficial deposits. [DRIFT GEOLOGY]
8.90 – 10.00	0.20 – 0.70	Bedrock geology consisting of very dense sandstone. [SOLID GEOLOGY]

¹ Formation base not proven

4.2 Record of Initial Ground

- 4.2.1 Made ground was recorded in each of the exploratory positions from surface to depths of between 0.20m (TP's 6 & 7) and 1.20m (TP04). As a whole, made ground was generally < 1m in thickness across the site.
- 4.2.2 Centrally, two areas of placed gravel stone were encountered, and this is considered part of the recent remedial work. Elsewhere centrally and in the east, concrete surfacing generally overlies thin sub-base deposits of sand and bricks. Locally, clay fill deposits consisting of brick and debris was encountered.
- 4.2.3 In the west (i.e. beyond the existing unit), a placed gravel consisting of road stone and ballast was recorded. Locally at TP01, the gravel overlies a thin sandy gravelly clay material.
- 4.2.4 Within the made ground, particularly centrally and to the east, shallow perched ground water was present between the made ground and natural clay interface. No hydrocarbon residue or free product was noted within the waters, although a slight odour is present locally within the made ground.



4.3 Record of Drift Geology

- 4.3.1 Beneath the initial made ground from depths of 0.20m and 1.20m, firm and stiff clay deposits were recorded. Locally, the clay is recorded as initially soft, becoming firm with depth.

4.4 Record of Solid Geology

- 4.4.1 Previous ground investigation recorded solid geological deposits of sandstone at approximately 10m depth beneath the eastern site area.
- 4.4.2 From around 5m depth, the boreholes were progressed via dynamic probing to map the rock head profile of the sandstone. The probes were driven to refusal, and this is anticipated to represent the head of the solid bedrock (i.e. through any weathered material). Refusal depths ranged between 9.20m (WS01 and WS02) and 10.70m (WS06).

4.5 Groundwater Observations

- 4.5.1 A shallow perched groundwater table is anticipated below the development site area, and for any future work, the provision of adequate dewatering (i.e., sump pumps etc.) equipment is recommended as good practice to remove surface water inundation or pockets of trapped/perched water where encountered.
- 4.5.2 Any groundwater encountered centrally and, in the east, may contain residual hydrocarbon and VOC contamination. As a precaution, such groundwaters should be pumped out of the ground, appropriately contained and removed from site, where possible. By removing groundwater from site, this removes some of the residual source contaminant material (i.e. this will improving the current site conditions).



5.0 GEOTECHNICAL ASSESSMENT

5.1 Strength Testing

5.1.1 Standard Penetration Testing (SPT) was conducted within the boreholes in the natural drift geology. In summary, the SPT tests recorded N-value ranging between:

- Pelaw Clay: 4 to 20 (soft, firm to stiff)

5.1.2 A series of insitu hand vane shear strength tests were undertaken within the cohesive clay deposits. Shear strength values of in the clay ranged between 40kPa (soft to firm) and 112kPa (high strength).

5.2 Soil Volume Change Potential

5.2.1 For classification purposes, 8 No. cohesive soil samples of the drift geology were subject to Atterberg Limit Determination and Water Content analyses. A summary of the classification testing results is summarised in Table 6.

Table 6: Summary of Atterberg Limit Testing Results

Atterberg Limit Determination				
Stratum	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
Cohesive Ground	13.5 – 18.1	21 – 32	13 – 16	7 – 19

4.2.3 The material tested can be described as cohesive deposits of a low plasticity. Based on the Plasticity Indices, the cohesive deposits exhibit a low volume change potential (considering the percentage passing of the 425-micron sieve).

4.2.4 Based on the above assessment, a minimum foundation depth for strip footings and pads should be 0.75m below ground level (assuming foundations are placed completely within the undisturbed clay). Foundations may require deepening to take into account the presence of locally deeper areas of made ground.

5.3 Aggressive & Acidic Ground Conditions

5.3.1 A series of samples were subject to soluble sulphate and pH analysis in order to determine whether the sub-surface materials (including foundation concrete etc.) will come into contact with potentially chemically aggressive and/or acid ground conditions. The testing results are summarised in Table 7.



Table 7: Summary of SO₄ and pH Results

Material	SO ₄ (mg/l)	SO ₄ Characteristic Design Value (mg/l)	pH	pH Characteristic Design Value
Made Ground	<10 – 1300	1300	8.2-11.9	8.2
Natural Clay	<10 – 84	84	8.1 – 8.9	8.9

5.3.2 Based on the above results (which have been compared against BRE Special Digest 1: 2005, 3rd Edition), Design Sulphate classifications and Aggressive Chemical Environment for Concrete classifications are as follows:

➤ DS-2, AC-2

5.4 Foundation Recommendations

5.4.1 A future development may include the placement of a commercial unit at the site. Based on the development proposals and recorded ground conditions, shallow foundations such as pads (taking column loads) complimented with strip footings are considered viable.

5.4.2 Given that foundations will be placed within clay of a low volume change potential, a minimum foundation depth of 0.75m below finished ground level is considered appropriate. Should foundations be placed within the zone of influence of adjacent trees (past, present or proposed), foundations shall be deepened accordingly.

5.4.3 Foundations may require deepening locally and taken through the full extent of made ground, and placed completely within the undisturbed natural clay deposits.

5.4.4 Based on the recorded nature of the natural clay, an initial allowable bearing capacity of 90kN/m² is recommended. The clay is initially soft locally. As a rule, the clay deposits offer increased bearing capacity with depth. Where foundations are deepened to 2.00m, a safe bearing present of 120kN/m² is recommended.

5.4.5 Prior to the placement of concrete, foundation excavations should be inspected by a qualified engineer to ensure that suitable ground is being used to support the pads and footings.

5.5 Ground Slab Recommendations

5.5.1 Existing made ground extends to approximately 1m depth. If a ground bearing slab is being considered, an engineered fill/supporting platform will be required beneath the underside of the slab.



- 5.5.2 At this stage, a vapour and ground gas resistant membrane may be required beneath a future ground slab or sub-floor. The specialist membrane will act to offer mitigation protection, by default, to any residual contamination (the latter of which is discussed in Section 6.0).

5.6 Road and Pavement Design

- 5.6.1 A series of insitu TRL DCP tests were positioned in boreholes 1 to 5 prior to progressing with the drilling works.
- 5.6.2 Based on a record of the layer strength analysis, a characteristic CBR value of >10% (recorded range of between 31% to 47%) is considered appropriate for existing granular deposits.
- 5.6.3 For the lower areas of cohesive (clay) ground, a characteristic CBR value within this material of 5% is considered appropriate (recorded range of between 6% and 9%).

5.7 Excavations & Trench Stability

- 5.7.1 The use of wheeled backhoe excavators (such as JCB 3CX) and robust 360 tracked excavators are considered appropriate for the site. For future site works, adequate lateral trench support may be required for excavations. Excavations sides shall be designed, constructed and supported in accordance with CIRA Report 97.
- 5.7.2 The contractor shall noted that excavations through shallow groundwater, where encountered locally, may lead to unstable side-walls. Mitigation (such as trench supported) may be required.
- 5.7.3 The contractor shall make provisions for breaking equipment (i.e. relict/buried features such as foundations associated with the former site use cannot be ruled out).

5.8 Groundwater

- 5.8.1 The provisions for ground/surface water controls is recommended to limit surface water runoff and trench inundation or should any localised pockets of perched / trapped water be encountered locally.
- 5.8.2 Any excavations on this site should remain open for as short a period as possible, since these materials may be susceptible to deterioration, if exposed to the natural elements. SGL cannot be held accountable for any deterioration of materials, when excavations are left exposed to surface water infiltration for any significant period of time.



6.0 LAND CONTAMINATION ASSESSMENT

6.1 Sampling and Testing Rationale

- 6.1.1 Following the completion of the Phase 1 Site Investigation (Desk Study) Report, a series of soil deposits were selected for the purpose of undertaken laboratory chemical analysis.
- 6.1.2 Shallow soil samples were screened for a number of determinants including the following:
- Metals
 - Inorganic Chemicals
 - Speciated PAH
 - Speciated TPH
 - BTEX
 - VOC
 - SVOC
 - Asbestos presence
- 6.1.3 The sampling and laboratory testing undertaken has been used to inform the Human Health and Controlled Waters Risk Assessments outlined below. Based on the Preliminary Conceptual Model and Risk Assessment, future end-users and construction/utility workers are considered as sensitive receptors.

6.2 Human Health Risk Assessment

Generic Assessment Criteria

- 6.2.1 Based on the proposed end-use of the site, the testing results have been compared to a series of available Generic Assessment Criteria (GAC) values (Appendix 5) based on a commercial end-use. This is considered appropriate given the proposed nature of the development and the sites immediate surroundings.
- 6.2.2 For the assessment, a generic soil organic content of 6.00% has been adopted.
- 6.2.3 Where available, selected GAC values have been derived from LQM/CIEH S4UL. In the absence of suitable values, Atkins ATRISK_{SOILS} and C4SL values have been considered.
- 6.2.4 In addition to the comparison of GAC values, SGL have compared the testing results to the previously agreed remedial treatment criteria, the latter of which were used to determine if materials are suitable for reuse.



Summary of Testing Results – Human Health

- 6.2.5 At trial pit location TP08, a standalone/localised slightly elevated lead concentration has been recorded within the immediately underlying natural clay, The testing suggests that the top of the clay at the location of TP08 has been impacted by anthropogenic debris. Given the depth of the lead concentration and likely soil mixing zones, such an exceedance is not considered to represent a high risk to future site users (see comments below on the protection of construction workers).
- 6.2.6 No other elevated concentrations of metals or inorganic chemicals have been recorded.
- 6.2.7 From 12 No. samples tested, no asbestos containing material has been recorded.
- 6.2.8 All of the speciated TPH, PAH and BTEX concentration values have been recorded within acceptable threshold limits.
- 6.2.9 Elevated VOCs has been recorded in several locations, and a summary has been provided below:
- 1,2-dichloroethane: TP03 (1.50-2.00m), TP04 (0.50-1.00m), TP05 (0.40-0.60m), TP07 (0.60-0.80m), TP08 (0.20-0.60m).
 - Cis-1,2-dichloroethylene: TP07 (0.60-0.80m)
 - 1,2,4-trimethylbenzene: TP04 (0.50-1.00m), TP07 (0.60-0.80m)
- 6.2.10 For ease, as well as the tables presented in Appendix 5, a summary “Hot-spot” location plan has been provided in Appendix 1.

Summary of Testing Results – Remedial Treatment Criteria

- 6.2.11 The remedial treatment criteria values were derived, and agreed with both the local authority and Environment Agency, for the proposed remediation undertaken in 2017. The criteria values were reported to assessment whether existing site materials are suitable for reuse.

Table 8: Summary of Elevated VOC Concentrations (highlighted red)

Parameters	SOIL CRITERIA GAC (mg/kg)	TP03 1.50- 2.00	TP04 0.50- 1.00	TP05 0.40- 0.60	TP06 0.25- 0.50	TP07 0.60- 0.80	WS01 0.50- 1.00	WS02 0.40-0.70	TP08 0.20- 0.60
1,2-dichloroethane	0.67	14	21	10	< 2.0	190	< 2.0	< 2.0	34
Vinyl Chloride	0.059	190	1	< 1.0	< 1.0	91	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethylene	14	< 1.0	< 1.0	2	< 1.0	840	< 1.0	< 1.0	21
Benzene	27	< 1.0	< 1.0	< 1.0	< 1.0	41	< 1.0	< 1.0	12
Trichloroethene	1.2	< 1.0	< 1.0	< 1.0	3	77	< 1.0	< 1.0	< 1.0
Toluene	6	490	390	65	5	11000	9.5	15	< 1.0
Ethylbenzene	6	8	26	6	2	4400	2.6	4.5	< 1.0
m+p-Xylene	6	19	60	10	4	6200	4.6	10	< 1.0



o-Xylene	6	3	12	2	< 1.0	1000	< 1.0	1.5	< 1.0
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6.2.12 The VOC concentration results suggest that existing near surface materials present in the central and eastern areas of site, irrespective of the 2017 remediation work, is unsuitable for reuse.

Recommendations

6.2.13 When considering human health exposure to construction workers and future site users, there are a series of VOC concentrations that represent a potential risk. Additional assessment or mitigation is required to quantify the risks further.

6.2.14 The remedial works did comment that there may be residual (background or left over) areas of contamination or unrecorded areas of contamination beneath the site. The assessment undertaken by SGL has confirmed both. Residual contamination and unrecorded contamination exist.

Export Unsuitable Material From Site

6.2.15 A Materials Management Plan should be considered to assess how near surface materials can be adequately controlled during construction. At face value, the assessment undertaken by SGL suggests near surface material in the central and eastern areas is unsuitable for reuse. If this material is excavated and removed from site, along with the perched groundwaters encountered, this largely removed the contamination source material.

6.2.16 Irrespective of land contamination, the above may be required as part of designs to place an engineered fill beneath the underside of a new ground slab. In theory, the concrete roadways and slabs onsite can be crushed, stored/stockpiled and reused. Approximately 800mm of contaminated material may require removal from site. An engineered fill/capping, suitably compacted in layers can be placed on top of the natural clay formation, and site levels can be brought back up to the underside of the slab.

Further Assessment

6.2.17 At this stage, an Options Appraisal and Remediation Strategy are required under BS10175. Residual contamination exists, and a suitable methodology to manage and make safe areas affecting the development require consideration. The strategy shall consider:

6.2.18 Partly removing the source by default, i.e. depending on finished ground levels and engineering layouts

-  A combination of source removal and blocking of the source through placement of a suitable carrier system. This will likely include a vapour/hydrocarbon resistant membrane. The membrane by default will also protect the structure from the ingress of any residual ground



gasses being emitted/generated within the made ground. The ground gassing monitoring has not recorded any significant ground gased.

- The placement of clean cover capping materials to make safe and support future areas of soft landscaped area.

- Any verification requirements

6.3 Controlled Waters Risk Assessment

- 6.3.1 Five of the soil samples were subject to leachate analysis for a range of metals, inorganic chemicals, speciated PAH, speciated TPH, BTEX and VOC/SVOC.
- 6.3.2 Extensive studies and third-party risk assessments have been conducted prior to the 2017 remediation. As part of the data review summarised in previous sections, the Environment Agency agreed to a series of site-specific target concentrations. These target concentration values are presented in Appendix 5, and SGL have compared the leachate results to these to make an updated assessment.
- 6.3.3 When considering controlled waters, SGL have attempted to verify that the previous remediation works and site conditions have been left in such a conditions that there are no unacceptable risks to controlled waters.
- 6.3.4 With the exception of one slightly elevated arsenic concentration (TP08, 0.80-1.00), there are no exceedances relating to concentrations of metals, inorganic chemicals, speciate PAH, speciated TPH, VOC and SVOCs.
- 6.3.5 It should be noted that in support of the above, no visual signs of hydrocarbon free product was noted during the works, although a slight odour was evident locally.
- 6.3.6 Whilst residual contamination is present in the upper soils in relation to human health, the assessment suggests that these materials are not currently impacting controlled waters.

6.4 Ground Gas Risk Assessment

- 6.4.1 When considering the findings of the preliminary risk assessment undertaken, and the recorded ground conditions; there is one primary ground gas sources.
 - Off-site: adjacent areas of ground gas sources
- 6.4.2 The gas monitoring wells focused in the central area of the site (i.e. where known contaminants were previously recorded). The wells were designed to include a response zone that targets both made ground into the natural deposits. It is recognised that the lower clay ground beneath the made ground is likely to prohibit the upward migration of gasses (i.e. emitting from other sources away from the area).



- 6.4.3 In terms of Wilson and Card, there is a very low risk to the site from ground gas, and this is reflected in the monitoring frequency adopted (i.e. for a commercial development). In support of the above, monitoring has been conducted on a total of three occasions, and acts to supplement/compliment the recent monitoring already undertaken at the site by others in 2017. A summary of the ground gas concentrations captured by SGL is presented in Table 9. The full data-set is presented within Appendix 2.

Table 9: Summary of Gas Monitoring Results

Flow Rates (l/hr)	CO ₂ (% v/v)	CH ₄ (% v/v)
0.0 – 0.1	0.0 – 1.7	0.0 – 0.5

- 6.4.4 Adopting a maximum flow rate of 0.1l/hr and a worst-case carbon dioxide concentration of 1.7% v/v. The worst-case Gas Screening value, GSV is 0.0017l/hr. If these initial results proved elevated concentrations of ground gasses, an extended and prolonged period of monitoring would be considered necessary. The results presented in Table 9 capture near-worst case conditions, and are therefore considered appropriate for this assessment.
- 6.4.5 Based on the above, no ground gas protection is considered necessary. It should be noted that a vapour/hydrocarbon resistant membrane may be required as part of mitigation beneath the new building footprint.
- 6.4.6 The levels of methane (<1%) and carbon dioxide (<5%) are lower than action levels presented in Building Regulations. Any methane present may be originating from the residual volatiles present in the ground. Whilst methane concentrations are not significant, it should be recognised that the proposed vapour/hydrocarbon membrane will, by default, offer some protection to the new building.

6.5 Protection of Future Site Workers

- 6.5.1 Given that residual contamination has been recorded, as good practice, robust health and safety procedures should be considered at the site. For future site works, particularly during the site strip/clearance and provision of utility/foundation runs and general excavations, the appointed Principal Contractor should make provisions to safeguard (through site documentation, procedures and welfare provisions) all personnel who will potentially come into contact with shallow Made Ground material. As a minimum, the following should be considered further.
- Site induction with reference to handling and managing excavations and excavated material;
 - Excavations left open for long periods of time should be suitably covered (i.e. to reduce the release of windblown materials);



- The use of suitable PPE at all times (including disposable overalls, gloves and dust masks);
- Suitable storage/containment of shallow arisings generated during earthworks and excavations;
- Provision of suitable welfare and hand-washing facilities.

6.5.2 Further reference should be made to the “Construction Code of Practice for the Sustainable Use of Soils on Construction Sites” (DEFRA, 2009).

6.5.3 A Materials Management Plan is recommended to incorporate the above measures, and to ensure that the movement, placement or otherwise removal of material from site is undertaken in a controlled manner, backed up with sufficient verification data.

7.0 REVISED CONCEPTUAL SITE MODEL

AVAILABLE CONTAMINANTS, PATHWAYS & RECEPTORS						
Contaminants			Pathways		Receptors	
C1 C2 C6	Elevated concentrations of VOCs in five locations when considering human health GAC.		P1	Direct soil and dust ingestion (including dermal contact)	R1	End-users
			P2	Inhalation of indoor dust	R2	Construction and utility works
			P3	Inhalation of outdoor dust	R6	Building Structure and Construction Materials
	Materials may be unsuitable for reuse due to the VOC/SVOC concentration values.		P4	Direct contact		
No elevated ground gases have been recorded.						
RISK EVALUATION						
Linkage			Risk	Risk Action		
C1 C2	P1 P2 P3 P4 P5	R1 R2 R3 R4 R5 R6	LOW-MOD	Either remove from site upper made ground soils and perched waters, particularly in the site centre and east, or further risk assess to gain a better understanding of the current risks. The latter may be required to inform an options appraisal. Either a remediation strategy or Materials Management Plan may be required.		
				If materials are to remain onsite and consideration is given to use of hydrocarbon/vapour resistant membranes, further supporting sampling and testing (i.e. risk assessment) may be required.		

Table 10: Updated Conceptual Site Model (CSM)

8.0 CONCLUSIONS & RECOMMENDATIONS

- 8.0.1 SGL has carried out intrusive ground investigation works including a series of boreholes and trial pits. The purpose of the investigation was to provide design information for the purchase of the land to facilitate a future commercial developed. The intrusive investigation is intended to provide a general overview of the ground and groundwater condition (including land contamination) underlying the site for future development.

8.1 Ground Conditions

- 8.1.1 Made ground was recorded in each position to depths of between 0.20m and 1.20m depth below surface. Made ground generally includes concrete or gravel surfacing. In the west, the made ground included roadstone/aggregate locally overlying a thin clay fill. In the site centre, a placed stone backfill is present (part of previous remedial work in 2017).
- 8.1.2 The made ground overlies firm and stiff cohesive glacial till deposits. The till was initially soft in nature. The clay overlies solid geological deposits of sandstone at an approximate depth of 10m from surface.
- 8.1.3 Localised areas of shallow trapped/perched groundwater was observed generally at the made ground and natural clay interface. Future works should attempt to pump out, store and remove from site groundwaters, which may locally contain residual contaminants.

8.2 Summary of Geotechnical Assessment

- 8.2.1 The Design Sulphate and Aggressive Chemical Environment classification of DS-2, AC-2 is considered appropriate for the site.
- 8.2.2 Traditional strip footing foundations placed at a minimum depth of 0.75m from surface within the natural clay deposits is recommended. Should made ground be encountered at greater depths, foundations shall be deepened and placed completely within the natural/undisturbed clay. A safe bearing capacity of 90kPa is available where foundations are placed within the initial clay. Where deepened to 2.00m, 120kPa is available within the cohesive deposits.
- 8.2.3 If a ground bearing slab is being considered, it may be prudent to place an engineered fill to support the new slab. Given known contamination issues, and given existing near surface material may be unsuitable for reuse, the upper 1m of made ground in the site centre and east may require removal from site.
- 8.2.4 If mitigation is acceptable, this could form placement of a hydrocarbon/vapour resident membrane beneath the new building structure.



- 8.2.5 If formation deposits include existing granular material, a CBR value of >10% is recommended. If formation is clay ground, a CBR value of 5% is considered appropriate.

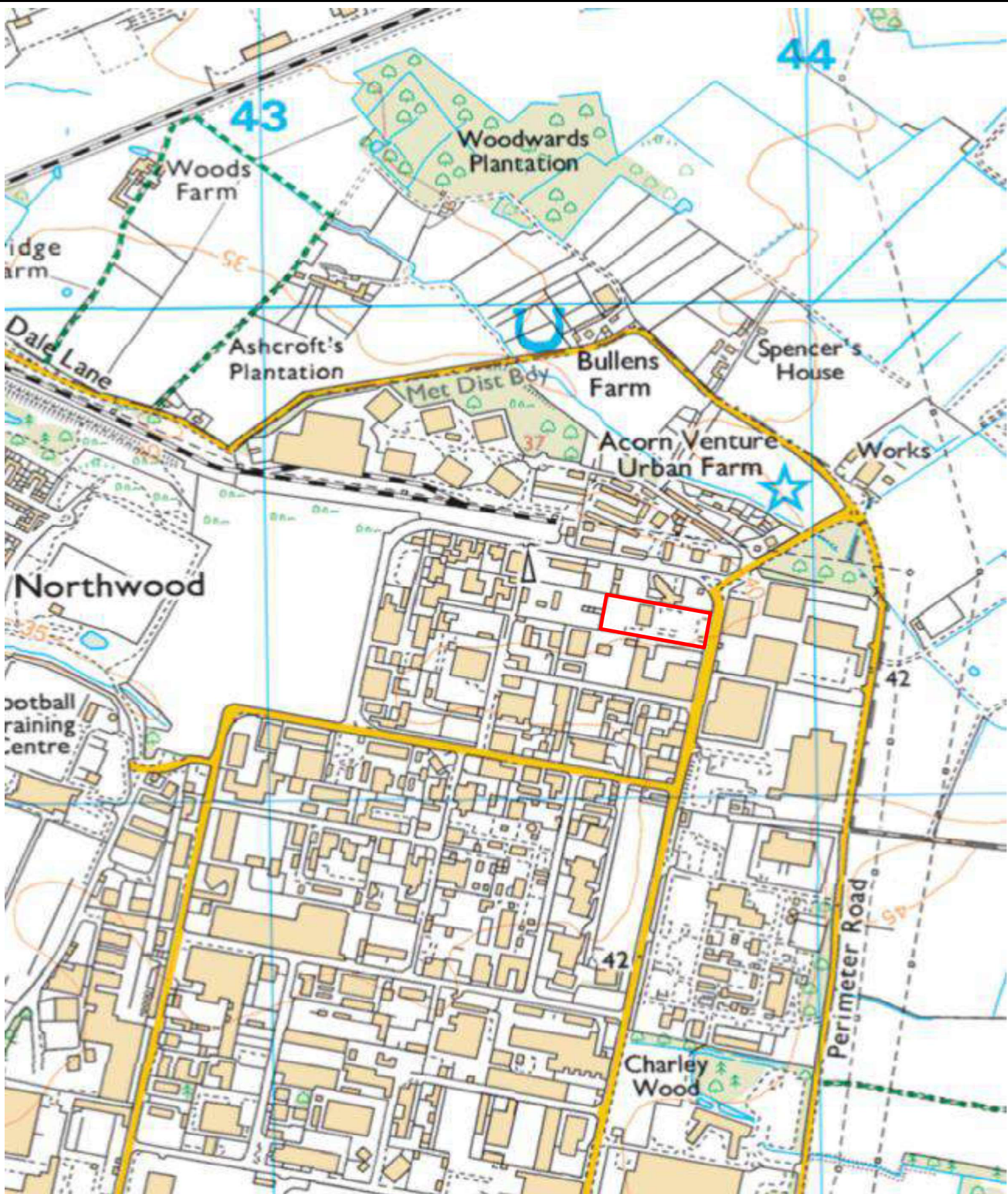
8.3 Summary of Land Contamination Assessment

- 8.3.1 The made ground in the central and eastern areas of site contains elevated VOCs and SVOCs which are potentially harmful to human health (construction workers and future end-users).
- 8.3.2 The above contamination may be seen as residual/background concentrations, and mitigation (such as the placement of a hydrocarbon/vapour membrane) may be acceptable subject to further sampling and assessment.
- 8.3.3 An Options Appraisal and Remediation Strategy should be developed. The strategy should include details relating to the blocking and/or removal of “contaminated” materials. Where limit areas of soft landscaping are proposed, the strategy shall document requirements for the inclusion of clean cover capping materials.
- 8.3.4 If by default, extensive amounts of made ground (and groundwater) require disposal to make way for a new ground slab with supporting engineering fill, then this provides betterment to the current site conditions through the removal of a significant quantity of contaminated material/waste.
- 8.3.5 Controlled waters are not considered to be at a significant risk based on the assessment undertaken by SGL and based on the previous third-party assessment.
- 8.3.6 No ground gas protection is considered necessary. The limited additional monitoring that has been conducted confirms that background /residual ground gasses are present. Whilst the methane concentrations are not above the 1% threshold (as considered in Building Regulations), the placement of a vapour barrier membrane shall act to block such gasses which are likely originating from any residual areas of volatiles in the ground.

APPENDIX 1



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0191 549 7384

Company No.: 15969735

DRAWING TITLE

SITE LOCATION MAP

CLIENT

BUILDING DESIGN NORTHERN

PROJECT

ACORNFIELD ROAD

STATUS

FINAL

DRAWING NO.

S2405_DWG_01

GENERAL NOTES

SGL has prepared the drawing for the sole use of the Client and their appointed agents. SGL shall not be responsible for any use of the drawing for any purpose other than that for which it was prepared. Agreement for the use or copying of this drawing by any Third Party must be obtained in writing from SGL. Should the Client require to pass copies of the drawing to other parties for information, no professional liability or warranty shall be extended to other parties by SGL.



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0191 549 7384

Company No.: 15969735

DRAWING TITLE

AERIAL SITE PLAN

CLIENT

BUILDING DESIGN NORTHERN

PROJECT

ACORNFIELD ROAD

STATUS

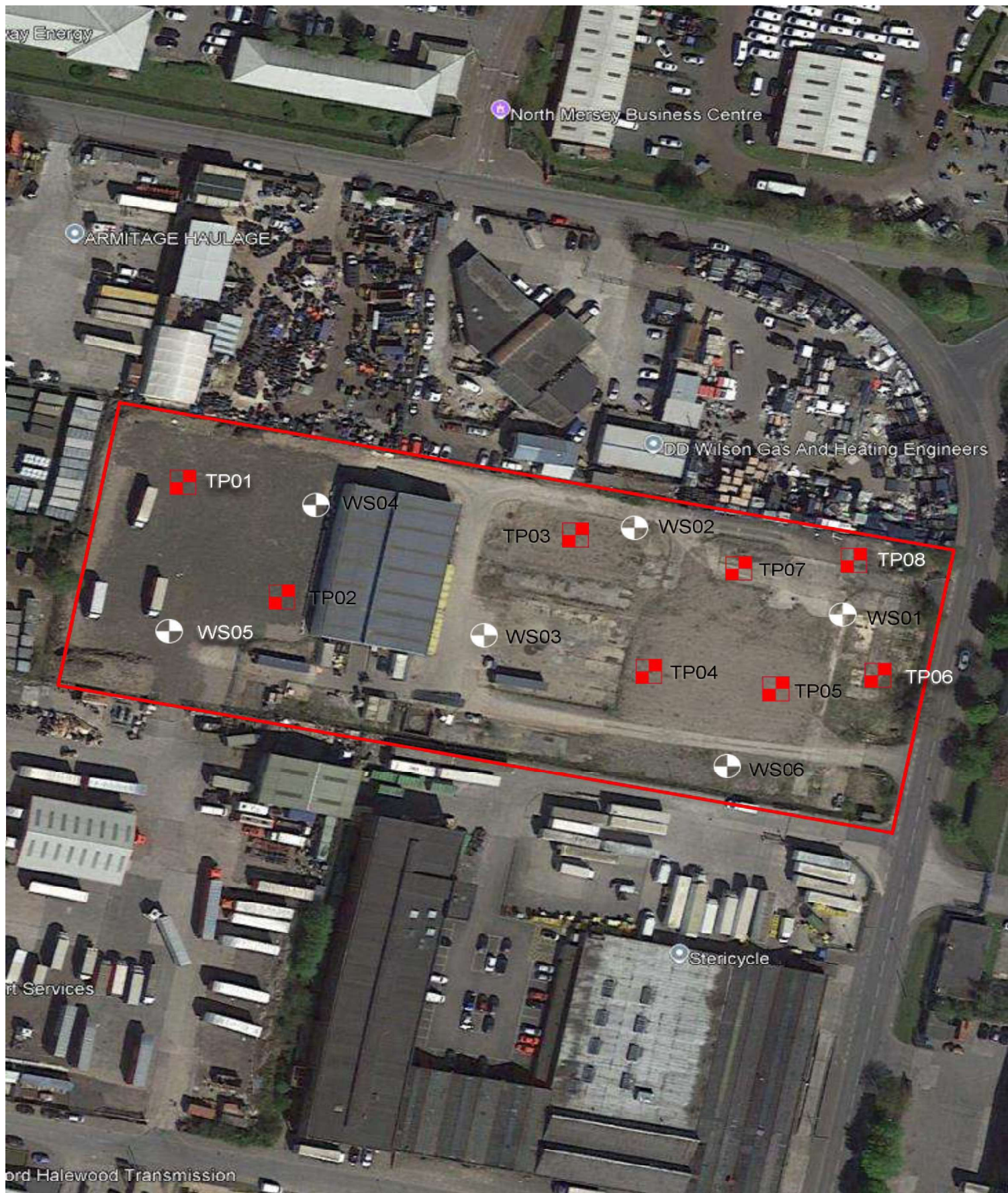
FINAL

DRAWING NO.

S2405_DWG_02

GENERAL NOTES

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Company No.: 15969735

DRAWING TITLE

EXPLORATORY HOLE LOCATION PLAN

CLIENT

BUILDING DESIGN NORTHERN

PROJECT

ACORNFIELD ROAD

STATUS

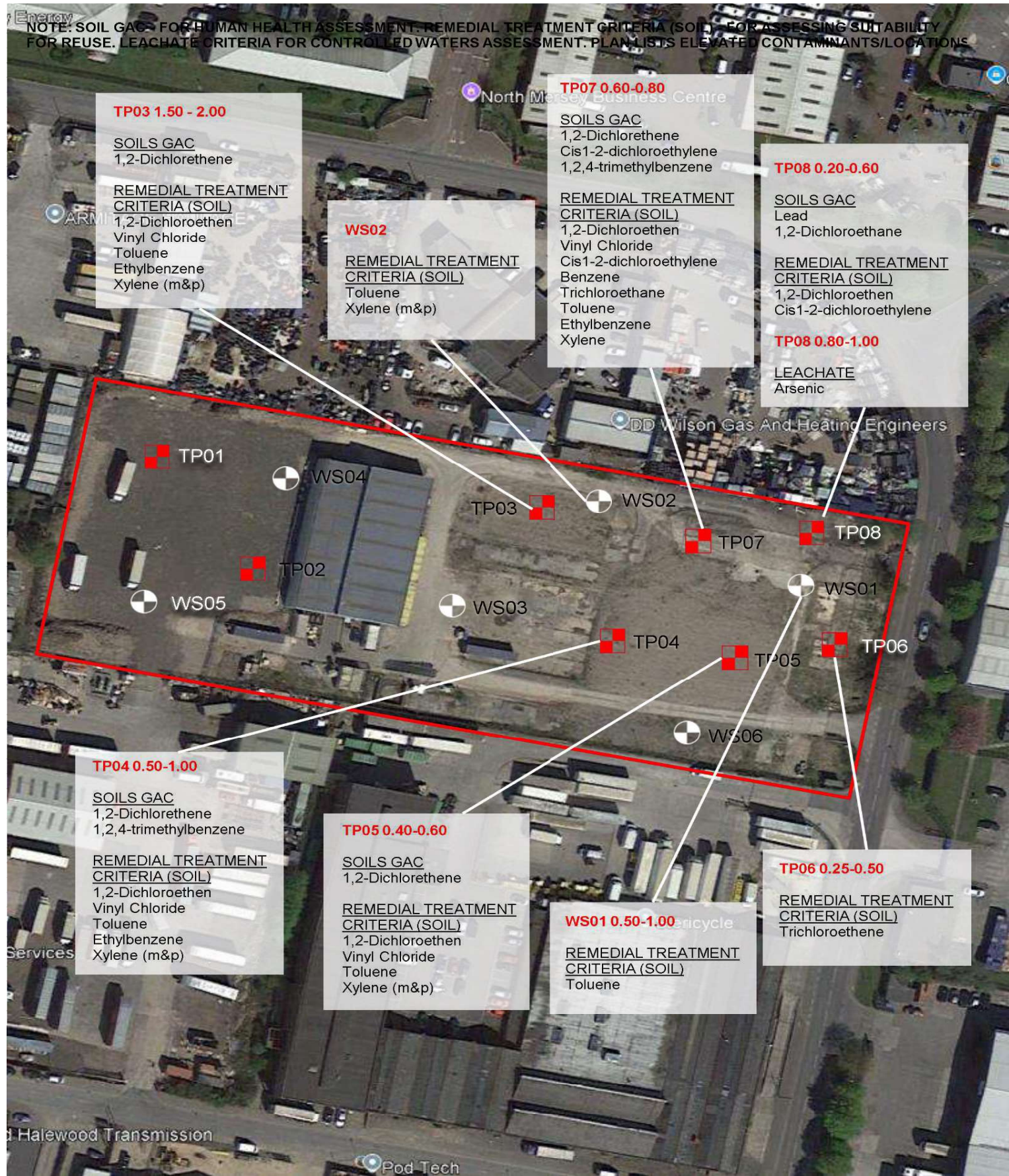
FINAL

DRAWING NO.

S2405_DWG_04

GENERAL NOTES

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Company No.: 15969735

DRAWING TITLE

"HOT-SPOT" LOCATION PLAN

CLIENT

BUILDING DESIGN NORTHERN

PROJECT

ACORNFIELD ROAD

STATUS

FINAL

DRAWING NO.

S2405_DWG_05

GENERAL NOTES

SGL has prepared the drawing for the sole use of the Client and their appointed agents. SGL shall not be responsible for any use of the drawing for any purpose other than that for which it was prepared. Agreement for the use or copying of this drawing by any Third Party must be obtained in writing from SGL. Should the Client require to pass copies of the drawing to other parties for information, no professional liability or warranty shall be extended to other parties by SGL.

APPENDIX 2



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Percussion Drilling Log

Project Name: Acornfield Road		Client: Building Design Northern		Date: 03/10/2024	
Location: Liverpool		Contractor: SGL		Co-ords: 343795, 399360	
Project No.: S2405		Issue: 0.0		Equipment: Dynamic Sampler	
Borehole Number WS01	Hole Type WLS	Level	Logger SDT	Scale	Page Number Sheet 1 of 1

[illegible]

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

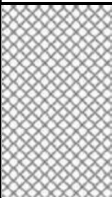
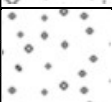
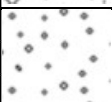
Remarks
Dynamic sampling to 5m with probe follow-on. Utility drawings checks, area scanned and hand pit excavated. Materials logged to BS5930. Monitoring well installed on completion. No groundwater encountered.





Percussion Drilling Log

Project Name: Acornfield Road		Client: Building Design Northern		Date: 03/10/2024	
Location: Liverpool		Contractor: SGL		Co-ords: 343751, 399384	
Project No.: S2405		Issue: 0.0		Equipment: Dynamic Sampler	
Borehole Number WS02	Hole Type WLS	Level	Logger SDT	Scale	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.40-070	ES		0.90			MADE GROUND: Placed and compacted slightly silty sandy gravel of ballast, with cobbles and fragments of brick		
		1.00	D					Firm becoming stiff (medium and high strength) greyish brown silty sandy CLAY with occasional fine and medium sub angular gravel. Initially soft (low strength)		
		1.00	V	40kPa						
		1.20-1.60	SPT	N=4						
		2.00	D							
		2.00-2.45	SPT	N=11						
		3.00	D							
		3.00-3.45	SPT	N=13						
		3.50	V	102kPa						
		3.50	B							
		4.00-4.45	SPT	N=19						
		4.00	D							
		5.00	B		5.00					
					9.00			Continued via probing in inferred superficial drift geology.		
					9.20			Very dense stratum. Refusal with dynamic probes – potential sandstone rockhead.		
								End of Borehole 9.20m		

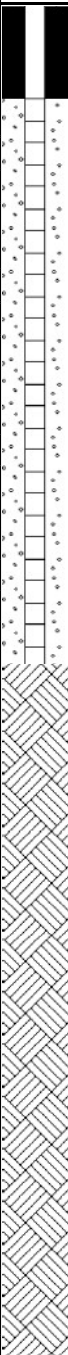
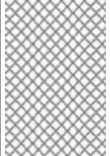
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
Dynamic sampling to 5m with probe follow-on. Utility drawings checks, area scanned and hand pit excavated. Materials logged to BS5930. Monitoring well installed on completion. Groundwater seepage at 0.90m.





Percussion Drilling Log

Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024									
Location: Liverpool				Contractor: SGL				Co-ords: 343711, 399356									
Project No.: S2405				Issue: 0.0				Equipment: Dynamic Sampler									
Borehole Number WS03		Hole Type WLS		Level		Logger SDT		Scale		Page Number Sheet 1 of 1							
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description									
		Depth (m)	Type	Results													
		0.30-0.50	ES		0.15			MADE GROUND: Concrete surfacing									
		0.50-0.75	ES				MADE GROUND: Grey and brown very clayey sandy gravel with whole bricks. Occasional sandstone gravels.										
		1.20-1.60	SPT		N=4			Firm becoming stiff (medium and high strength) greyish brown silty sandy CLAY with occasional fine and medium sub angular gravel. Initially soft (low strength)									
		1.5	B														
		1.5	V		55kPa												
		1.5-2.0	LB														
		2.0-2.45	SPT		N=12												
		2.5	D														
		3.00-3.45	SPT		N=14												
		3.5	D														
		4.00	B														
		4.00-4.45	SPT		N=16												
		4.5	V		112kPa												
		5.00															
		9.00															
		9.50							Very dense stratum. Refusal with dynamic probes – potential sandstone rockhead.								
					End of Borehole 9.50m												
		Hole Diameter			Casing Diameter				Chiselling				Inclination and Orientation				
		Depth Base	Diameter		Depth Base				Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Dynamic sampling to 5m with probe follow-on. Utility drawings checks, area scanned and hand pit excavated. Materials logged to BS5930. Monitoring well installed on completion. No groundwater encountered.																	



Percussion Drilling Log

Project Name: Acornfield Road				Client: Building Design Northern				Date: 04/10/2024			
Location: Liverpool				Contractor: SGL				Co-ords: 343750, 399345			
Project No.: S2405				Issue: 0.0				Equipment: Dynamic Sampler			
Borehole Number WS04		Hole Type WLS		Level		Logger SDT		Scale		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.50	D	N=10	0.70		MADE GROUND: Dark grey places sandy gravel of roadstone and ballast. With bricks and concrete rubble				
		1.00	D								
		1.20-1.60	SPT								
		1.50	B	81kPa	5.00		Stiff (high strength) greyish brown silty sandy CLAY with occasional fine and medium sub angular gravel.				
		1.50	V								
		2.00-2.45	SPT								
		2.50	B	100kPa	9.10		Continued via probing in inferred superficial drift geology.				
		3.00	D								
		3.00	V								
		3.00-3.45	SPT	N=17	9.60		Very dense stratum. Refusal with dynamic probes - potential sandstone rockhead.				
4.00-4.45	SPT										
5.00	D										
								End of Borehole 9.60m			
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Dynamic sampling to 5m with probe follow-on. Utility drawings checks, area scanned and hand pit excavated. Materials logged to BS5930. Borehole remained dry.											



Percussion Drilling Log

Project Name: Acornfield Road		Client: Building Design Northern		Date: 03/10/2024	
Location: Liverpool		Contractor: SGL		Co-ords: 343639, 399359	
Project No.: S2405		Issue: 0.0		Equipment: Dynamic Sampler	
Borehole Number WS05	Hole Type WLS	Level	Logger SDT	Scale	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.20-0.40	ES		0.70			MADE GROUND: Dark grey places sandy gravel of roadstone and ballast. With bricks and concrete rubble				
		0.50	D									
		1.00	D									
		1.20-1.60	SPT									
		1.20	B	N=8	5.00			Stiff (high strength) greyish brown silty sandy CLAY with occasional fine and medium sub angular gravel.				
		1.50	V	94kPa								
		2.00-2.45	SPT	N=12								
		2.50	B									
		3.00	D	88kPa								
		3.00	V									
		3.00-3.45	SPT									
				N=11								
		4.00-4.45	SPT	N=11								
		5.00	B									
								Continued via probing in inferred superficial drift geology.				
					9.80			Very dense stratum. Refusal with dynamic probes – potential sandstone rockhead.				
					10.00							
							End of Borehole 10.00m					

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
Dynamic sampling to 5m with probe follow-on. Utility drawings checks, area scanned and hand pit excavated. Materials logged to BS5930. Borehole remained dry.





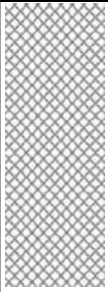
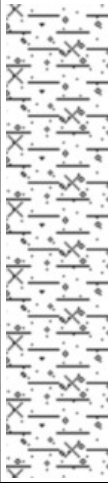
Percussion Drilling Log

Project Name: Acornfield Road				Client: Building Design Northern				Date: 04/10/2024			
Location: Liverpool				Contractor: SGL				Co-ords: 343751, 399384			
Project No.: S2405				Issue: 0.0				Equipment: Dynamic Sampler			
Borehole Number WS06		Hole Type WLS		Level		Logger SDT		Scale		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.40-0.60	ES	60kPa N=17	0.90		MADE GROUND: Placed and compacted slightly silty sandy gravel of ballast, with cobbles and fragments of brick				
		1.00	B								
		1.00	D								
		1.00	V								
		1.20-1.60	SPT								
		2.00	D		N=15		Firm becoming stiff (medium and high strength) greyish brown silty sandy CLAY with occasional fine and medium sub angular gravel. Initially soft (low strength)				
		2.00-2.45	SPT								
		3.00	D								
		3.00-3.45	SPT								
		3.50	V								
		3.50	B		110kPa		Continued via probing in inferred superficial drift geology.				
		4.00-4.45	SPT								
		4.00	D								
		5.00	B								
		5.00	B								
5.00				N=19		Very dense stratum. Refusal with dynamic probes – potential sandstone rockhead.					
										4.00-4.45	SPT
										4.00	D
10.00						End of Borehole 10.70m					
										5.00	B
10.70											
										5.00	B
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Dynamic sampling to 5m with probe follow-on. Utility drawings checks, area scanned and hand pit excavated. Materials logged to BS5930. Monitoring well installed on completion. Groundwater seepage at 0.90m.											



Trial Pit Log

Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024								
Location: Liverpool				Contractor: SGL				Co-ords: 343646, 399391								
Project No.: S2405				Issue: 0.0				Equipment: Mechanical Excavation								
Trial Pit Number TP01		Hole Type TP		Level		Logger SDT		Scale		Page Number Sheet 1 of 1						
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description								
		Depth (m)	Type	Results												
		0.00-050	ES	66kPa	0.50			MADE GROUND: Dark grey places sandy gravel of roadstone and ballast. With bricks and concrete rubble, pottery fragments of rare timber.								
		0.50-0.60	ES										MADE GROUND: Grey very sandy gravelly clay. Disturbed natural material with limited anthropogenic debris.			
		1.00	B													
		1.50	V		90kPa	2.50		Firm and stiff (medium and high strength) brown silty sandy CLAY with occasional medium coarse sub rounded and sub angular gravel.								
		2.50	B													
		2.50	V													
								End of Trial Pit 2.50m								
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation								
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation					
Remarks Mechanically excavated trial pit. Utility drawings checks, area scanned. Materials logged to BS5930. Trial pit remained dry.																

 SPIRE GEOTECHNICAL Geologists & Site Investigation Specialists				Trial Pit Log									
Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024					
Location: Liverpool				Contractor: SGL				Co-ords: 343667, 399366					
Project No.: S2405				Issue: 0.0				Equipment: Mechanical Excavation					
Trial Pit Number TP02		Hole Type TP		Level		Logger SDT		Scale		Page Number Sheet 1 of 1			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description					
		Depth (m)	Type	Results									
		0.20-0.60	ES	104kPa	0.60			MADE GROUND: Dark grey places sandy gravel of roadstone and ballast. With bricks and concrete rubble, pottery fragments of rare timbe and plastic. Cobbles of sandstone.					
		0.80	D				98kPa	3.00		Firm and stiff (medium and high strength) brown silty sandy CLAY with occasional medium coarse sub rounded and sub angular gravel.			
		1.00	B										
		1.50	V										
		2.50	B										
2.50	V												
3.00	B	End of Trial Pit 3.00m											
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation		
Remarks Mechanically excavated trial pit. Utility drawings checks, area scanned. Materials logged to BS5930. Perched/trapped water at 0.60m													

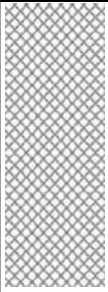


Trial Pit Log

Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024			
Location: Liverpool				Contractor: SGL				Co-ords: 343737, 399379			
Project No.: S2405				Issue: 0.0				Equipment: Mechanical Excavation			
Trial Pit Number TP03		Hole Type TP		Level		Logger SDT		Scale		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.50-1.00	ES	60kPa	1.00	3.00		MADE GROUND: Placed and compacted slightly silty sandy gravel of ballast, with cobbles and fragments of brick. slight hydrocarbon odour. No visual signs of free product.			
		1.00	D								
		1.50-2.00	ES					Firm and stiff (medium and high strength) brown silty sandy CLAY with occasional medium coarse sub rounded and sub angular gravel.			
		1.80	V								
		2.50	B								
								End of Trial Pit 3.00m			
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Mechanically excavated trial pit. Utility drawings checks, area scanned. Materials logged to BS5930. Perched/trapped water seepage at 1.00m .											



Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024			
Location: Liverpool				Contractor: SGL				Co-ords: 343750, 399345			
Project No.: S2405				Issue: 0.0				Equipment: Mechanical Excavation			
Trial Pit Number TP04		Hole Type TP		Level		Logger SDT		Scale		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.50-1.00	ES		1.20			MADE GROUND: Placed and compacted slightly silty sandy gravel of ballast, with cobbles and fragments of brick. slight hydrocarbon odour. No visual signs of free product.			
		1.50	D				81kPa				
		1.50	V	60kPa							
		1.50	B								
		1.80	V								
3.00	B										
					3.50			End of Trial Pit 3.50m			
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Mechanically excavated trial pit. Utility drawings checks, area scanned. Materials logged to BS5930. No groundwater encountered.											

 SPIRE GEOTECHNICAL Geologists & Site Investigation Specialists				Trial Pit Log							
Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024			
Location: Liverpool				Contractor: SGL				Co-ords: 343784, 399341			
Project No.: S2405				Issue: 0.0				Equipment: Mechanical Excavation			
Trial Pit Number TP05		Hole Type TP		Level		Logger SDT		Scale		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.40-0.60	ES		0.90			MADE GROUND: Placed and compacted slightly silty sandy gravel of ballast, with cobbles and fragments of brick and whole brick. Rebar metal present. slight hydrocarbon odour. No visual signs of free product.			
		1.00	B				48kPa				
		1.00	V								
		2.00	V	99kPa							
		3.000	B	3.00					End of Trial Pit 3.00m		
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Mechanically excavated trial pit. Utility drawings checks, area scanned. Materials logged to BS5930. Perched/trapped water seepage at 0.90m .											



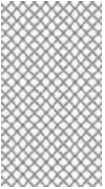
Trial Pit Log

Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024			
Location: Liverpool				Contractor: SGL				Co-ords: 343804, 399345			
Project No.: S2405				Issue: 0.0				Equipment: Mechanical Excavation			
Trial Pit Number TP06		Hole Type TP		Level		Logger SDT		Scale		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.25-0.50	ES		0.08			MADE GROUND: Surface concrete slab.			
					0.20			MADE GROUND: Sand subbase with whole bricks.			
		1.00	B	90kPa	3.00			Firm and stiff (medium and high strength) brown silty sandy CLAY with occasional medium coarse sub rounded and sub angular gravel.			
		1.50	V								
		2.00	B								
3.00	V	110kPa									
								End of Trial Pit 3.00m			
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Mechanically excavated trial pit. Utility drawings checks, area scanned. Materials logged to BS5930. No water encountered.											



Trial Pit Log

Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024			
Location: Liverpool				Contractor: SGL				Co-ords: 343777, 399374			
Project No.: S2405				Issue: 0.0				Equipment: Mechanical Excavation			
Trial Pit Number TP07		Hole Type TP		Level		Logger SDT		Scale		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.60-0.80	ES								
		1.00	B								
				1.50			End of Trial Pit 1.50m				
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
Remarks Mechanically excavated trial pit. Utility drawings checks, area scanned. Materials logged to BS5930. Water encountered at 0.20m. Abandoned at 1.50m due to water inundation.											

 SPIRE GEOTECHNICAL Geologists & Site Investigation Specialists				Trial Pit Log											
Project Name: Acornfield Road				Client: Building Design Northern				Date: 03/10/2024							
Location: Liverpool				Contractor: SGL				Co-ords: 343799, 399374							
Project No.: S2405				Issue: 0.0				Equipment: Mechanical Excavation							
Trial Pit Number TP08		Hole Type TP		Level		Logger SDT		Scale		Page Number Sheet 1 of 1					
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description							
		Depth (m)	Type	Results											
		0.20-0.60	ES		0.16			MADE GROUND: Reinforced concrete slab.							
		0.80-1.00	ES									MADE GROUND: black sandy gravels of ash with cobbles of slag. With sandstone cobbles and whole bricks.			
		1.50	B					Firm and stiff (medium and high strength) brown silty sandy CLAY with occasional medium coarse sub rounded and sub angular gravel.							
		1.00	V												
		2.50	D									99kPa			
2.50	V														
					2.50		End of Trial Pit 2.50m								
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation							
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation				
Remarks Mechanically excavated trial pit. Utility drawings checks, area scanned. Materials logged to BS5930. Seepage recorded at 0.60m.															

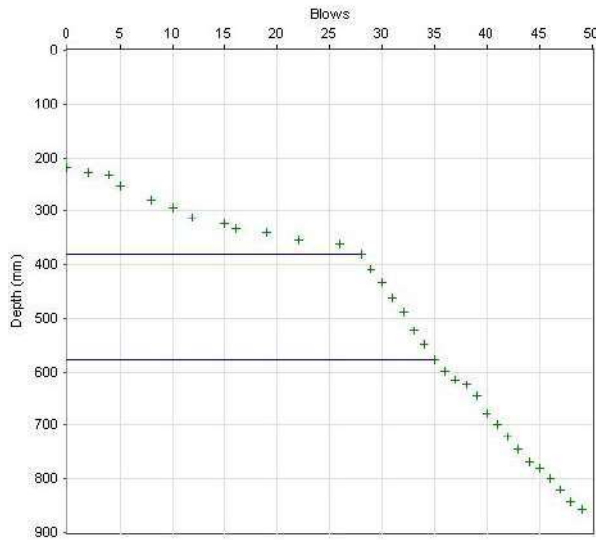
DCP Layer Strength Analysis Report

Project Name: S2405 Acornfield Road DCP Report

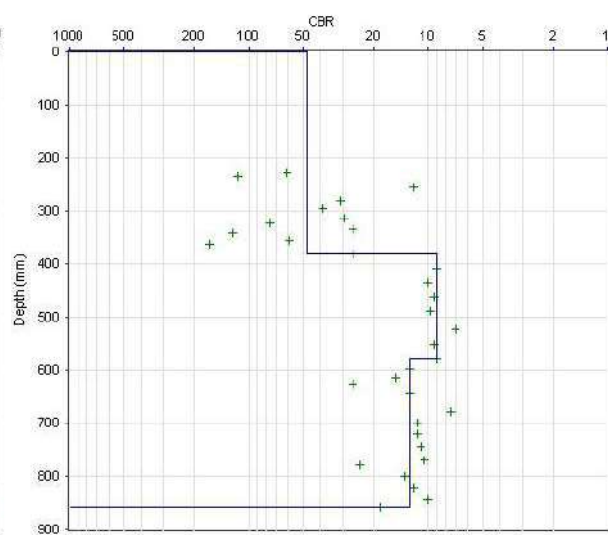
Chainage (km): 1.000
Direction:
Location/Offset: Lay-by / other
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 03/10/2024

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted

Layer Boundaries: Chainage 1.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	5.79	47	382	382
2	28.00	9	196	578
3	20.07	13	281	859

CBR Relationship:

TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by

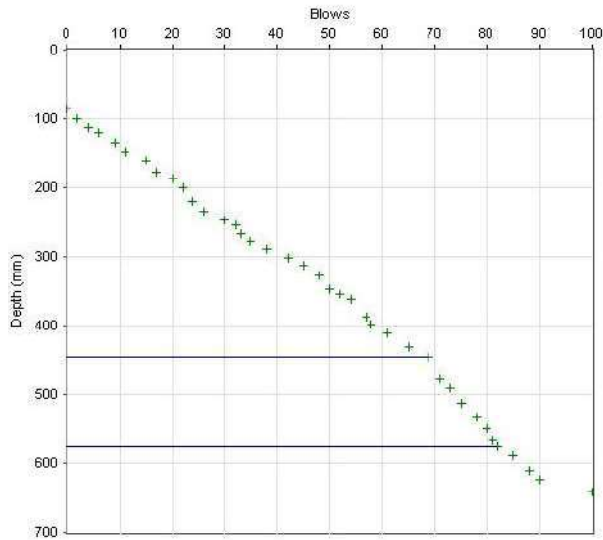
DCP Layer Strength Analysis Report

Project Name: S2405 Acornfield Road DCP Report

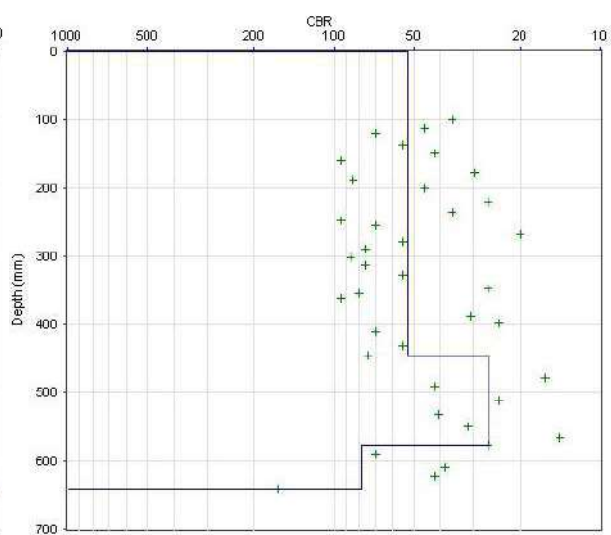
Chainage (km): 2.000
 Direction:
 Location/Offset: Lay-by / other
 Cone Angle: 60 degrees
 Zero Error (mm): 0
 Test Date: 03/10/2024

Surface Type: Unpaved
 Thickness (mm): 0
 Base Type:
 Thickness (mm):
 Surface Moisture: Unknown
 Moisture adjustment factor: Not adjusted

Layer Boundaries: Chainage 2.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	5.22	53	445	445
2	10.15	26	132	577
3	3.56	79	64	641

CBR Relationship:

TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

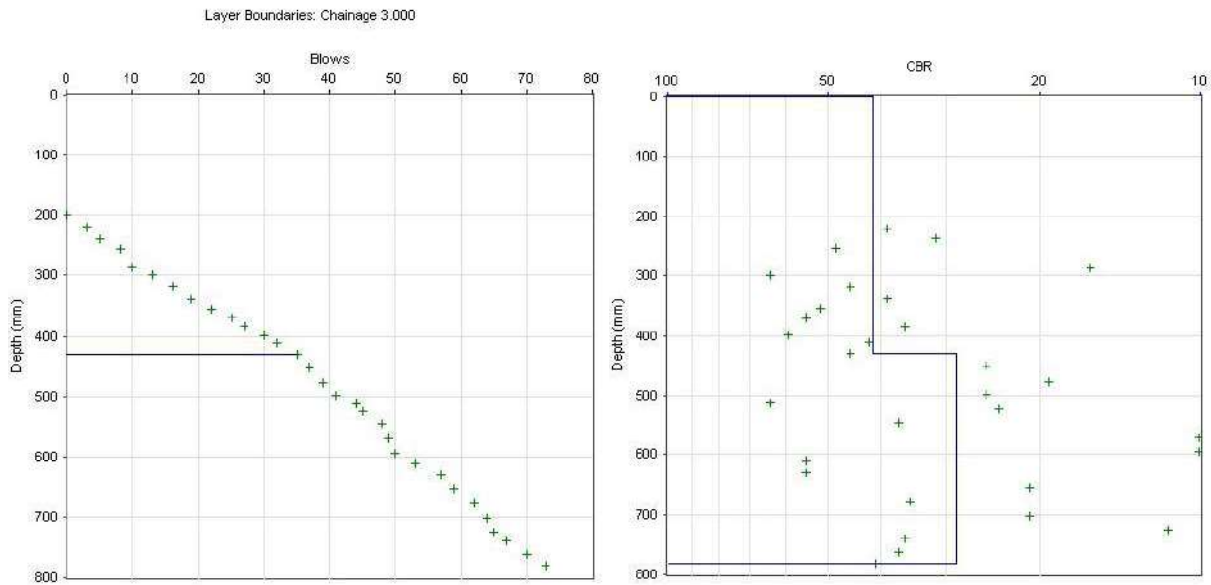
Report produced by

DCP Layer Strength Analysis Report

Project Name: S2405 Acornfield Road DCP Report

Chainage (km): 3.000
Direction:
Location/Offset: Lay-by / other
Cone Angle: 60 degrees
Zero Error (mm): 0
Test Date: 03/10/2024

Surface Type: Unpaved
Thickness (mm): 0
Base Type:
Thickness (mm):
Surface Moisture: Unknown
Moisture adjustment factor: Not adjusted



Layer Boundaries Chart

CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	6.57	41	430	430
2	9.26	29	352	782

CBR Relationship:

TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

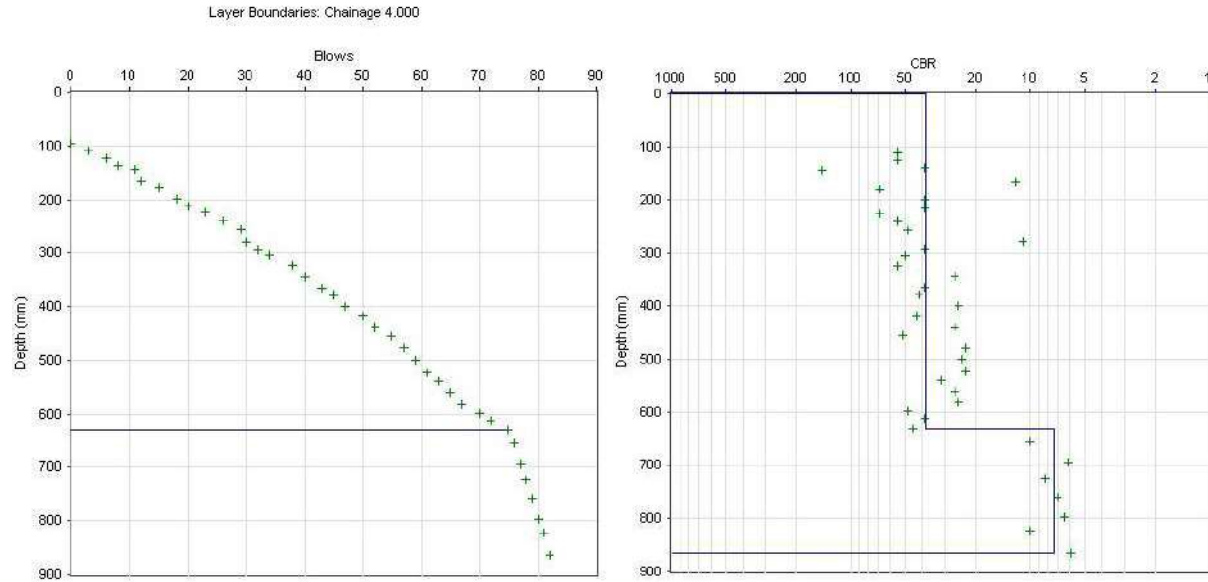
Report produced by

DCP Layer Strength Analysis Report

Project Name: S2405 Acornfield Road DCP Report

Chainage (km): 4.000
 Direction:
 Location/Offset: Lay-by / other
 Cone Angle: 60 degrees
 Zero Error (mm): 0
 Test Date: 03/10/2024

Surface Type: Unpaved
 Thickness (mm): 0
 Base Type:
 Thickness (mm):
 Surface Moisture: Unknown
 Moisture adjustment factor: Not adjusted



Layer Boundaries Chart

CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	7.13	38	630	630
2	33.43	7	234	864

CBR Relationship:

TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by

DCP Layer Strength Analysis Report

Project Name: S2405 Acornfield Road DCP Report

Chainage (km): 5.000

Direction:

Location/Offset: Lay-by / other

Cone Angle: 60 degrees

Zero Error (mm): 0

Test Date: 03/10/2024

Surface Type:

Unpaved

Thickness (mm):

0

Base Type:

Thickness (mm):

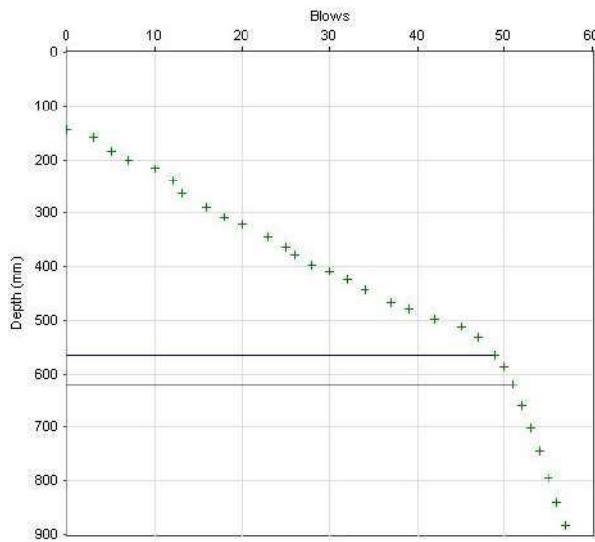
Surface Moisture:

Unknown

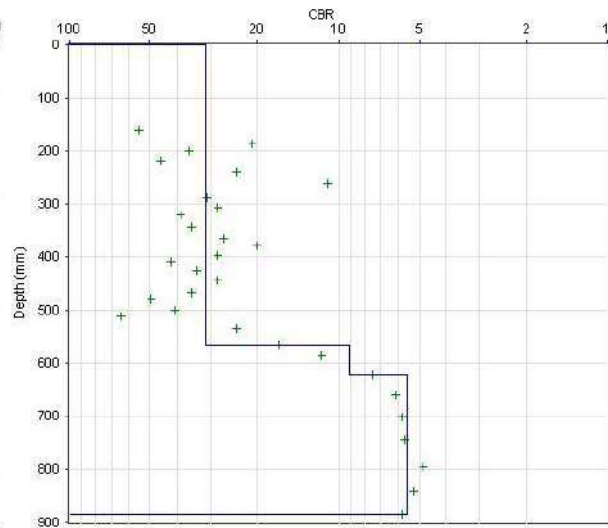
Moisture adjustment factor:

Not adjusted

Layer Boundaries: Chainage 5.000



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	8.57	31	565	565
2	27.50	9	55	620
3	43.83	6	263	883

CBR Relationship:

TRL equation: $\log_{10}(\text{CBR}) = 2.48 - 1.057 \times \log_{10}(\text{Strength})$

Report produced by

Characteristic Gas Situation (relevant for commercial only)	NHBC Traffic Light (relevant for residential only)
1	Green
2	Amber 1
3	Amber 2
4, 5, 6	Red

S2405 Ground Gas and Water Monitoring Results

PAGE 1 OF 2

VISIT ONE

Borehole	Date/Time	CH4 (%)	CO2 (%)	O2 (%)	Barometric Pressure (mb)	CO Pod (ppm)	H2S Pod (ppm)	Flow l/h	Min Flows	Max Flows	Water Dips (m BGL)	Q _{hg} Lh ⁻¹	Characteristic gas situation	Hazard potential	NHBC
WS01	04/10/2024	0.0	0.4	20.0	999	0.0	0.0	0.0	0.0	0.0	3.67	No Flow	1	Very Low	
WS02	04/10/2024	0.0	0.0	19.4	999	0.0	0.0	0.0	0.0	0.0	4.10	No Flow	1	Very Low	
WS03	04/10/2024	0.1	0.1	18.9	999	0.0	0.0	0.0	0.0	0.0	4.45	No Flow	1	Very Low	

VISIT TWO

Borehole	Date/Time	CH4 (%)	CO2 (%)	O2 (%)	Barometric Pressure (mb)	CO Pod (ppm)	H2S Pod (ppm)	Flow l/h	Min Flows	Max Flows	Water Dips (m)	Q _{hg} Lh ⁻¹	Characteristic gas situation	Hazard potential	NHBC
WS01	22/10/2024	0.0	1.0	16.5	1014	0.0	0.0	0.1	0.0	0.0	2.91	0.001	1	Very Low	
WS02	22/10/2024	0.0	0.2	18.9	1014	0.0	0.0	0.0	0.0	0.0	1.14	No Flow	1	Very Low	
WS03	22/10/2024	0.5	0.5	17.9	1014	0.0	0.0	0.0	0.0	0.0	1.98	No Flow	1	Very Low	

VISIT THREE

Borehole	Date/Time	CH4 (%)	CO2 (%)	O2 (%)	Barometric Pressure (mb)	CO Pod (ppm)	H2S Pod (ppm)	Flow l/h	Min Flows	Max Flows	Water Dips (m BGL)	Q _{hg} Lh ⁻¹	Characteristic gas situation	Hazard potential	NHBC
WS01	30/10/2024	0.0	1.7	17.6	1020	0.0	0.0	0.1	0.0	0.1	2.04	0.0017	1	Very Low	
WS02	30/10/2024	0.0	0.5	19.0	1020	0.0	0.0	0.0	0.0	0.0	1.28	No Flow	1	Very Low	
WS03	30/10/2024	0.4	0.5	18.8	1020	0.0	0.0	0.0	0.0	0.0	2.05	No Flow	1	Very Low	

APPENDIX 3



SPIRE
GEOTECHNICAL
Geologists & Site Investigation
Specialists



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TEST REPORT

Client: **Spire Geotechnical Ltd, North Sands Business Centre, Sunderland, SR6 0QA**
Engineer: **Stephen Telford**
Project: **S2405 - Acornfield Road, Liverpool**
Supplier/Source: **Site**
Date Sampled: **04/10/2024**
Date Received: **07/10/2024**
Sampled By: **Clients Staff**
SampleSpec: **Sampled by Site Staff/Client**
Remarks: **None**

Signed: _____

☒ M. Newton, Laboratory Manager☐ P. Fletcher, Senior Technician**ADDITIONAL INFORMATION****Notes:**

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

If Northumberland County Council carried out the sampling then all sampling was carried out at the named project above. All testing is carried out at Northumberland County Council Laboratory, testing is carried out to the specification stated in this report, except for subcontracted testing.

Uncertainty of measurement available on request..

Results reported herein relate only to the material supplied to the laboratory.

No decision rule will be given

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Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.



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Report/Sample ID No: S1899/01

Determination of Particle Size Distribution in accordance with BS1377-2:1990

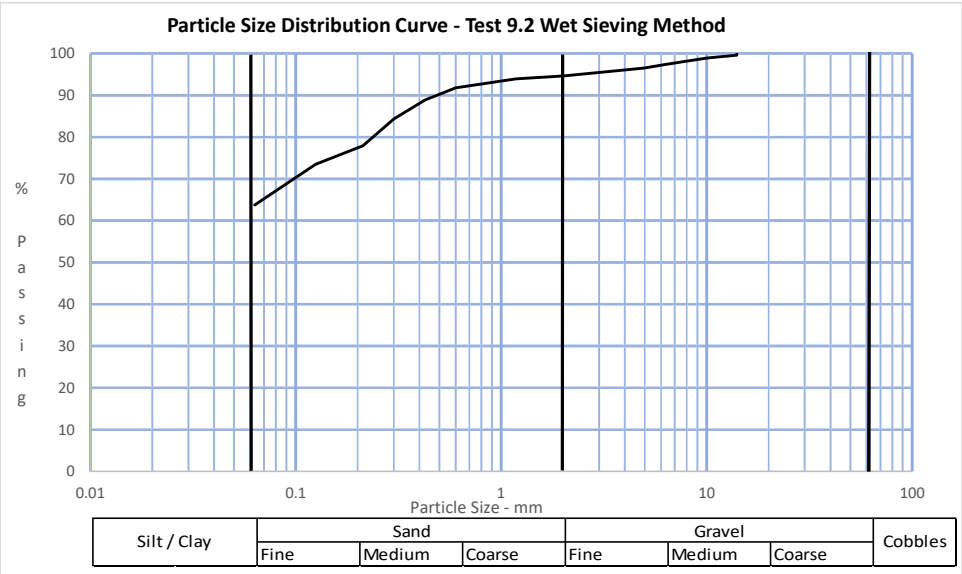
Location: WS01 at 1.50-2.00m
Material Type: Brown sandy CLAY with very occasional gravel

Test Results Specification

Water Content (%) 14.7 BS EN ISO 17892-1:2014

PSD Sieving		PSD Sedimentation	
Size (mm)	% Passing	Size (mm)	% Passing
125	100	No sedimentation test	
90	100		
80	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	97		
5	97		
3.35	96		
2	95		
1.18	94		
0.6	92		
0.425	89		
0.300	84		
0.212	78		
0.150	73		
0.063	64		

Gravel %	5
Sand %	31
Silt/Clay %	64





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Report/Sample ID No: S1899/02

Determination of Particle Size Distribution in accordance with BS1377-2:1990

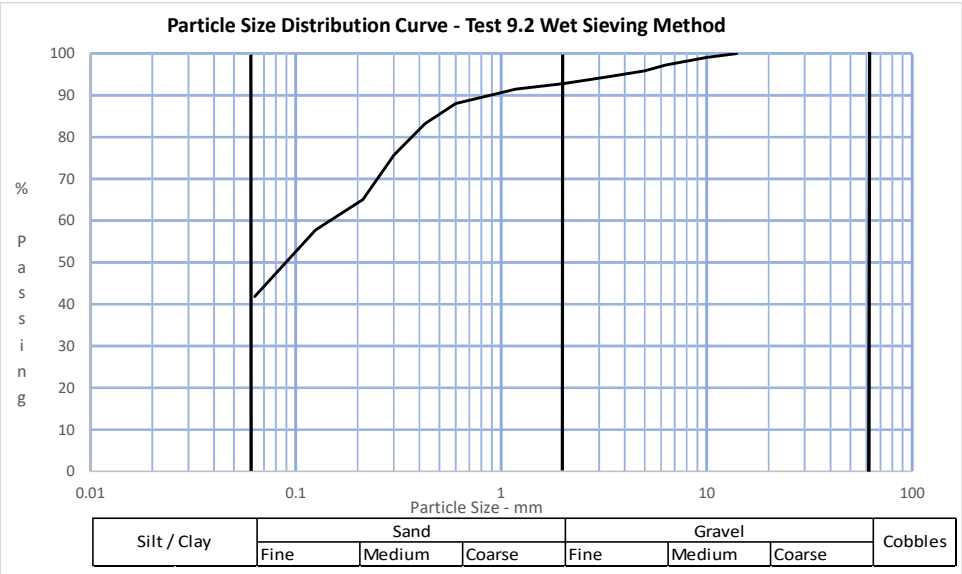
Location: TP02 at 1.00m
Material Type: Brown sandy CLAY with occasional gravel

Test Results Specification

Water Content (%) 18.0 BS EN ISO 17892-1:2014

PSD Sieving		PSD Sedimentation	
Size (mm)	% Passing	Size (mm)	% Passing
125	100	No sedimentation test	
90	100		
80	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	97		
5	96		
3.35	94		
2	93		
1.18	91		
0.6	88		
0.425	83		
0.300	76		
0.212	65		
0.150	58		
0.063	42		

Gravel %	7
Sand %	51
Silt/Clay %	42



Remarks: None

Start of test date: 08/10/2024 End of test date: 17/10/2024 Report Date: 17/10/2024



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Report/Sample ID No: S1899/03

Determination of Particle Size Distribution in accordance with BS1377-2:1990

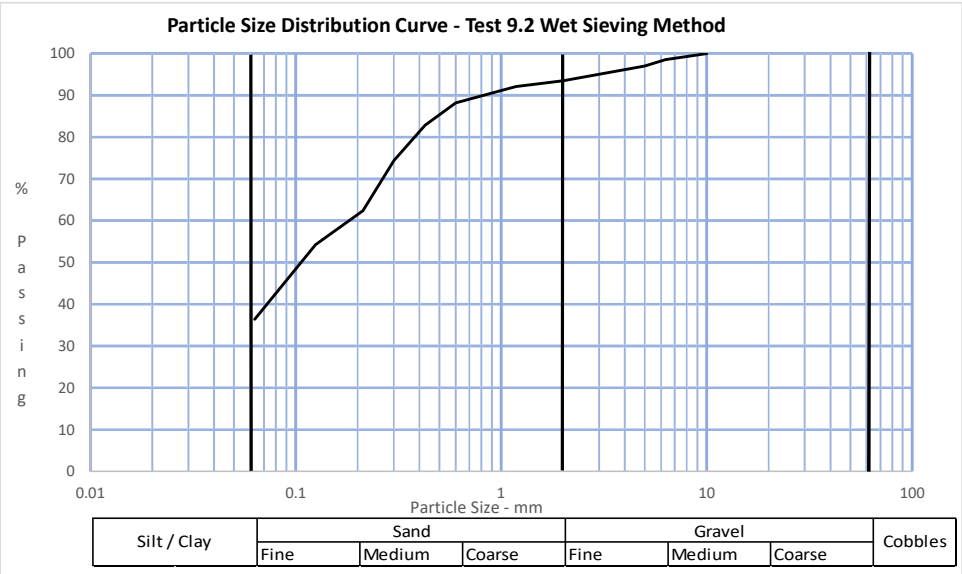
Location: WS03 at 1.50-2.00m
Material Type: Brown sandy CLAY with occasional gravel

Test Results Specification

Water Content (%) 16.0 BS EN ISO 17892-1:2014

PSD Sieving		PSD Sedimentation	
Size (mm)	% Passing	Size (mm)	% Passing
125	100	No sedimentation test	
90	100		
80	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	97		
3.35	95		
2	93		
1.18	92		
0.6	88		
0.425	83		
0.300	74		
0.212	62		
0.150	54		
0.063	36		

Gravel %	7
Sand %	57
Silt/Clay %	36



Remarks: None

Start of test date: 08/10/2024 End of test date: 17/10/2024 Report Date: 17/10/2024



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Report/Sample ID No: **S1899-04**

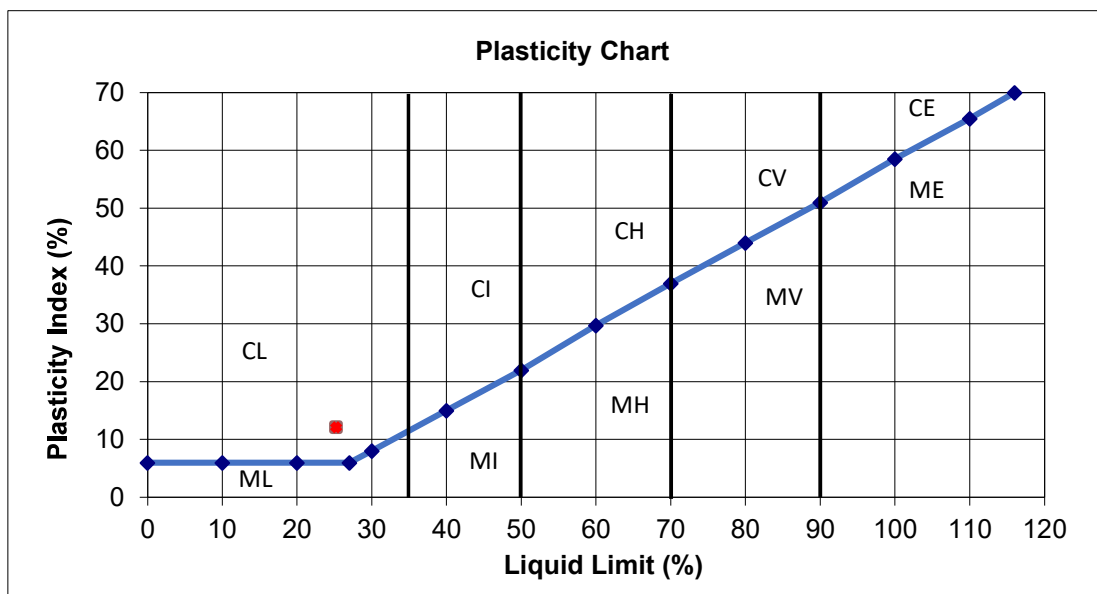
Location: WS01 at 3.50m

Material Type: Brown very sandy CLAY with gravel

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	13.5	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Material greater than 20mm removed prior to testing (%)	10	
Liquid Limit (%)	25	Part 2 Clause 4.4
Plastic Limit (%)	13	Part 2 Clause 5.3
Plasticity Index (%)	12	Part 2 Clause 5.4
Passing 425mic (%)	80	
Soil Classification:	CL	



Remarks: None

Start of test date: 08/10/2024 **End of test date:** 17/10/2024 **Report Date:** 17/10/2024



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Report/Sample ID No: **S1899-05**

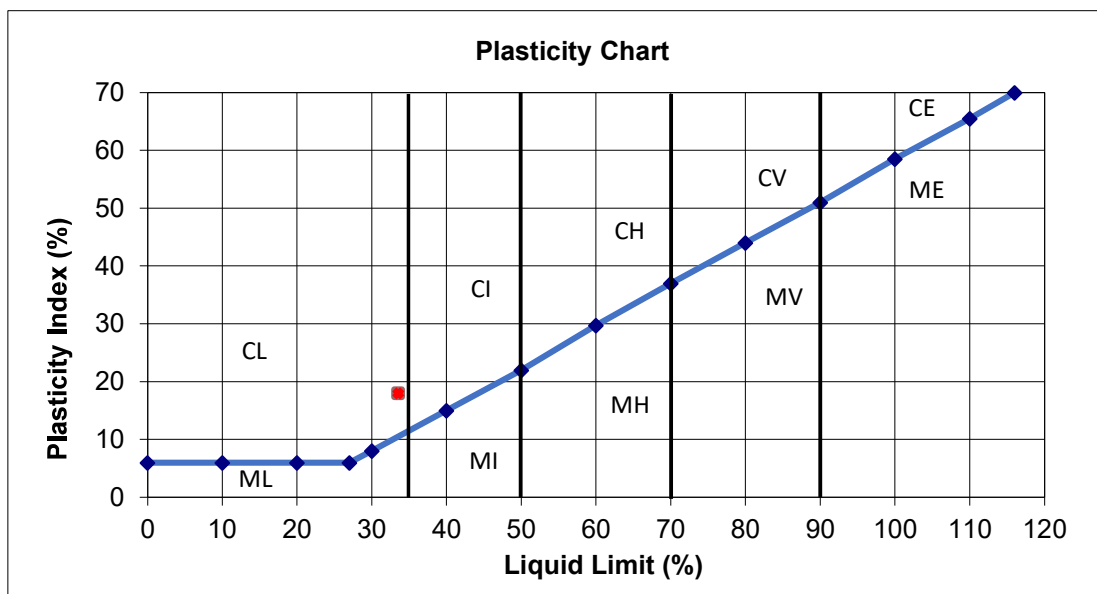
Location: WS05 at 1.20m

Material Type: Brown, grey sandy CLAY with very occasional gravel

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	17.2	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Material greater than 20mm removed prior to testing (%)	0	
Liquid Limit (%)	34	Part 2 Clause 4.4
Plastic Limit (%)	16	Part 2 Clause 5.3
Plasticity Index (%)	18	Part 2 Clause 5.4
Passing 425mic (%)	92	
Soil Classification:	CL	



Remarks: None

Start of test date: 08/10/2024 **End of test date:** 17/10/2024 **Report Date:** 17/10/2024



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Report/Sample ID No: **S1899-06**

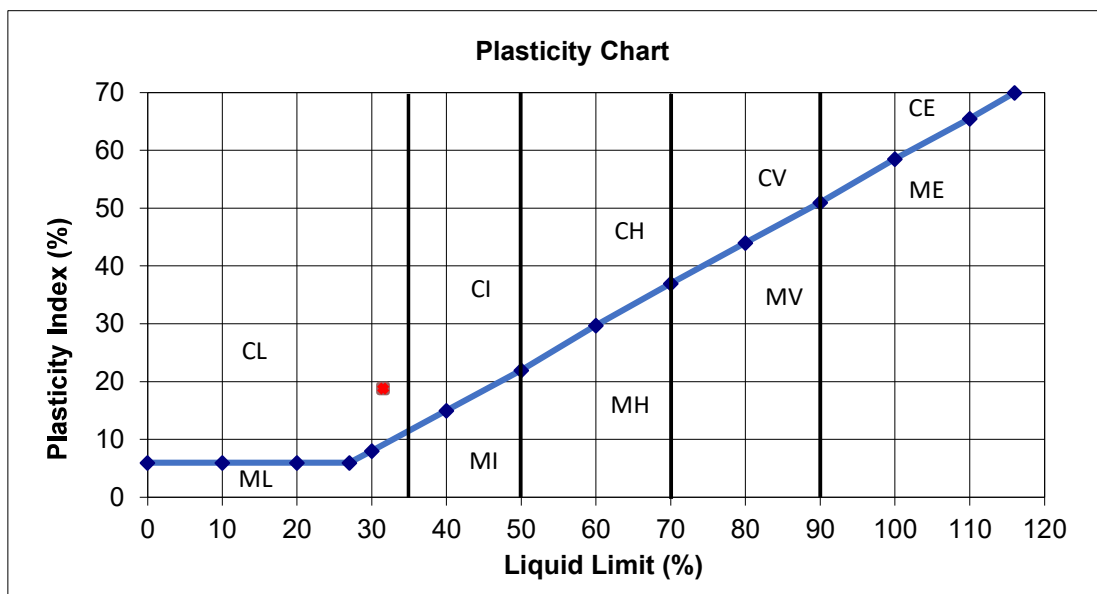
Location: WS03 at 4.00m

Material Type: Brown sandy CLAY with sand inclusions and very occasional gravel

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	17.2	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Material greater than 20mm removed prior to testing (%)	0	
Liquid Limit (%)	32	Part 2 Clause 4.4
Plastic Limit (%)	13	Part 2 Clause 5.3
Plasticity Index (%)	19	Part 2 Clause 5.4
Passing 425mic (%)	92	
Soil Classification:	CL	



Remarks: None

Start of test date: 08/10/2024 End of test date: 17/10/2024 Report Date: 17/10/2024



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Report/Sample ID No: **S1899-07**

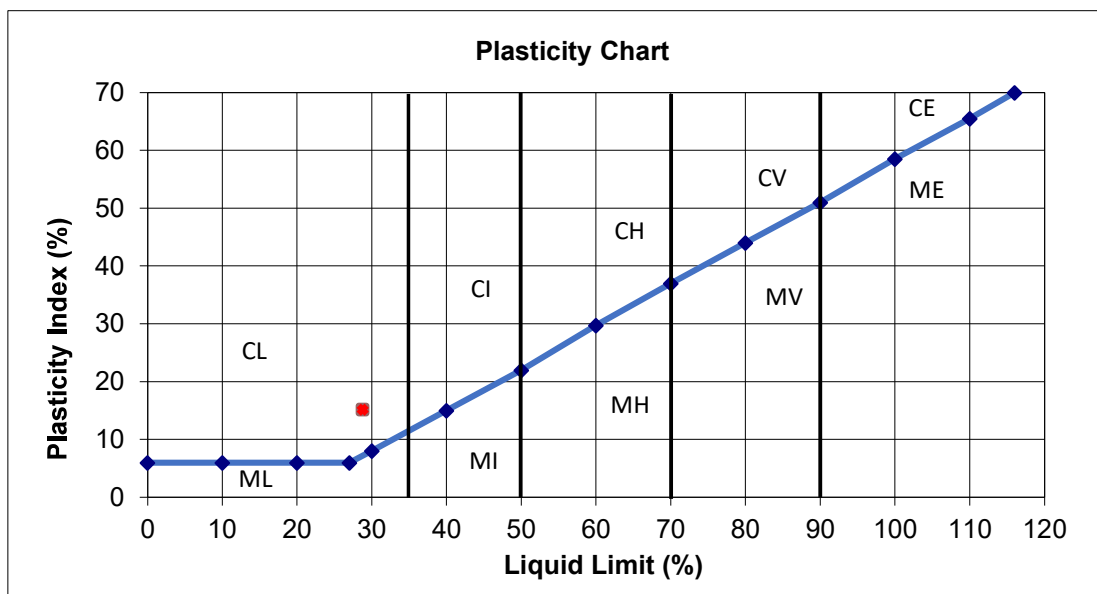
Location: WS03 at 1.50m

Material Type: Brown sandy CLAY with very occasional gravel

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	17.4	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Material greater than 20mm removed prior to testing (%)	0	
Liquid Limit (%)	29	Part 2 Clause 4.4
Plastic Limit (%)	14	Part 2 Clause 5.3
Plasticity Index (%)	15	Part 2 Clause 5.4
Passing 425mic (%)	91	
Soil Classification:	CL	



Remarks: None

Start of test date: 08/10/2024 **End of test date:** 17/10/2024 **Report Date:** 17/10/2024



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Report/Sample ID No: **S1899-08**

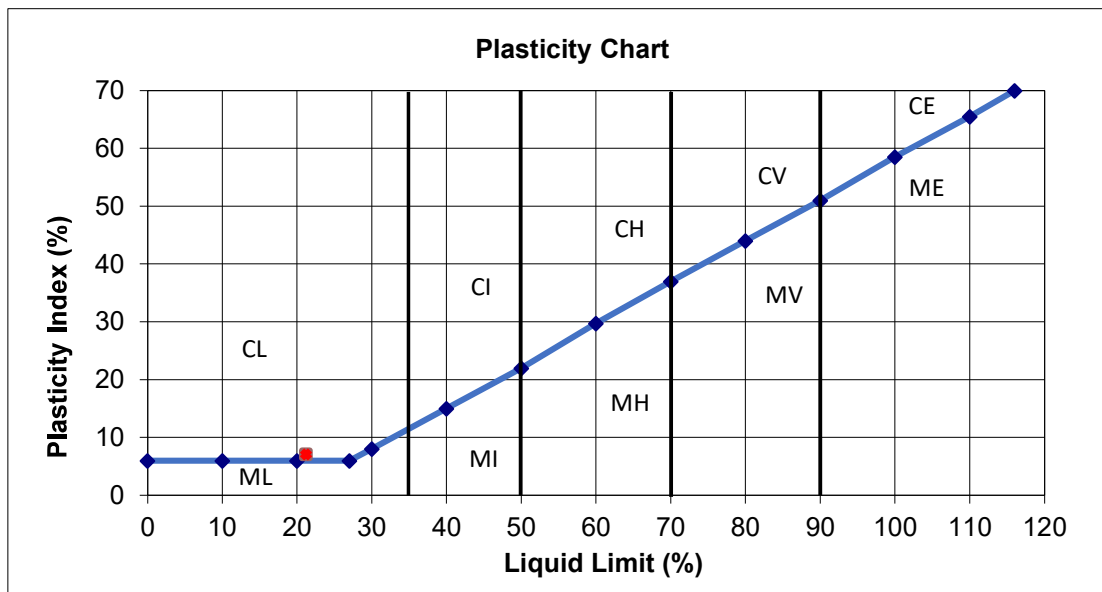
Location: WS06 at 1.00m

Material Type: Brown grey very sandy CLAY with sand inclusions

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	16.8	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Material greater than 20mm removed prior to testing (%)	0	
Liquid Limit (%)	21	Part 2 Clause 4.4
Plastic Limit (%)	14	Part 2 Clause 5.3
Plasticity Index (%)	7	Part 2 Clause 5.4
Passing 425mic (%)	96	
Soil Classification:	CL	



Remarks: Sample had a very strong odour

Start of test date: 08/10/2024 **End of test date:** 17/10/2024 **Report Date:** 17/10/2024



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Report/Sample ID No: **S1899-09**

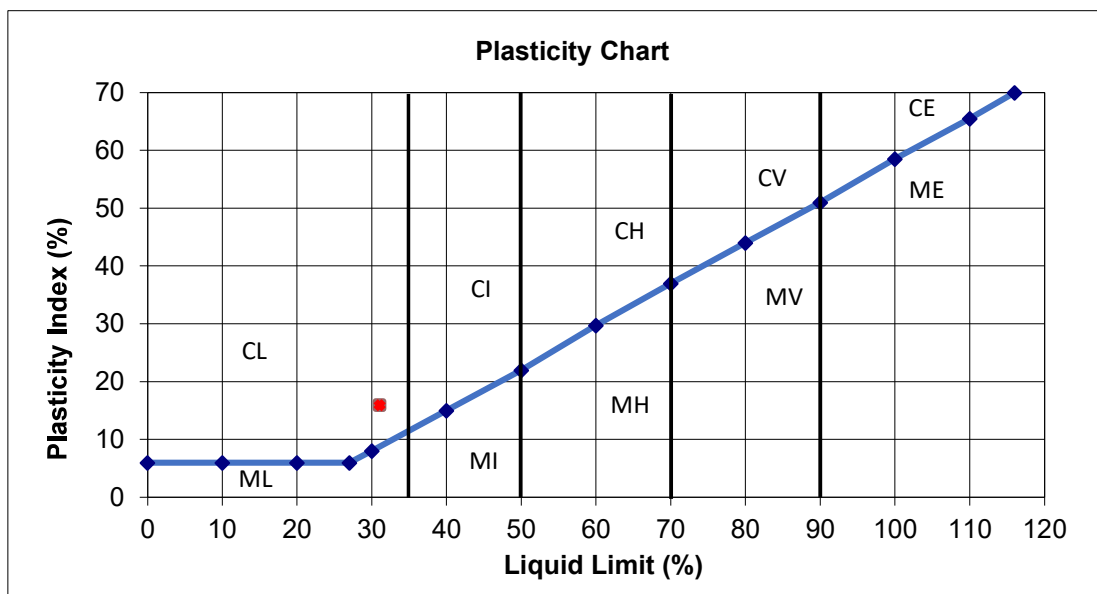
Location: TP08 at 1.50m

Material Type: Brown, grey sandy CLAY with sand inclusions, occasional gravel and

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	18.1	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Material greater than 20mm removed prior to testing (%)	0	
Liquid Limit (%)	31	Part 2 Clause 4.4
Plastic Limit (%)	15	Part 2 Clause 5.3
Plasticity Index (%)	16	Part 2 Clause 5.4
Passing 425mic (%)	88	
Soil Classification:	CL	



Remarks: None

Start of test date: 08/10/2024 **End of test date:** 17/10/2024 **Report Date:** 17/10/2024



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Report/Sample ID No: **S1899-10**

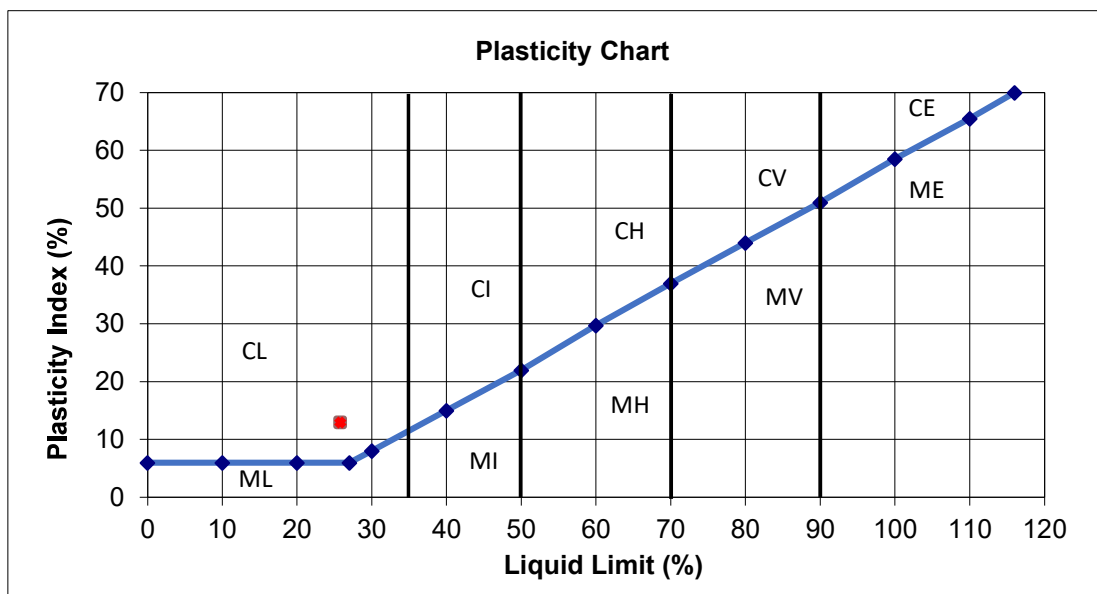
Location: TP04 at 1.50m

Material Type: Brown sandy CLAY with occasional gravel

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	15.0	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Material greater than 20mm removed prior to testing (%)	0	
Liquid Limit (%)	26	Part 2 Clause 4.4
Plastic Limit (%)	13	Part 2 Clause 5.3
Plasticity Index (%)	13	Part 2 Clause 5.4
Passing 425mic (%)	88	
Soil Classification:	CL	



Remarks: None

Start of test date: 08/10/2024 **End of test date:** 17/10/2024 **Report Date:** 17/10/2024



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Report/Sample ID No: **S1899-11**

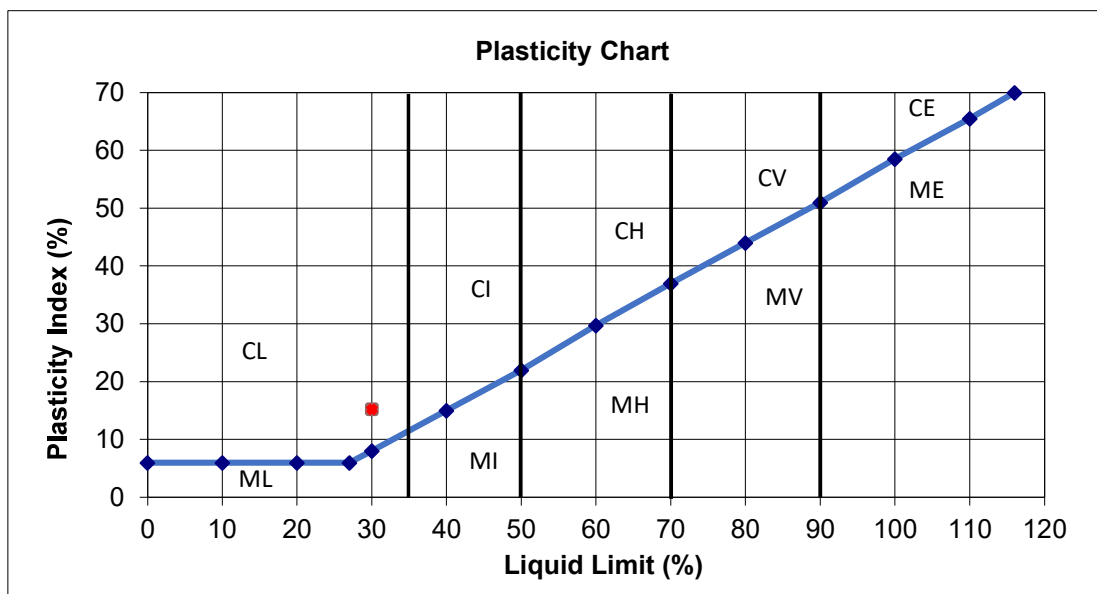
Location: TP01 at 1.00m

Material Type: Brown sandy CLAY with very occasional

	<u>Test Results</u>	<u>Specification</u>
Water Content (%)	17.6	BS EN ISO 17892-1:2014

Liquid and Plastic Limit tests carried out in accordance with BS1377-2:1990

Material greater than 20mm removed prior to testing (%)	0	
Liquid Limit (%)	30	Part 2 Clause 4.4
Plastic Limit (%)	15	Part 2 Clause 5.3
Plasticity Index (%)	15	Part 2 Clause 5.4
Passing 425mic (%)	90	
Soil Classification:	CL	



Remarks: None

Start of test date: 08/10/2024 End of test date: 17/10/2024 Report Date: 17/10/2024



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DEVIATING SAMPLE INFORMATION

Comments:

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards. For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling. If Northumberland County Council Laboratory did not undertake the sampling. Such samples may be deviating.

APPENDIX 4



SPIRE
GEOTECHNICAL
Geologists & Site Investigation
Specialists



Final Report

Report No.: 24-32181-1

Initial Date of Issue: 14-Oct-2024

Re-Issue Details:

Client Spire Geotechnical Limited

Client Address: North Sands Business Centre
Sunderland
SR6 0QA

Contact(s): Stephen Telford

Project S2405 Acornfield Road, Liverpool

Quotation No.: Q24-36043

Date Received: 04-Oct-2024

Order No.:

Date Instructed: 04-Oct-2024

No. of Samples: 21

Turnaround (Wkdays): 5

Results Due: 10-Oct-2024

Date Approved: 14-Oct-2024

Approved By:

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Leachate

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited			Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043			Chemtest Sample ID.:		1876360	1876362	1876366	1876370	1876372
Order No.:			Client Sample Ref.:		TP02	TP03	TP07	TP08	WS03
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.20	1.50	0.60	0.80	0.50
			Bottom Depth (m):		0.60	2.00	0.80	1.00	0.75
			Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
Determinand	Accred.	SOP	Type	Units	LOD				
pH at 20C	U	1010	10:1		4.0	8.9	9.0	9.1	10.9
Sulphate	U	1220	10:1	mg/l	1.0	22	< 1.0	5.0	8.1
Arsenic (Dissolved)	U	1455	10:1	µg/l	0.20	9.2	3.7	3.6	16
Cadmium (Dissolved)	U	1455	10:1	µg/l	0.11	< 0.11	< 0.11	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	10:1	µg/l	0.50	< 0.50	< 0.50	0.84	2.7
Copper (Dissolved)	U	1455	10:1	µg/l	0.50	10	9.1	31	17
Mercury (Dissolved)	U	1455	10:1	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	10:1	µg/l	0.50	< 0.50	0.94	2.4	1.2
Lead (Dissolved)	U	1455	10:1	µg/l	0.50	3.9	1.6	9.2	2.3
Selenium (Dissolved)	U	1455	10:1	µg/l	0.50	0.88	0.55	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	10:1	µg/l	2.5	9.4	27	50	21
Chromium (Hexavalent)	U	1490	10:1	µg/l	20	< 20	< 20	< 20	< 20
Aliphatic TPH >C5-C8	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	24
Aromatic TPH >C21-C35	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	10:1	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	24
Total Petroleum Hydrocarbons	N	1675	10:1	µg/l	10	< 10	< 10	< 10	24
Dichlorodifluoromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	10:1	µg/l	1.0	< 1.0	2.2	< 1.0	< 1.0
Bromomethane	U	1760	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chloroethane	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Leachate

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited			Chemtest Job No.:			24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043			Chemtest Sample ID.:			1876360	1876362	1876366	1876370	1876372
Order No.:			Client Sample Ref.:			TP02	TP03	TP07	TP08	WS03
			Sample Type:			SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):			0.20	1.50	0.60	0.80	0.50
			Bottom Depth (m):			0.60	2.00	0.80	1.00	0.75
			Date Sampled:			03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
Determinand	Accred.	SOP	Type	Units	LOD					
1,1-Dichloroethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10
Bromodichloromethane	U	1760	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10
Toluene	U	1760	10:1	µg/l	1.0	< 1.0	6.3	36	2.5	8.0
Trans-1,3-Dichloropropene	N	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	10:1	µg/l	10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	10:1	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	1.6	10
1,1,1,2-Tetrachloroethane	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	5.6	1.8	< 1.0
m & p-Xylene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	8.6	4.4	< 1.0
o-Xylene	U	1760	10:1	µg/l	1.0	2.0	< 1.0	2.5	< 1.0	< 1.0
Styrene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	10:1	µg/l	50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	10:1	µg/l	1.0	1.8	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Leachate

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited			Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043			Chemtest Sample ID.:		1876360	1876362	1876366	1876370	1876372
Order No.:			Client Sample Ref.:		TP02	TP03	TP07	TP08	WS03
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.20	1.50	0.60	0.80	0.50
			Bottom Depth (m):		0.60	2.00	0.80	1.00	0.75
			Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
Determinand	Accred.	SOP	Type	Units	LOD				
4-Isopropyltoluene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	10:1	µg/l	50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	10:1	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	10:1	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	11
1,4-Dichlorobenzene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol (o-Cresol)	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Methylphenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Isophorone	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Nitrophenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50

Results - Leachate

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876360	1876362	1876366	1876370	1876372
Order No.:		Client Sample Ref.:		TP02	TP03	TP07	TP08	WS03
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.20	1.50	0.60	0.80	0.50
		Bottom Depth (m):		0.60	2.00	0.80	1.00	0.75
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
Determinand	Accred.	SOP	Type	Units	LOD			
Acenaphthene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Fluorene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Azobenzene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Phenanthrene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Anthracene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Carbazole	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate	N	1790	10:1	µg/l	0.50	< 0.50	1.5	3.5
Fluoranthene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Pyrene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Butylbenzyl Phthalate	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzof[alanthracene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Chrysene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzof[b]fluoranthene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzof[k]fluoranthene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzof[a]pyrene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Dibenz[a,h]Anthracene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Benzof[g,h,i]perylene	N	1790	10:1	µg/l	0.50	< 0.50	< 0.50	< 0.50

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876352	1876353	1876354	1876355	1876356	1876357	1876358	1876359	1876360
Order No.:		Client Sample Ref.:		WS05	WS06	TP04	WS01	WS02	WS03	WS04	WS05	WS06
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		1.50	2.00	1.50	1.0	1.20	1.50	1.50	1.50	1.50
		Bottom Depth (m):										
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:										
Determinand	HWOL Code	Accred.	SOP	Units	LOD							
ACM Type		U	2192		N/A							
Asbestos Identification		U	2192		N/A							
Moisture		N	2030	%	0.020	12	15	13	11	15	14	13
Soil Colour		N	2040		N/A							
Other Material		N	2040		N/A							
Soil Texture		N	2040		N/A							
pH at 20C		M	2010		4.0	8.5	8.2	8.7	8.2	8.1	8.4	8.3
pH (2.5:1) at 20C		N	2010		4.0							
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.011	0.025	< 0.010	0.012	< 0.010	0.084	< 0.010
Arsenic		M	2455	mg/kg	0.5							
Cadmium		M	2455	mg/kg	0.10							
Chromium		M	2455	mg/kg	0.5							
Copper		M	2455	mg/kg	0.50							
Mercury		M	2455	mg/kg	0.05							
Nickel		M	2455	mg/kg	0.50							
Lead		M	2455	mg/kg	0.50							
Selenium		M	2455	mg/kg	0.25							
Zinc		M	2455	mg/kg	0.50							
Chromium (Hexavalent)		N	2490	mg/kg	0.50							
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05							
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10							
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05							
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25							
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00							
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00							
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00							
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00							
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00							
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00							
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00							
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05							
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05							
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05							
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25							
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00							

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876352	1876353	1876354	1876355	1876356	1876357	1876358	1876359	1876360
Order No.:		Client Sample Ref.:		WS05	WS06	TP04	WS01	WS02	WS03	WS04	WS05	WS06
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		1.50	2.00	1.50	1.0	1.20	1.50	1.50	1.50	1.50
		Bottom Depth (m):										
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:										
Determinand	HWOL Code	Accred.	SOP	Units	LOD							
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00							
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00							
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00							
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00							
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00							
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00							
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50							
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00							
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00							
Dichlorodifluoromethane		U	2760	µg/kg	1.0							
Chloromethane		M	2760	µg/kg	1.0							
Vinyl Chloride		M	2760	µg/kg	1.0							
Bromomethane		M	2760	µg/kg	20							
Chloroethane		U	2760	µg/kg	2.0							
Trichlorofluoromethane		M	2760	µg/kg	1.0							
1,1-Dichloroethene		M	2760	µg/kg	1.0							
Trans 1,2-Dichloroethene		M	2760	µg/kg	1.0							
1,1-Dichloroethane		M	2760	µg/kg	1.0							
cis 1,2-Dichloroethene		M	2760	µg/kg	1.0							
Bromochloromethane		U	2760	µg/kg	5.0							
Trichloromethane		M	2760	µg/kg	1.0							
1,1,1-Trichloroethane		M	2760	µg/kg	1.0							
Tetrachloromethane		M	2760	µg/kg	1.0							
1,1-Dichloropropene		U	2760	µg/kg	1.0							
Benzene		M	2760	µg/kg	1.0							
1,2-Dichloroethane		M	2760	µg/kg	2.0							
Trichloroethene		N	2760	µg/kg	1.0							
1,2-Dichloropropene		M	2760	µg/kg	1.0							
Dibromomethane		M	2760	µg/kg	1.0							
Bromodichloromethane		M	2760	µg/kg	5.0							
cis-1,3-Dichloropropene		N	2760	µg/kg	10							
Toluene		M	2760	µg/kg	1.0							
Trans-1,3-Dichloropropene		N	2760	µg/kg	10							
1,1,2-Trichloroethane		M	2760	µg/kg	1.0							
Tetrachloroethene		M	2760	µg/kg	1.0							
1,3-Dichloropropane		U	2760	µg/kg	2.0							
Dibromochloromethane		U	2760	µg/kg	10							
1,2-Dibromoethane		M	2760	µg/kg	5.0							

Results - Soil

Project: S2405 Acornfield Road, Liverpool									
Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876352	1876353	1876354	1876355	1876356	1876357
Order No.:		Client Sample Ref.:		WS05	WS06	TP04	WS01	WS02	WS04
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		1.50	2.00	1.50	1.0	1.20	1.50
		Bottom Depth (m):							
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:							
Determinand	HWOL Code	Accred.	SOP	Units	LOD				
Chlorobenzene		M	2760	µg/kg	1.0				
1,1,1,2-Tetrachloroethane		M	2760	µg/kg	2.0				
Ethylbenzene		M	2760	µg/kg	1.0				
m & p-Xylene		M	2760	µg/kg	1.0				
o-Xylene		M	2760	µg/kg	1.0				
Styrene		M	2760	µg/kg	1.0				
Tribromomethane		U	2760	µg/kg	1.0				
Isopropylbenzene		M	2760	µg/kg	1.0				
Bromobenzene		M	2760	µg/kg	1.0				
1,2,3-Trichloropropane		N	2760	µg/kg	50				
N-Propylbenzene		U	2760	µg/kg	1.0				
2-Chlorotoluene		M	2760	µg/kg	1.0				
1,3,5-Trimethylbenzene		M	2760	µg/kg	1.0				
4-Chlorotoluene		U	2760	µg/kg	1.0				
Tert-Butylbenzene		U	2760	µg/kg	1.0				
1,2,4-Trimethylbenzene		M	2760	µg/kg	1.0				
Sec-Butylbenzene		U	2760	µg/kg	1.0				
1,3-Dichlorobenzene		M	2760	µg/kg	1.0				
4-Isopropyltoluene		U	2760	µg/kg	1.0				
1,4-Dichlorobenzene		M	2760	µg/kg	1.0				
N-Butylbenzene		U	2760	µg/kg	1.0				
1,2-Dichlorobenzene		M	2760	µg/kg	1.0				
1,2-Dibromo-3-Chloropropane		U	2760	µg/kg	50				
1,2,4-Trichlorobenzene		M	2760	µg/kg	1.0				
Hexachlorobutadiene		N	2760	µg/kg	1.0				
1,2,3-Trichlorobenzene		U	2760	µg/kg	2.0				
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0				
N-Nitrosodimethylamine		M	2790	mg/kg	0.50				
Phenol		M	2790	mg/kg	0.50				
2-Chlorophenol		N	2790	mg/kg	0.50				
Bis-(2-Chloroethyl)Ether		M	2790	mg/kg	0.50				
1,3-Dichlorobenzene		M	2790	mg/kg	0.50				
1,4-Dichlorobenzene		N	2790	mg/kg	0.50				
1,2-Dichlorobenzene		M	2790	mg/kg	0.50				
2-Methylphenol		M	2790	mg/kg	0.50				
Bis(2-Chloroisopropyl)Ether		M	2790	mg/kg	0.50				
Hexachloroethane		N	2790	mg/kg	0.50				
N-Nitrosodi-n-propylamine		M	2790	mg/kg	0.50				

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876352	1876353	1876354	1876355	1876356	1876357	1876358	1876359	1876360
Order No.:		Client Sample Ref.:		WS05	WS06	TP04	WS01	WS02	WS03	WS04	WS05	WS06
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		1.50	2.00	1.50	1.0	1.20	1.50	1.50	1.50	1.50
		Bottom Depth (m):										
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:										
Determinand	HWOL Code	Accred.	SOP	Units	LOD							
4-Methylphenol		M	2790	mg/kg	0.50							
Nitrobenzene		N	2790	mg/kg	0.50							
Isophorone		M	2790	mg/kg	0.50							
2-Nitrophenol		N	2790	mg/kg	0.50							
2,4-Dimethylphenol		N	2790	mg/kg	0.50							
Bis(2-Chloroethoxy)Methane		M	2790	mg/kg	0.50							
2,4-Dichlorophenol		N	2790	mg/kg	0.50							
1,2,4-Trichlorobenzene		M	2790	mg/kg	0.50							
Naphthalene		M	2790	mg/kg	0.50							
4-Chloroaniline		N	2790	mg/kg	0.50							
Hexachlorobutadiene		M	2790	mg/kg	0.50							
4-Chloro-3-Methylphenol		N	2790	mg/kg	0.50							
2-Methylnaphthalene		M	2790	mg/kg	0.50							
4-Nitrophenol		N	2790	mg/kg	0.50							
2,4,6-Trichlorophenol		N	2790	mg/kg	0.50							
2,4,5-Trichlorophenol		N	2790	mg/kg	0.50							
2-Chloronaphthalene		M	2790	mg/kg	0.50							
2-Nitroaniline		N	2790	mg/kg	0.50							
Acenaphthylene		M	2790	mg/kg	0.50							
Dimethylphthalate		M	2790	mg/kg	0.50							
2,6-Dinitrotoluene		N	2790	mg/kg	0.50							
Acenaphthene		M	2790	mg/kg	0.50							
3-Nitroaniline		N	2790	mg/kg	0.50							
Dibenzofuran		M	2790	mg/kg	0.50							
4-Chlorophenylphenylether		M	2790	mg/kg	0.50							
2,4-Dinitrotoluene		N	2790	mg/kg	0.50							
Fluorene		M	2790	mg/kg	0.50							
Diethyl Phthalate		M	2790	mg/kg	0.50							
4-Nitroaniline		N	2790	mg/kg	0.50							
Azobenzene		M	2790	mg/kg	0.50							
4-Bromophenylphenyl Ether		M	2790	mg/kg	0.50							
Hexachlorobenzene		M	2790	mg/kg	0.50							
Phenanthrene		M	2790	mg/kg	0.50							
Anthracene		M	2790	mg/kg	0.50							
Carbazole		M	2790	mg/kg	0.50							
Di-N-Butyl Phthalate		N	2790	mg/kg	0.50							
Fluoranthene		M	2790	mg/kg	0.50							
Pyrene		M	2790	mg/kg	0.50							

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876352	1876353	1876354	1876355	1876356	1876357	1876358	1876359	1876360
Order No.:		Client Sample Ref.:		WS05	WS06	TP04	WS01	WS02	WS03	WS04	WS05	WS06
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		1.50	2.00	1.50	1.0	1.20	1.50	1.50	1.50	1.50
		Bottom Depth (m):										
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:										
Determinand	HWOL Code	Accred.	SOP	Units	LOD							
Butylbenzyl Phthalate		N	2790	mg/kg	0.50							
Benzof[a]anthracene		M	2790	mg/kg	0.50							
Chrysene		M	2790	mg/kg	0.50							
Bis(2-Ethylhexyl)Phthalate		N	2790	mg/kg	0.50							
Di-N-Octyl Phthalate		N	2790	mg/kg	0.50							
Benzof[b]fluoranthene		M	2790	mg/kg	0.50							
Benzof[k]fluoranthene		M	2790	mg/kg	0.50							
Benzof[a]pyrene		M	2790	mg/kg	0.50							
Indeno(1,2,3-c,d)Pyrene		N	2790	mg/kg	0.50							
Dibenz(a,h)Anthracene		N	2790	mg/kg	0.50							
Benzof[g,h,i]perylene		M	2790	mg/kg	0.50							

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876359	1876360	1876361	1876362	1876363	1876364	1876365	
Order No.:		Client Sample Ref.:		TP01	TP02	TP03	TP03	TP04	TP05	TP06	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		0.00	0.20	0.50	1.50	0.50	0.40	0.25	
		Bottom Depth (m):		0.50	0.60	1.00	2.00	1.00	0.60	0.50	
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	
		Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	
Determinand	HWOL Code	Accred.	SOP	Units	LOD						
ACM Type		U	2192		N/A	-	-	-	-	-	
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	
Moisture		N	2030	%	0.020	9.0	11	7.6	12	8.5	15
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	
Other Material		N	2040		N/A	Stones	Stones	Stones	Stones	Stones	
Soil Texture		N	2040		N/A	Sand	Sand	Clay	Clay	Clay	
pH at 20C		M	2010		4.0	9.6	9.0	10.7	8.9	10.8	8.6
pH (2.5:1) at 20C		N	2010		4.0	10.0	9.0	10.8	9.3	10.7	8.5
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	1.3	0.25	0.55	< 0.010	0.62	< 0.010
Arsenic		M	2455	mg/kg	0.5	7.0	8.4	6.6	9.2	8.3	3.1
Cadmium		M	2455	mg/kg	0.10	0.25	0.21	0.31	< 0.10	0.32	< 0.10
Chromium		M	2455	mg/kg	0.5	22	31	20	38	23	31
Copper		M	2455	mg/kg	0.50	46	52	30	22	58	760
Mercury		M	2455	mg/kg	0.05	0.10	0.46	0.07	< 0.05	0.15	< 0.05
Nickel		M	2455	mg/kg	0.50	16	25	21	42	26	34
Lead		M	2455	mg/kg	0.50	53	56	32	16	58	16
Selenium		M	2455	mg/kg	0.25	< 0.25	0.36	0.27	0.32	0.40	< 0.25
Zinc		M	2455	mg/kg	0.50	87	150	190	72	200	240
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0	25	< 2.0	7.6	< 2.0
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	< 1.0	< 1.0	140	< 1.0	66	< 1.0
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	9.3	3.8	160	< 2.0	73	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	13	12	180	< 3.0	91	< 3.0
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10	< 10	12	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	22	16	510	< 5.0	240	< 5.0
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	22	16	520	< 10	240	< 10
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	0.21	< 0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0	9.6	< 1.0	< 1.0	< 1.0

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited Quotation No.: Q24-36043 Order No.:	Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
	Chemtest Sample ID.:		1876359	1876360	1876361	1876362	1876363	1876364	1876365	
	Client Sample Ref.:		TP01	TP02	TP03	TP03	TP04	TP05	TP06	
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
	Top Depth (m):		0.00	0.20	0.50	1.50	0.50	0.40	0.25	
	Bottom Depth (m):		0.50	0.60	1.00	2.00	1.00	0.60	0.50	
	Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	
	Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	
Determinand	HWOL Code	Accred.	SOP	Units	LOD					
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0	56	24	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	40	11	89	47	4.3
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	50	18	26	20	< 2.0
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	160	16	12	1.5	< 1.0
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	90	29	180	91	< 5.0
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	250	44	190	92	< 10
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	110	44	680	330	< 10
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	280	60	690	330	< 10
Dichlorodifluoromethane		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride		M	2760	µg/kg	1.0	< 1.0	< 1.0	1.3	< 1.0	< 1.0
Bromomethane		M	2760	µg/kg	20	< 20	< 20	< 20	< 20	< 20
Chloroethane		U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	1.7	< 1.0
Bromochloromethane		U	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		M	2760	µg/kg	2.0	< 2.0	< 2.0	14	10	< 2.0
Trichloroethene		N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.1
1,2-Dichloropropane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane		M	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene		N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10
Toluene		M	2760	µg/kg	1.0	2.1	2.6	390	65	5.4
Trans-1,3-Dichloropropene		N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	7.3	20
1,3-Dichloropropane		U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane		U	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane		M	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited Quotation No.: Q24-36043 Order No.:	Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
	Chemtest Sample ID.:		1876359	1876360	1876361	1876362	1876363	1876364	1876365	1876364	1876365
	Client Sample Ref.:		TP01	TP02	TP03	TP03	TP04	TP05	TP06	TP05	TP06
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		0.00	0.20	0.50	1.50	0.50	0.40	0.25	0.40	0.25
	Bottom Depth (m):		0.50	0.60	1.00	2.00	1.00	0.60	0.50	0.60	0.50
	Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
	Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
	Accred.		M	M	M	M	M	M	M	M	M
	Units		µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Determinand	HWOL Code	Accred.	SOP	Units	LOD	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Chlorobenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	3.9	10	2.4	< 1.0
1,1,1,2-Tetrachloroethane		M	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	1.4	26	5.8	2.0
m & p-Xylene		M	2760	µg/kg	1.0	< 1.0	< 1.0	2.4	60	9.6	3.5
o-Xylene		M	2760	µg/kg	1.0	< 1.0	< 1.0	3.1	12	2.0	< 1.0
Styrene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane		N	2760	µg/kg	50	< 50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	2.2	< 1.0	< 1.0
4-Chlorotoluene		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	7.6	< 1.0	< 1.0
Sec-Butylbenzene		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	4.6	32	28	< 1.0
4-Isopropyltoluene		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.1	< 1.0
N-Butylbenzene		U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane		U	2760	µg/kg	50	< 50	< 50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene		N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene		U	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Chlorophenol		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Methylphenol		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexachloroethane		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:				24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876359		1876360	1876361	1876362	1876363	1876364	1876365
Order No.:		Client Sample Ref.:		TP01		TP02	TP03	TP03	TP04	TP05	TP06
		Sample Type:		SOIL		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.00		0.20	0.50	1.50	0.50	0.40	0.25
		Bottom Depth (m):		0.50		0.60	1.00	2.00	1.00	0.60	0.50
		Date Sampled:		03-Oct-2024		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:		NEW-ASB		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD						
4-Methylphenol		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nitrobenzene		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Isophorone		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Nitrophenol		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dimethylphenol		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dichlorophenol		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthalene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Chloroaniline		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexachlorobutadiene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Methylnaphthalene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Nitrophenol		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Chloronaphthalene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Nitroaniline		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Acenaphthylene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dimethylphthalate		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,6-Dinitrotoluene		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Acenaphthene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
3-Nitroaniline		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibenzofuran		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Chlorophenylphenylether		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4-Dinitrotoluene		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Fluorene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Diethyl Phthalate		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Nitroaniline		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Azobenzene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenanthrene		M	2790	mg/kg	0.50	1.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Anthracene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbazole		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Di-N-Butyl Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Fluoranthene		M	2790	mg/kg	0.50	2.1	< 0.50	< 0.50	0.60	< 0.50	< 0.50
Pyrene		M	2790	mg/kg	0.50	2.4	3.6	< 0.50	0.57	< 0.50	< 0.50

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876359	1876360	1876361	1876362	1876363	1876364	1876365	
Order No.:		Client Sample Ref.:		TP01	TP02	TP03	TP03	TP04	TP05	TP06	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		0.00	0.20	0.50	1.50	0.50	0.40	0.25	
		Bottom Depth (m):		0.50	0.60	1.00	2.00	1.00	0.60	0.50	
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	
		Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	
Determinand	HWOL Code	Accred.	SOP	Units	LOD						
Butylbenzyl Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Benzof[anthracene		M	2790	mg/kg	0.50	1.0	2.0	< 0.50	< 0.50	< 0.50	
Chrysene		M	2790	mg/kg	0.50	1.1	2.0	< 0.50	< 0.50	< 0.50	
Bis(2-Ethylhexyl)Phthalate		N	2790	mg/kg	0.50	< 0.50	0.93	0.81	< 0.50	1.4	< 0.50
Di-N-Octyl Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzof[b]fluoranthene		M	2790	mg/kg	0.50	1.9	3.1	< 0.50	< 0.50	< 0.50	< 0.50
Benzof[k]fluoranthene		M	2790	mg/kg	0.50	0.68	0.99	< 0.50	< 0.50	< 0.50	< 0.50
Benzof[a]pyrene		M	2790	mg/kg	0.50	1.6	2.7	< 0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene		N	2790	mg/kg	0.50	0.85	1.5	< 0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzof[g,h,i]perylene		M	2790	mg/kg	0.50	1.1	1.7	< 0.50	< 0.50	< 0.50	< 0.50

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876366	1876367	1876368	1876369	1876371
Order No.:		Client Sample Ref.:		TP07	WS01	WS02	TP08	WS03
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.60	0.50	0.40	0.20	0.30
		Bottom Depth (m):		0.80	1.00	0.70	0.60	0.50
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
ACM Type		U	2192		N/A	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	16	11	12
Soil Colour		N	2040		N/A	Brown	Brown	Black
Other Material		N	2040		N/A	Stones	Stones	Stones
Soil Texture		N	2040		N/A	Loam	Clay	Loam
pH at 20C		M	2010		4.0	9.1	8.2	9.7
pH (2.5:1) at 20C		N	2010		4.0	9.4	8.2	9.7
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	< 0.010	< 0.010	0.24
Arsenic		M	2455	mg/kg	0.5	1.7	4.8	3.8
Cadmium		M	2455	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Chromium		M	2455	mg/kg	0.5	22	35	24
Copper		M	2455	mg/kg	0.50	22	47	54
Mercury		M	2455	mg/kg	0.05	< 0.05	< 0.05	0.12
Nickel		M	2455	mg/kg	0.50	26	42	24
Lead		M	2455	mg/kg	0.50	7.6	20	42
Selenium		M	2455	mg/kg	0.25	< 0.25	< 0.25	< 0.25
Zinc		M	2455	mg/kg	0.50	38	120	140
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10	0.27	0.21	0.21
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	0.14	< 0.05	0.12
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	0.41	< 0.25	0.32
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0	17
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	< 1.0	< 1.0	82
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0	95
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	< 3.0	< 3.0	150
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10	< 10	< 10
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	< 5.0	< 5.0	340
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10	< 10	340
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	0.17	< 0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	1.9	< 0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	1.6	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	3.7	< 0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	5.6	< 1.0	5.1

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited Quotation No.: Q24-36043 Order No.:	Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181
	Chemtest Sample ID.:		1876366	1876367	1876368	1876369	1876371
	Client Sample Ref.:		TP07	WS01	WS02	TP08	WS03
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):		0.60	0.50	0.40	0.20	0.30
	Bottom Depth (m):		0.80	1.00	0.70	0.60	0.50
	Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
	Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD		
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	4.7	5.3
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0	< 2.0
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	1.3	< 1.0
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	11	5.3
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	12	< 10
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	4.1	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	11	< 10
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	12	< 10
Dichlorodifluoromethane		U	2760	µg/kg	1.0	< 1.0	< 1.0
Chloromethane		M	2760	µg/kg	1.0	< 1.0	< 1.0
Vinyl Chloride		M	2760	µg/kg	1.0	91	< 1.0
Bromomethane		M	2760	µg/kg	20	< 20	< 20
Chloroethane		U	2760	µg/kg	2.0	< 2.0	< 2.0
Trichlorofluoromethane		M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethene		M	2760	µg/kg	1.0	9.6	< 1.0
Trans 1,2-Dichloroethene		M	2760	µg/kg	1.0	110	< 1.0
1,1-Dichloroethane		M	2760	µg/kg	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene		M	2760	µg/kg	1.0	840	< 1.0
Bromochloromethane		U	2760	µg/kg	5.0	< 5.0	< 5.0
Trichloromethane		M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane		M	2760	µg/kg	1.0	< 1.0	< 1.0
Tetrachloromethane		M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloropropene		U	2760	µg/kg	1.0	< 1.0	< 1.0
Benzene		M	2760	µg/kg	1.0	41	< 1.0
1,2-Dichloroethane		M	2760	µg/kg	2.0	190	< 2.0
Trichloroethene		N	2760	µg/kg	1.0	77	< 1.0
1,2-Dichloropropene		M	2760	µg/kg	1.0	< 1.0	< 1.0
Dibromomethane		M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromodichloromethane		M	2760	µg/kg	5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene		N	2760	µg/kg	10	< 10	< 10
Toluene		M	2760	µg/kg	1.0	11000	9.5
Trans-1,3-Dichloropropene		N	2760	µg/kg	10	< 10	< 10
1,1,2-Trichloroethane		M	2760	µg/kg	1.0	< 1.0	< 1.0
Tetrachloroethene		M	2760	µg/kg	1.0	620	< 1.0
1,3-Dichloropropene		U	2760	µg/kg	2.0	< 2.0	< 2.0
Dibromochloromethane		U	2760	µg/kg	10	< 10	< 10
1,2-Dibromoethane		M	2760	µg/kg	5.0	< 5.0	< 5.0

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited Quotation No.: Q24-36043 Order No.:	Chemtest Job No.: Chemtest Sample ID.: Client Sample Ref.: Sample Type:	24-32181 1876366 TP07 SOIL	24-32181 1876367 WS01 SOIL	24-32181 1876368 WS02 SOIL	24-32181 1876369 TP08 SOIL	24-32181
	Top Depth (m): Bottom Depth (m): Date Sampled: Asbestos Lab:	0.60 0.80 03-Oct-2024 NEW-ASB	0.50 1.00 03-Oct-2024 NEW-ASB	0.40 0.70 03-Oct-2024 NEW-ASB	0.20 0.60 03-Oct-2024 NEW-ASB	0.30 0.50 03-Oct-2024 NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD	
Chlorobenzene		M	2760	µg/kg	1.0	
1,1,1,2-Tetrachloroethane		M	2760	µg/kg	2.0	< 1.0 < 2.0 < 2.0 < 1.0 9.8
Ethylbenzene		M	2760	µg/kg	1.0	4400 2.6 4.5 1.7
m & p-Xylene		M	2760	µg/kg	1.0	6200 4.6 10 3.7
o-Xylene		M	2760	µg/kg	1.0	1000 1.5 1.5 1.0 1.0
Styrene		M	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
Tribromomethane		U	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
Isopropylbenzene		M	2760	µg/kg	1.0	14 1.0 1.0 1.0 1.0
Bromobenzene		M	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
1,2,3-Trichloropropane		N	2760	µg/kg	50	< 50 1.0 1.0 1.0 1.0
N-Propylbenzene		U	2760	µg/kg	1.0	7.9 1.0 1.0 1.0 1.0
2-Chlorotoluene		M	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
1,3,5-Trimethylbenzene		M	2760	µg/kg	1.0	10 1.0 1.0 1.0 1.0
4-Chlorotoluene		U	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
Tert-Butylbenzene		U	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
1,2,4-Trimethylbenzene		M	2760	µg/kg	1.0	29 1.0 1.0 1.0 1.0
Sec-Butylbenzene		U	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
1,3-Dichlorobenzene		M	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
4-Isopropyltoluene		U	2760	µg/kg	1.0	2.3 1.0 1.0 1.0 1.0
1,4-Dichlorobenzene		M	2760	µg/kg	1.0	1.7 1.0 1.0 1.0 1.0
N-Butylbenzene		U	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
1,2-Dichlorobenzene		M	2760	µg/kg	1.0	54 1.0 1.0 1.0 1.0
1,2-Dibromo-3-Chloropropane		U	2760	µg/kg	50	< 50 1.0 1.0 1.0 1.0
1,2,4-Trichlorobenzene		M	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
Hexachlorobutadiene		N	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
1,2,3-Trichlorobenzene		U	2760	µg/kg	2.0	< 2.0 1.0 1.0 1.0 1.0
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0	< 1.0 1.0 1.0 1.0 1.0
N-Nitrosodimethylamine		M	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
Phenol		M	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
2-Chlorophenol		N	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
Bis-(2-Chloroethyl)Ether		M	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
1,3-Dichlorobenzene		M	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
1,4-Dichlorobenzene		N	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
1,2-Dichlorobenzene		M	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
2-Methylphenol		M	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
Bis(2-Chloroisopropyl)Ether		M	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
Hexachloroethane		N	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0
N-Nitrosodi-n-propylamine		M	2790	mg/kg	0.50	< 0.50 1.0 1.0 1.0 1.0

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited Quotation No.: Q24-36043 Order No.:	Chemtest Job No.: Chemtest Sample ID.: Client Sample Ref.: Sample Type:	24-32181 1876366 TP07 SOIL	24-32181 1876367 WS01 SOIL	24-32181 1876368 WS02 SOIL	24-32181 1876369 TP08 SOIL	24-32181 1876371 WS03 SOIL
	Top Depth (m): Bottom Depth (m): Date Sampled: Asbestos Lab:	03-Oct-2024 NEW-ASB	03-Oct-2024 NEW-ASB	03-Oct-2024 NEW-ASB	03-Oct-2024 NEW-ASB	03-Oct-2024 NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD	
4-Methylphenol		M	2790	mg/kg	0.50	< 0.50
Nitrobenzene		N	2790	mg/kg	0.50	< 0.50
Isophorone		M	2790	mg/kg	0.50	< 0.50
2-Nitrophenol		N	2790	mg/kg	0.50	< 0.50
2,4-Dimethylphenol		N	2790	mg/kg	0.50	< 0.50
Bis(2-Chloroethoxy)Methane		M	2790	mg/kg	0.50	< 0.50
2,4-Dichlorophenol		N	2790	mg/kg	0.50	< 0.50
1,2,4-Trichlorobenzene		M	2790	mg/kg	0.50	< 0.50
Naphthalene		M	2790	mg/kg	0.50	< 0.50
4-Chloroaniline		N	2790	mg/kg	0.50	< 0.50
Hexachlorobutadiene		M	2790	mg/kg	0.50	< 0.50
4-Chloro-3-Methylphenol		N	2790	mg/kg	0.50	< 0.50
2-Methylnaphthalene		M	2790	mg/kg	0.50	< 0.50
4-Nitrophenol		N	2790	mg/kg	0.50	< 0.50
2,4,6-Trichlorophenol		N	2790	mg/kg	0.50	< 0.50
2,4,5-Trichlorophenol		N	2790	mg/kg	0.50	< 0.50
2-Chloronaphthalene		M	2790	mg/kg	0.50	< 0.50
2-Nitroaniline		N	2790	mg/kg	0.50	< 0.50
Acenaphthylene		M	2790	mg/kg	0.50	< 0.50
Dimethylphthalate		M	2790	mg/kg	0.50	< 0.50
2,6-Dinitrotoluene		N	2790	mg/kg	0.50	< 0.50
Acenaphthene		M	2790	mg/kg	0.50	< 0.50
3-Nitroaniline		N	2790	mg/kg	0.50	< 0.50
Dibenzofuran		M	2790	mg/kg	0.50	< 0.50
4-Chlorophenylphenylether		M	2790	mg/kg	0.50	< 0.50
2,4-Dinitrotoluene		N	2790	mg/kg	0.50	< 0.50
Fluorene		M	2790	mg/kg	0.50	< 0.50
Diethyl Phthalate		M	2790	mg/kg	0.50	< 0.50
4-Nitroaniline		N	2790	mg/kg	0.50	< 0.50
Azobenzene		M	2790	mg/kg	0.50	< 0.50
4-Bromophenylphenyl Ether		M	2790	mg/kg	0.50	< 0.50
Hexachlorobenzene		M	2790	mg/kg	0.50	< 0.50
Phenanthrene		M	2790	mg/kg	0.50	< 0.50
Anthracene		M	2790	mg/kg	0.50	< 0.50
Carbazole		M	2790	mg/kg	0.50	< 0.50
Di-N-Butyl Phthalate		N	2790	mg/kg	0.50	< 0.50
Fluoranthene		M	2790	mg/kg	0.50	< 0.50
Pyrene		M	2790	mg/kg	0.50	< 0.50

Results - Soil

Project: S2405 Acornfield Road, Liverpool

Client: Spire Geotechnical Limited		Chemtest Job No.:		24-32181	24-32181	24-32181	24-32181	24-32181
Quotation No.: Q24-36043		Chemtest Sample ID.:		1876366	1876367	1876368	1876369	1876371
Order No.:		Client Sample Ref.:		TP07	WS01	WS02	TP08	WS03
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.60	0.50	0.40	0.20	0.30
		Bottom Depth (m):		0.80	1.00	0.70	0.60	0.50
		Date Sampled:		03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:		NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	HWOL Code	Accred.	SOP	Units	LOD			
Butylbenzyl Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzof[anthracene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Chrysene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzof[fluoranthene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzof[k]fluoranthene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzof[a]pyrene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Dibenz(a,h)Anthracene		N	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Benzof[g,h,i]perylene		M	2790	mg/kg	0.50	< 0.50	< 0.50	< 0.50

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
1010	pH Value of Waters	pH at 20°C	pH Meter	
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.	
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).	
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.	
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection	
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.	
1790	Semi-Volatile Organic Compounds (SVOCs) in Waters by GC-MS	Semi-volatile organic compounds	Solvent extraction / GCMS detection	
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.	
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection	
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8–C10 Aromatics: >C5–C7,>C7–C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS	
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.

Any comments or interpretations are outside the scope of UKAS accreditation.

The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.

Uncertainty of measurement for the determinands tested are available upon request .

None of the results in this report have been recovery corrected.

All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at $\leq 30^{\circ}\text{C}$ prior to analysis.

All Asbestos testing is performed at the indicated laboratory .

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.

All water samples will be retained for 14 days from the date of receipt.

Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

- DW - Drinking Water
- GW - Ground Water
- LE - Land Leachate
- NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

APPENDIX 5



SPIRE
GEOTECHNICAL
Geologists & Site Investigation
Specialists

GENERIC ASSESSMENT CRITERIA DATA SHEETS (SOILS)

Commercial End Use (6% SOM)

Parameters	Generic Assessment Criteria (mg/kg)	TP01 0.00-0.50	TP02 0.20-0.60	TP03 0.50-1.00	TP03 1.50-2.00	TP04 0.50-1.00	TP05 0.40-0.60	TP06 0.25-0.50	TP07 0.60-0.80	WS01 0.50-1.00	WS02 0.40-0.70	TP08 0.20-0.60	WS03 0.30-0.50
Metals/Metalloids													
Arsenic (total)	640	7	8.4	6.6	9.2	8.3	6.9	3.1	2	5	4	74	4
Cadmium (total)	190	0.25	0.21	0.31	<0.10	0.32	0.13	<0.10	<0.10	<0.10	<0.10	4.5	<0.10
Chromium (total)	8600	22	31	20	38	23	34	31	22	35	24	44	36
Chromium (VI)	33	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Copper (total)	68000	46	52	30	22	58	27	760	22	47	54	470	39
Lead (total)	630	53	56	32	16	58	35	16	7.6	20	42	890	17
Mercury (total)	1100	0.1	0.46	0.07	<0.05	0.15	0.06	<0.05	<0.05	<0.05	0.12	0.31	<0.05
Nickel (total)	980	16	25	21	42	26	28	34	26	42	24	390	29
Selenium (total)	12000	<0.25	0.36	0.27	0.32	0.4	0.39	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Zinc (total)	730000	87	150	190	72	200	120	240	38	120	140	630	93
Other													
Asbestos	Non Detection	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD
PAH													
Acenaphthene	100000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acenaphthylene	100000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Anthracene	540000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(a)anthracene	180	1	2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(a)pyrene	36	1.6	2.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(b)fluoranthene	45	1.9	3.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(ghi)perylene	4000	1.1	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(k)fluoranthene	1200	0.68	0.99	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chrysene	350	1.1	2.00	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dibenz(a,h)anthracene	3.6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoranthene	23000	2.1	3.80	0.66	<0.50	0.6	<0.50	<0.50	<0.50	<0.50	<0.50	0.83	<0.50
Fluorene	71000	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Indeno(123cd)pyrene	510	0.85	1.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	1100	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Phenanthrene	23000	1.1	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.79	<0.50
Pyrene	54000	2.4	3.60	0.60	<0.50	0.57	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50
TPH													
Aliphatic C5-C6	8000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aliphatic C6-C8	25000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.31	<0.05
Aliphatic C8-C10	7000	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14	<0.05	0.12	14	<0.05

GENERIC ASSESSMENT CRITERIA DATA SHEETS (SOILS)

Commercial End Use (6% SOM)

Parameters	Generic Assessment Criteria (mg/kg)	TP01 0.00-0.50	TP02 0.20-0.60	TP03 0.50-1.00	TP03 1.50-2.00	TP04 0.50-1.00	TP05 0.40-0.60	TP06 0.25-0.50	TP07 0.60-0.80	WS01 0.50-1.00	WS02 0.40-0.70	TP08 0.20-0.60	WS03 0.30-0.50
Aliphatic C10-C12	32000	< 2.0	< 2.0	25.0	< 2.0	16.0	7.6	< 2.0	< 2.0	< 2.0	17	1600	< 2.0
Aliphatic C12-C16	90000	< 1.0	< 1.0	140.0	< 1.0	120.0	66.0	< 1.0	< 1.0	< 1.0	82	1900	< 1.0
Aliphatic C16-C21	180000	9.3	3.8	160.0	< 2.0	120.0	73.0	< 2.0	< 2.0	< 2.0	95	1100	< 2.0
Aromatic C5-C7	55000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.17	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic C7-C8	130000	< 0.05	< 0.05	< 0.05	0.2	< 0.05	< 0.05	< 0.05	1.9	< 0.05	< 0.05	0.93	< 0.05
Aromatic C8-C10	120000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.6	< 0.05	< 0.05	16	< 0.05
Aromatic C10-C12	31000	< 1.0	< 1.0	9.6	< 1.0	11.0	< 1.0	< 1.0	5.6	< 1.0	5.1	440	< 1.0
Aromatic C12-C16	38000	< 1.0	< 1.0	33.0	< 1.0	56.0	24.0	< 1.0	< 1.0	< 1.0	35	720	< 1.0
Aromatic C16-C21	28000	40.0	11.0	56.0	4.7	89.0	47.0	4.3	4.7	5.3	58	340	4.9
Aromatic C21-C35	28000	50.0	18.0	9.5	< 2.0	26.0	20.0	< 2.0	< 2.0	< 2.0	8.5	13	< 2.0
VOC / SVOC													
1,2-dichloroethane	1.7	< 2.0	< 2.0	< 2.0	14	21	10	< 2.0	190	< 2.0	< 2.0	34	< 2.0
1,1,1,2-tetrachloroethanes	560	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
1,1,1-trichloroethane	3000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	120	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	290	< 1.0	< 1.0	< 1.0	4	10	2	< 1.0	< 1.0	< 1.0	2.2	< 1.0	9.8
Cis-1,2-dichloroethylene	47	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2	< 1.0	840	< 1.0	< 1.0	21	< 1.0
Benzene	90	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	41	< 1.0	< 1.0	12	< 1.0
Chloroethane	0.12	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloromethane	350	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	14	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	95	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3	77	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	95	< 1.0	< 1.0	< 1.0	< 1.0	7	7	20	620	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	170	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	1280	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichlorobenzene	3240	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexachlorobenzene	120	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-dichloropropane	12	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	180000	2	3	5	490	390	65	5	11000	9.5	15	< 1.0	3
Ethylbenzene	27000	< 1.0	< 1.0	1	8	26	6	2	4400	2.6	4.5	< 1.0	1.7
m+p-Xylene	31000	< 1.0	< 1.0	2	19	60	10	4	6200	4.6	10	< 1.0	3.7
o-Xylene	33000	< 1.0	< 1.0	< 1.0	3	12	2	< 1.0	1000	< 1.0	1.5	< 1.0	< 1.0
Isopropylbenzene	7700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	14	< 1.0	< 1.0	140	< 1.0
1,2,4-trimethylbenzene	2	< 1.0	< 1.0	< 1.0	< 1.0	8	< 1.0	< 1.0	29	< 1.0	< 1.0	< 1.0	< 1.0



Commercial End Use (6% SOM)

[illegible]

LEACHATE CRITERIA DATA SHEETS (LEACHATE)

Commercial End Use (6% SOM)

Parameters	Leachate Assessment Criteria (ug/l)	TP02 0.20-0.60	TP03 1.50-2.00	TP07 0.60-0.80	TP08 0.80-1.00	WS03 0.50-0.75
Metals/Metalloids						
Arsenic (total)	10	9.2	3.7	4	16	3
Cadmium (total)	5	<0.11	<0.11	<0.11	<0.11	<0.11
Chromium (total)	50	<0.50	<0.50	0.84	2.7	0.86
Chromium (VI)	50	<20	<20	<20	<20	<20
Copper (total)	2000	10	9.1	31	17	8.8
Lead (total)	10	3.9	1.6	9.2	2.3	<0.50
Mercury (total)	1	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel (total)	20	<0.50	0.94	24	1.2	1.6
Selenium (total)	10	0.88	0.55	<0.50	<0.50	<0.50
Zinc (total)	50	9.4	27	50	21	3.8
PAH						
Acenaphthene	~	<0.50	<0.50	<0.50	<0.50	<0.50
Acenaphthylene	~	<0.50	<0.50	<0.50	<0.50	<0.50
Anthracene	0.1	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(a)anthracene	~	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(a)pyrene	0.01	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(b)fluoranthene	0.1	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(ghi)perylene	0.1	<0.50	<0.50	<0.50	<0.50	<0.50
Benzo(k)fluoranthene	0.1	<0.50	<0.50	<0.50	<0.50	<0.50
Chrysene	~	<0.50	<0.50	<0.50	<0.50	<0.50
Dibenz(ah)anthracene	~	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoranthene	0.1	<0.50	<0.50	<0.50	<0.50	<0.50
Fluorene	~	<0.50	<0.50	<0.50	<0.50	<0.50
Indeno(123cd)pyrene	0.1	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	2.4	<0.50	<0.50	<0.50	<0.50	<0.50
Phenanthrene	~	<0.50	<0.50	<0.50	<0.50	<0.50
Pyrene	~	<0.50	<0.50	<0.50	<0.50	<0.50
TPH						
Aliphatic C5-C6	38	<0.10	<0.10	<0.10	<0.10	<0.10
Aliphatic C6-C8	7500	<0.10	<0.10	<0.10	<0.10	<0.10
Aliphatic C8-C10	7500	<0.10	<0.10	<0.10	<0.10	<0.10

LEACHATE CRITERIA DATA SHEETS (LEACHATE)

Commercial End Use (6% SOM)

Parameters	Leachate Assessment Criteria (ug/l)	TP02 0.20-0.60	TP03 1.50-2.00	TP07 0.60-0.80	TP08 0.80-1.00	WS03 0.50-0.75
Aliphatic C10-C12	1500	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic C12-C16	1500	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic C16-C21	~	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic C5-C7	50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic C7-C8	250	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic C8-C10	250	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic C10-C12	200	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic C12-C16	600	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic C16-C21	450	< 0.10	< 0.10	< 0.10	< 0.10	24
Aromatic C21-C35	450	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
VOC / SVOC						
1,2-dichloroethane	15	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Vinyl chloride	2.5	< 1.0	2	< 1.0	< 1.0	< 1.0
Chlorobenzene	100	< 1.0	< 1.0	< 1.0	1.6	10
Cis-1,2-dichloroethylene	70	< 1.0	< 1.0	7.7	< 1.0	< 1.0
Tetrachloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-trimethylbenzene	~	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzene	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	250	< 1.0	6	36	2.5	8
Ethylbenzene	300	< 1.0	< 1.0	5.6	1.8	< 1.0
m+p-Xylene	150	< 1.0	< 1.0	8.6	4.4	< 1.0
o-Xylene	150	2	< 1.0	2.5	< 1.0	< 1.0
Phenol	7.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50



SOIL REMEDIAL TREATMENT CRITERIA GAC (SOILS) FOR REUSE

(GAC VALUES AS AGREED WITHIN AMEC FOSTER WHEEL 2017 REMEDIATION)

Parameters	SOIL CRITERIA GAC (mg/kg)	TP01 0.00- 0.50	TP02 0.20- 0.60	TP03 0.50- 1.00	TP03 1.50- 2.00	TP04 0.50- 1.00	TP05 0.40- 0.60	TP06 0.25- 0.50	TP07 0.60- 0.80	WS01 0.50- 1.00	WS02 0.40- 0.70	TP08 0.20- 0.60	WS03 0.30- 0.50
TPH													
Aliphatic C5-C6	500	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic C6-C8	500	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.31	< 0.05
Aliphatic C8-C10	500	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.14	< 0.05	0.12	14	< 0.05

SOIL REMEDIAL TREATMENT CRITERIA GAC (SOILS) FOR REUSE

(GAC VALUES AS AGREED WITHIN AMEC FOSTER WHEEL 2017 REMEDIATION)

Parameters	SOIL CRITERIA GAC (mg/kg)	TP01 0.00-0.50	TP02 0.20-0.60	TP03 0.50-1.00	TP03 1.50-2.00	TP04 0.50-1.00	TP05 0.40-0.60	TP06 0.25-0.50	TP07 0.60-0.80	WS01 0.50-1.00	WS02 0.40-0.70	TP08 0.20-0.60	WS03 0.30-0.50
Aliphatic C10-C12	500	< 2.0	< 2.0	25.0	< 2.0	16.0	7.6	< 2.0	< 2.0	< 2.0	17	1600	< 2.0
Aliphatic C12-C16	500	< 1.0	< 1.0	140.0	< 1.0	120.0	66.0	< 1.0	< 1.0	< 1.0	82	1900	< 1.0
Aliphatic C16-C21	1000	9.3	3.8	160.0	< 2.0	120.0	73.0	< 2.0	< 2.0	< 2.0	95	1100	< 2.0
Aromatic C5-C7	500	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.17	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic C7-C8	500	< 0.05	< 0.05	< 0.05	0.2	< 0.05	< 0.05	< 0.05	1.9	< 0.05	< 0.05	0.93	< 0.05
Aromatic C8-C10	500	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.6	< 0.05	< 0.05	16	< 0.05
Aromatic C10-C12	500	< 1.0	< 1.0	9.6	< 1.0	11.0	< 1.0	< 1.0	5.6	< 1.0	5.1	440	< 1.0
Aromatic C12-C16	500	< 1.0	< 1.0	33.0	< 1.0	56.0	24.0	< 1.0	< 1.0	< 1.0	35	720	< 1.0
Aromatic C16-C21	1000	40.0	11.0	56.0	4.7	89.0	47.0	4.3	4.7	5.3	58	340	4.9
Aromatic C21-C35	1000	50.0	18.0	9.5	< 2.0	26.0	20.0	< 2.0	< 2.0	< 2.0	8.5	13	< 2.0
VOC / SVOC													
1,2-dichloroethane	0.67	< 2.0	< 2.0	< 2.0	14	21	10	< 2.0	190	< 2.0	< 2.0	34	< 2.0
Vinyl Chloride	0.059	< 1.0	< 1.0	< 1.0	190	1	< 1.0	< 1.0	91	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	56	< 1.0	< 1.0	< 1.0	4	10	2	< 1.0	< 1.0	< 1.0	2.2	< 1.0	9.8
Cis-1,2-dichloroethylene	14	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2	< 1.0	840	< 1.0	< 1.0	21	< 1.0
Benzene	27	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	41	< 1.0	< 1.0	12	< 1.0
Tetrachloromethane	19	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3	77	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	6	2	3	5	490	390	65	5	11000	9.5	15	< 1.0	3
Ethylbenzene	6	< 1.0	< 1.0	1	8	26	6	2	4400	2.6	4.5	< 1.0	1.7
m+p-Xylene	6	< 1.0	< 1.0	2	19	60	10	4	6200	4.6	10	< 1.0	3.7
o-Xylene	6	< 1.0	< 1.0	< 1.0	3	12	2	< 1.0	1000	< 1.0	1.5	< 1.0	< 1.0
1,2,4-trimethylbenzene	42	< 1.0	< 1.0	< 1.0	< 1.0	8	< 1.0	< 1.0	29	< 1.0	< 1.0	< 1.0	< 1.0

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