



GEOENVIRONMENTAL DESK STUDY AND GROUND INVESTIGATION REPORT

Knowsley Lane Knowsley Business Park

Reference

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Author

DMH

5 John Charles Way
LEEDS
LS12 6QA

Tel: 0113 263 1155
admin@jpg.group
www.jpg.group





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Fletcher Rae Architects. Proposed Site Plan. Knowsley Lane, Knowsley. Drawing No. 19011-FRA-AV-XX-DR-A-90-1001-P9. Dated May 2022, for Caddick Developments Limited.

Fletcher Rae Architects. Proposed Site Plan Option 4. Knowsley Lane, Knowsley. Drawing No. PR1171_SK10, dated February 2019, for Caddick Developments Limited.

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CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Caddick Developments Limited
Castlegarth Grange
Scott Lane
WETHERBY
LS22 6LH

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P01	July 2019	First Issue	Information	DMH	
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EXECUTIVE SUMMARY

Site Address	Knowsley Lane, Knowsley
NGR	Approximate NGR 343757, 396696
Current Site Use & Proposed Development	The site is an irregular shape and covers an area of approximately 6.42ha. Access to the site is gained from the west off Ormskirk Road via a driveway, or from the east off Knowsley Lane via a dirt track. The site comprises Tinkle Peg Farm and open fields. The farm comprises a two-storey house of brick construction with an extension, a single-storey outhouse and a metal constructed barn house. Goring's Plantation oriented east to west is located in the northern part of the site. Between the plantation and the northern boundary, the site is heavily overgrown with brambles. It is proposed to redevelop the site for a commercial end-use.
Site History	The early historical plans show Tinkle Peg Farm in the approximate centre of the site and Goring's Plantation, oriented east to west is shown in the northern part of the site. The northern part of Caddick's Wood and a small pond are shown in the south east part of the site. A rectangular building is shown between the wood and the farm. The remainder of the site comprises open fields. Later plans show a small building in the northeast of the site. The rectangular building, the small building in the north east of the site and the pond adjacent to the south east boundary of the site are no longer shown on the plans dating from the 1950's. No further changes are shown up to the present day.
Site Setting	Geology – The GS report and geological maps state that no made ground is shown to be present on the site. However, based on observations made during the site visit and discussions with the farmer, made ground is anticipated to be present across the site. The site is shown to be underlain by superficial deposits comprising the Shirdley Hill Sand. This is described as a fine-grained sand, divisible into an upper 'white' sand and a lower 'brown' sand, with peat layers in the lower part. The soils on the site are described as 'dark sandy loam soils', as shown on the Lancashire 100 SW map. The underlying bedrock is shown to comprise the Chester Formation (sandstone). Mining – The site is not located in a coal mining reporting area and therefore will not be affected by instability due to past underground coal mining. Hydrogeology – The Shirdley Hill Sand Deposits underlying the site are classified as Secondary A Aquifer. The underlying bedrock is classified as a Principal Aquifer. Hydrology – An inland river is located in the northern part of the site in Goring's Plantation. Knowsley Brook is located approximately 120m north of the site. Flooding – The site lies within Flood Zone 1 and is classified as having a very low risk of Flooding from Rivers and the Sea (RoFRaS). Landfill – There are no active landfill site within 500m of the site. Radon Risks – The property is not in a Radon Affected Area. Therefore, no radon gas protective measures will be required
Fieldwork	The fieldwork was carried out between the 23 and 26 April 2019. 20No. Trial pits were advanced to target specific site features (i.e. buildings and the backfilled pond) and to provide general site coverage. Cable percussive boreholes were targeted at the locations of the proposed units. Gas and groundwater monitoring wells were installed in the cable percussive boreholes in order to assess the ground gas and groundwater regime in both the made and natural ground beneath the site. Soil samples were submitted for chemical analysis and geotechnical testing.
Ground and Groundwater Conditions	Ground conditions typically comprise made ground of topsoil and subsoil to a maximum depth of 0.80m. The made ground is underlain by superficial deposits comprising loose to medium dense orange-brown and brown fine to coarse sand (Shirdley Hill Sand Deposits) and very soft to stiff, very low to high strength brown, grey, reddish brown and purplish brown sandy gravelly clay. The base of the superficial deposits was confirmed to depths of between 3.00 and 7.00m bgl. The underlying bedrock (Chester Formation) was recovered as medium dense and very dense reddish brown slightly clayey medium to coarse sand. Perched water and running sand were encountered between depths of 1.10m to 4.70m during the ground investigation. During the monitoring period shallow groundwater was encountered between depths of 0.80m to 6.83m.
Geotechnical and Engineering Assessment	Foundations – The selection of foundation type will be largely governed by the thickness of any made ground and the nature of the underlying natural strata. The made ground and zones of very soft and soft material within the superficial deposits are unsuitable for the support of structural loads due to variations in material properties. Where the unsuitable materials are absent or are present at shallow depth (i.e. above founding depth) and where the underlying natural strata comprises medium dense granular deposits an allowable bearing capacity of 125kN/m ² for total settlements of less than 25mm will be available. Under the same circumstances, and where the underlying natural strata comprises firm medium strength cohesive deposits an allowable bearing capacity of 100kN/m ² for total settlements of less than 25mm will be available. Alternatively, the shallow natural ground could be subject to some form of ground improvement in order to increase the allowable bearing capacity for the proposed structure. Should ground improvement prove unsuitable, then a piled foundation solution is recommended Ground Floor Construction – In the absence of the very soft and soft cohesive deposits and where the ground floor slab of the proposed building is underlain by medium dense granular deposits, firm to stiff



	cohesive deposits or a suitable thickness of engineered fill. A lightly loaded ground bearing floor slab could be utilised. Earthworks – Any earthworks should be carried out in accordance with the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Series 600 Earthworks. Roads, Pavements and Hardstanding Surfaces – It is recommended that a CBR value of <1% is adopted for the soft and firm low strength materials. A CBR value of 2.5% should be adopted for the firm medium strength material and the granular material. A higher CBR value of 5% should be adopted for the stiff high strength material. Excavations – The stability of the made ground and underlying natural ground is likely to be poor. Obstructions – Based on the history of the site, the presence of significant sub-surface obstructions, e.g. relic foundations, services should be expected locally in the previously developed parts of the site. Chemical Attack on Buried Concrete – It is recommended that concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-1 and ACEC Class AC-2z.
Environmental Risk Assessment	Based on the identified potential sources of contamination and available pathways and receptors, the following potential linkage assessments have been considered. This assessment is based on current site conditions (unless stated) and does not consider exposure pathways following any remediation of the site. Construction and Maintenance Workers - There is a potential risk to development and maintenance workers of exposure to hazardous ground gases. Future Site End Users - There is a potential risk to site end users from exposure to hazardous ground gases. Mitigation Measures - In order to mitigate the risks posed by the potential contaminants which are present on the site, consideration should be given to the following measures: Construction and Maintenance Workers - Site workers involved in groundworks should take the necessary measures to ensure that all works in excavations and confined spaces are carried out in accordance with best practice in order to prevent exposure to potentially hazardous gases. Site workers involved in groundworks should use appropriate PPE, i.e. overalls and gloves and where appropriate facemasks. Appropriate health and safety measures, e.g. washing hands prior to eating or drinking, should also be enforced. During redevelopment of the site, all workers should remain vigilant to the possible risk of encountering areas of potentially contaminated material. Should potentially contaminated material be encountered, site management should be informed. Further testing may then be required to assess the risk to health and safety of the site workers and the environment. Future Site Users – It is understood that consideration is being given to ground improvement using vibro-stone columns. Therefore, in order to mitigate the potential risk from hazardous ground gases, it is recommended that gas protection measures in accordance with Characteristic Situation 2 are incorporated into the development.
Hazardous Gas	If proposed excavations or ground improvement works, i.e. stone columns do not intercept the underlying granular deposits then no gas protection measures would be required, i.e. Characteristic Situation 1. However, it is understood that consideration is being given to ground improvement using vibro-stone columns which are likely to intercept the underlying gravel band. Therefore, in order to mitigate the potential risk from hazardous ground gases, it is recommended that gas protection measures in accordance with Characteristic Situation 2 are incorporated into the development.
This sheet is intended as a summary only of the assessment of the site in relation to ground condition. It does not provide a definitive engineering analysis.	



1.0 INTRODUCTION

1.1 Instruction

JPG (Leeds) Limited (JPG) have been instructed by Caddick Developments Limited to carry out a geoenvironmental desk study and ground investigation for a proposed commercial development at land off Knowsley Lane, Knowsley Business Park, Liverpool.

1.2 Objectives

The main objective of the geoenvironmental desk study and ground investigation is to identify potential geotechnical and environmental issues that may represent constraints to the proposed redevelopment of the site.

1.3 Scope of Works

The scope of works for the desk study included the following:

- Site inspection and description.
- Review of any previous reports provided.
- Review of contemporary and historical Ordnance Survey publications.
- Consultations with regulatory authorities where appropriate.
- Review of geological publications (including hydrology, hydrogeology and soil survey publications where appropriate).
- Obtain a Coal Authority Mining Report, if required.
- Review of the radon status of the site.
- An environmental database search; and,
- Outline environmental risk assessment.

The scope of the investigation included the following works:

- A description of the ground investigation works carried out, i.e. factual reporting.

Interpretative reporting, including:

- Assessment of potential contaminants using generic assessment criteria specific to the proposed end use.
- A qualitative (Tier 1) screening assessment using source-pathway-receptor linkages.
- An assessment of the classification of materials for disposal off-site (not including WAC testing).
- Engineering assessment to include recommendations with respect to foundations, ground floor and pavement design.



- Comments on the likely requirements for remedial measures on the site, to address potential contamination or ground gas issues.
- Recommendations for further work where appropriate; and,
- Presentation of the findings in a tabular non-technical summary.

1.4 Location

The site is located at Tingle Peg Farm, approximately 0.90km to the north of Knowsley town centre. The site is situated south of the A580 East Lancashire Road, east of Ormskirk Road and west of the B5202 Knowsley Lane. The approximate centre of the site is located at NGR 343757, 396696. A site location plan is provided as Figure 1 in Appendix A.

1.5 Site Description and Topography

The site is an irregular shape and covers an area of approximately 6.42ha. Access to the site is gained from the west off Ormskirk Road via a driveway, or from the east off Knowsley Lane via a dirt track.

The site comprises Tingle Peg Farm and open fields. The farm comprises a 2-storey house of brick construction with an extension, a single storey outhouse and a metal constructed barn house. Gooring's Plantation oriented east to west is located in the northern part of the site. Between the plantation and the northern boundary, the site is heavily overgrown with brambles.

Most of the site boundaries are formed by a wooden post and rail fence.

Beyond the site to the north is the A580 East Lancashire Road, with Knowsley Brook beyond.

Beyond the site to the east is the B5202 Knowsley Lane, with open fields beyond.

There is a roundabout immediately beyond the southern tip of the site, beyond which are open fields.

Beyond the site to the west is Ormskirk Road, with a commercial development, including News Printers Knowsley beyond.

The site is relatively flat, lying at an approximate elevation of between 39.0m and 43.0m AOD. The site typically falls from the northeast towards the northwest and southwest.

An aerial photograph of the site is presented as Figure 2 in Appendix A and selected photographs of the site are provided in Appendix B.



1.6 Development Proposals

It is proposed to construct three commercial units with internal office space, external car parking and service yards. A preliminary proposed site plan has been provided showing the development, this is referenced below, and a copy is provided in Appendix A.

- Fletcher Rae Architects. Proposed Site Plan. Knowsley Lane, Knowsley. Drawing No. 19011-FRA-AV-XX-DR-A-90-1001-P9. Dated May 2022, for Caddick Developments Limited.

The scope of the ground investigation was designed based on a previous proposed layout. This is referenced below, and a copy is also provided in Appendix A.

- Fletcher Rae Architects. Proposed Site Plan Option 4. Knowsley Lane, Knowsley. Drawing No. PR1171_SK10, dated February 2019 for Caddick Developments.

1.9 Limitations

The general limitations to the nature of the investigation are outlined in Appendix I.

It should be noted that access was not possible to the northern part of the site due to the presence of Gooring's Plantation and the overgrown brambles.



2.0 SITE HISTORY

Historical plans for the site were obtained from GroundSure (GS). These have been reviewed in order to establish any former uses of the site and identify any potentially contaminative historical uses, or potential geotechnical constraints to the proposed development.

A summary of the relevant map information is presented in Table 2.0 and copies of relevant plans are presented in Appendix C.

Table 2.0 – Summary of Relevant Historical Map Information

Date(s) & Scale	Feature
1867: 1:2,500	No features are shown on the site. Great Horn House is shown approximately 200m to the north west of the site.
1891-92 1:10,560 & 1893 1:2,500	Tingle Peg Farm is shown in the approximate centre of the site and Goring's Plantation, oriented east to west is shown in the northern part of the site. The northern part of Caddick's Wood and a small pond are shown in the south east part of the site. A rectangular building is shown between the wood and the farm. The remainder of the site comprises open fields. Hewitts Pits (woodland) is shown 50m to the north of the site. Scarsbrick Quarry Pond is shown 450m to the north of the site. Knowsley Water Works is shown 250m to the north of the site. Strawberry Lodge is shown adjacent to the northwestern boundary of the site. An old sand pit is shown 225m to the southwest of the site. Great Horn House is shown 200m to the northwest of the site. Several ponds are shown within 250m of the site in all directions. Roads are shown adjacent to the eastern and western boundaries of the site.
1906-07 1:10,560 & 1908 1:2,500	A building is shown in the northeast of the site. The Scarsbrick Quarry to the north is now shown as disused. The old sand pit to the southwest of the site is no longer shown. Ponds within 175m of the eastern boundary of the site are no longer shown.
1925 1:10,560 & 1927 1:2,500	No significant changes are shown on or beyond the site.
1937 1:2,500 & 1938 1:10,560	No significant changes are shown on the site. East Lancashire Road is shown adjacent to the northern boundary of the site, trending east to west. Two roundabouts are shown 100m beyond the northeastern and northwestern corners of the site. The road adjacent to the eastern boundary of the site is shown as Knowsley Lane (B5202).
1955-56 1:10,560 & 1959-60 1:2,500	The rectangular building between the wood and the farm and the building in the northeast of the site are no longer shown. The pond adjacent to the southeastern boundary is also no longer shown. The road adjacent to the western boundary of the site is shown as Ormskirk Road. Houses are shown immediately beyond the site to the west.
1965-66 1:10,560	No significant changes are shown on the site. A works is shown 500m north of the site. The Knowsley Water Works (to the north of the site) is now shown as a works. A works and dismantled tramway are shown 150m to the northwest of the site.
1977 1:1,250 & 1978-80 1:10,000	No significant changes are shown on the site. A gas valve compound is shown 25m to the northwest of the site Knowsley Brook is shown 120m to the north of the site. The works shown 500m north of the site is now shown as an Electrical Sub Station. The houses to the west of the site are no longer shown, this area is now shown as Knowsley Industrial Estate.
1988 1:10,000	No significant changes are shown on the site. A roundabout is shown adjacent to the southern boundary of the site. Buildings associated with Knowsley Industrial Estate are shown 750m to the west of the site.
1991 1:2,500	No significant changes are shown on the site. A car park and building associated with Knowsley Industrial Estate are shown 200m to the west of the site.
2002 1:10,000	No significant changes are shown on the site. The works shown 260m north of the site is now shown as a Water Works. Knowsley Industrial Estate to the west is now shown as Knowsley Business Park. The collection of warehouses and works to the northwest of the site are now shown as part of Knowsley Industrial Park.
2010 1:10,000	No significant changes are shown on or beyond the site.
2014 1:10,000	No significant changes are shown on or beyond the site.



3.0 SITE SETTING

3.1 Geology

The GroundSure (GS) report and the following British Geological Survey (BGS) publications have been consulted:

- British Geological Survey (BGS), Sheet 84, Wigan at 1:50,000 Scale, Solid Edition, dated 1977.
- BGS, Sheet 84, Wigan at 1:63,300 Scale, Drift Edition, dated 1970.
- BGS, Lancashire Sheet 100 SW at 1:6-inch Scale, Solid and Drift Edition, dated 1909.

No made ground is shown to be present on the site. However, based on observations made during the site visit and discussions with the farmer, made ground is anticipated to be present across the site.

The site is shown to be underlain by superficial deposits comprising the Shirdley Hill Sand. This is described as a fine-grained sand, divisible into an upper 'white' sand and a lower 'brown' sand, with peat layers in the lower part. The soils on the site are described as 'dark sandy loam soils', as shown on the Lancashire 100 SW map.

The underlying bedrock is shown to comprise the Chester Formation (sandstone). The Chester Formation is a subdivision of the Sherwood Sandstone Group.

The nearest fault is located approximately 950m east of the site, this is oriented north to south and is shown to downthrow towards the west.

Historical borehole information has been obtained from the BGS. There are several borehole records within 250m of the site. Three of these are summarised in Table 3.1 below.

Table 3.1 – Summary of Historical Borehole

Borehole Log	Distance & Direction	Depth (m bgl)	Strata Summary
Holst & Co. Ltd SJ49NW151	60m SW	Surface-0.15	Topsoil.
		0.15-2.00	Brown slightly organic sand with bands of grey silty clay.
		2.00-6.10	Stiff red/brown boulder clay.
Ian Farmers Associates BH1	100m W	Surface-1.20	MADE GROUND: Scrub over firm brown sandy gravelly clay with sand bands.
		1.20-2.90	MADE GROUND: Loose brown clayey gravelly fine to coarse sand with clay pockets.
		2.90-5.60	Very weak red brown fine to coarse grained sandstone, recovered as clayey sandy gravel.
		5.60-6.06	Moderately weak red brown fine to coarse grained sandstone, recovered as sandy gravel size fragments.
H.B. Boring & Company Ltd RC4	250m NW	Surface-0.20	Topsoil.
		0.20-0.80	Red Sandstone.
		0.80-5.30	(Cored) Very weak very poorly cemented red/brown fine-grained sandstone.

A copy of the historical exploratory borehole logs are provided in Appendix D.



3.2 Coal Mining

The site is not located within a coal mining reporting area.

3.3 Hydrogeology

The Shirdley Hill Sand deposits underlying the site are classified as a Secondary A Aquifer. These are described as 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.'

The underlying bedrock is classified as a Principal Aquifer, these are described as 'Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale'.

There is one active groundwater abstraction licence within 1km of the site. The abstraction is for a potable water supply and is located 241m to the northeast of the site.

The northern and central parts of the site lie within a groundwater source protection zone 2 (Outer Catchment) and the southern part of the site lies within a groundwater source protection zone 3 (Total Catchment).

3.4 Hydrology

An inland river is located in the northern part of the site in Goorling's Plantation. Knowsley Brook is located approximately 120m to the north of the site.

There are two active discharge consents to controlled waters within 500m of the site. These are summarised in Table 3.4 below.

Table 3.4 – Summary of Active Discharge Consent, within 500m of the site

Distance and direction	Address	Effluent Type	Permit No	Receiving Water
135m, NW	Kirkby 132KV Substation Outfall, 2 Mollys Lane, Kirkby, Liverpool, L33 7TT	Miscellaneous Discharges – Surface Water	016997076 V1	Unnamed Tributary of Knowsley Brook
376, NE	Delph Cottage, Hewitts lane, Kirby	Sewage Discharges – Final/Treated Effluent	016991249 V1	Knowsley Brook

There are no active surface water abstraction licences within 2km of the site.

Information on the EA website as presented in the GS report indicates that the site lies within a Zone 1 floodplain.

The site is classified as having a very low risk of Flooding from Rivers and the Sea (RoFRaS), i.e. less than 1 in 1000 chance of flooding in any given year.



3.5 Pollution Incidents

There are no recorded Environment Agency List 1 or List 2 pollution incidents within 500m of the site.

3.6 Landfill and Waste

The GS report includes information on active and historical landfill sites supplied by the Environment Agency, BGS, DoE, Local Authority and historical mapping.

There are no active or historical landfill sites recorded within 500m of the site.

There are no operation waste treatment, transfer or disposal sites within 500m of the study site.

3.7 Environmental Permits, Incidents and Registers

There are no records of any historic Integrated Pollution Control (IPC) authorisations within 500m of the site.

There are no records of any active Part A(1) or Integrated Pollution Prevention Control (IPPC) authorised activities within 500m of the site.

There are no records of any active Part A(2) permitted activities (potential to cause air pollution) within 500m of the site.

There are no records of any active Part B permitted activities within 500m of the site.

There are no recorded Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the site.

There are no Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the site.

There are no records of any active List 1 or List 2 Dangerous Substances Inventory Sites within 500m of the site.

There are no current records of Category 3 or 4 Radioactive Substances Licences within 500m of the site.

There are no active recorded Control of Major Accidents Hazard (COMAH) within 500m of the site.

There are no active recorded Notification of Installations Handling Hazardous Substances (NIHHS) site within 500m of the site.

There are no sites determined as contaminated Land under Part IIA EPA 1990 within 500m of the site.



3.8 Radon Risks

The site is not in a radon affected area, as less than 1% of properties are above the action level. Therefore, no radon gas protective measures will be required.

3.9 Additional Information

There was one historical petrol station located 86m northwest of the site.

The tenant farmer informed JPG that up to 1.00m of sand was removed from the site and that topsoil was imported to enable farming to be undertaken on the site.

The Kirkby – Lister Drive 1 high voltage underground electricity transmission cable (275kV) runs beneath the site. It follows the northern boundary and exits via the northeastern corner of the site.

3.10 Previous Reports

No previous reports for the site have been made available for review.



4.0 ENVIRONMENTAL RISK ASSESSMENT

4.1 Introduction

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. Within the context of current UK legislation i.e. Part 2A of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995, the interpretation of a "significant risk" is termed to be one where:

- Significant harm is being caused, or there is a significant possibility of such harm being caused, (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and/or
- Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm to occur requires three conditions to be satisfied:

- Presence of substances (potential contaminants/pollutants) that may cause harm (Sources).
- The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora (Receptors); and,
- The existence of a linkage between the Source and the Receptor (The Pathway).

In order to assess the contamination risk at the site, the above rationale has been applied and is discussed in the context of Contamination Sources and Potential Pollutant Linkages.

4.2 Potential Sources

As summary of the site history is provided below:

- The early historical plans show Tingle Peg Farm in the approximate centre of the site and Gooring's Plantation, oriented east to west is shown in the northern part of the site. The northern part of Caddick's Wood and a small pond are shown in the south east part of the site. A rectangular building is shown between the wood and the farm. The remainder of the site comprises open fields. Later plans show a small building in the northeast of the site.
- The rectangular building, the small building in the north east of the site and the pond adjacent to the south east boundary of the site are no longer shown on the plans dating from the 1950's.
- No further changes are shown up to the present day.



Based on the history of the site, the following potential sources of contamination may be present:

- Made ground associated with existing and former structures, i.e. buildings and the backfilled pond.
- Hazardous gases associated with the made ground.

Potential contaminants, associated with the above sources which could be present on the site are summarised below:

- Metals, metalloids and their compounds.
- Inorganic compounds, e.g. arsenic.
- Organic compounds, e.g. Poly Aromatic Hydrocarbons (PAH).
- Asbestos.
- Hazardous ground gases/soil vapours; and,
- Organochlorine pesticides, organophosphorus pesticides and triazine herbicides.



5.0 FIELDWORK

The intrusive investigation was designed to provide information on the general ground, groundwater and hazardous gas conditions at the site.

Trial pits were advanced to target specific site features (i.e. buildings and the backfilled pond) and to provide general site coverage. Cable percussive boreholes were targeted at the locations of the proposed units.

Gas and groundwater monitoring wells were installed in the cable percussive boreholes in order to assess the ground gas and groundwater regime in the natural ground beneath the site.

The rationale behind each exploratory location is summarised in Table 5.1 below.

Table 5.1 – Exploratory Hole Rationale

Potential Issue	Exploratory Holes
General coverage to assess ground conditions.	TP101 to TP108 and TP111 to TP120
Trial Pit to target the building once present in the centre of the site.	TP109
Trial Pit to target the infilled pond adjacent to the eastern boundary of the site.	TP110
Exploratory holes targeted at the locations of the proposed units.	BH101 to BH107

The fieldwork was carried out between the 23 April and 26 April 2019. The works undertaken are summarised in Table 5.2 below.

Table 5.2 – Summary of Ground Investigation Works

Investigation Method	No of Positions	Maximum Depth (m bgl)	Monitoring Wells	Monitoring
Trial Pits	20 (TP101 to TP120)	3.10	-	-
Cable Percussion Boreholes	7 (BH101 to BH107)	7.55	7 x 50mm	GG, WL

bgl – below ground level

GG – ground gas monitoring (methane, carbon dioxide, oxygen, hydrogen sulphide, gas flow and atmospheric pressure using a portable gas meter)

WL – standing groundwater level using an electric contact dip meter

The ground investigation has been undertaken in general accordance with the techniques outlined in BS5930: 2015 Code of Practice for Site Investigations at the positions shown on the Exploratory Hole Location Plan, which is presented as Figure 3 in Appendix A.

The investigation was carried out under the full-time supervision of an engineer from JPG. The Exploratory Hole Logs are contained in Appendix E.

Exploratory hole locations were surveyed using Leica GPS equipment (accuracy +/- 10mm). The surveyed positions were then transferred onto the survey drawing.



6.0 LABORATORY TESTING

6.1 Chemical Analysis

The chemical analysis suite was designed to:

- Characterise near surface contamination levels to provide an assessment of the risks associated with direct contact with soils onsite in its current state;
- Provide information on the general contamination concentrations in the various strata across the site; and,
- Provide information on the solubility of contaminants and therefore the potential for impact on controlled waters.

Chemical testing was carried out for the following determinands by Derwentside Environmental Testing Services Limited (DETS) in County Durham. Chemical analysis certificates are presented in Appendix F.

Soils – General

Selected samples of soil were analysed for the following contaminants on a total concentration basis:

Arsenic	Mercury	Copper
Cadmium	Lead	Nickel
Chromium	Zinc	Selenium
Cyanide (free)	Phenol	
Speciated Poly Aromatic Hydrocarbons (PAHs)		
Soil Organic Matter		
Sulphate (water soluble) and pH		
Asbestos Screen/Quantification		

In addition, selected samples were submitted for the following analysis:

- Hexavalent chromium, total chloride, total sulphate, total sulphide and ammoniacal nitrogen; and,
- Organochlorine pesticides, organophosphorus pesticides and triazine herbicides.

Waters – General

Selected samples of soil leachate and groundwater were analysed for the following contaminants:

Arsenic	Mercury	Copper
Cadmium	Lead	Nickel
Chromium	Zinc	Selenium
Cyanide (free)	Phenol	
Speciated Poly Aromatic Hydrocarbons (PAH)		
Sulphate and pH		



6.2 Geotechnical Testing

In situ standard penetration tests (SPT) were performed within all the boreholes. The results are presented on the exploratory hole logs provided in Appendix G.

Laboratory geotechnical testing was carried out by Professional Soils Laboratory (PSL) in Doncaster, in order to determine the physical characteristics of the substrata and comprised the following:

- Moisture content and Atterberg Limits testing to classify the materials.
- Particle size distribution to confirm the field descriptions of the soils encountered.
- Compaction testing (2.5kg and 4.5kg) and particle density to assess the compaction properties of the soils.
- California Bearing Ratio (CBR) tests (2.5kg, unsoaked) to determine the bearing characteristics of the material; and,
- Water extract soluble sulphate and pH.

The geotechnical testing was carried out in accordance with BS1377:1990, "*Methods of Test for Soils for Civil Engineering Purposes*". The results of the geotechnical testing are contained in Appendix G.



7.0 GROUND AND GROUNDWATER CONDITIONS

7.1 Introduction

The ground conditions encountered during the investigation was consistent with the anticipated sequence of strata indicated by the desk study information.

7.2 Ground Conditions

Ground conditions typically comprise made ground of topsoil and subsoil to a maximum depth of 0.80m.

The made ground is underlain by superficial deposits comprising loose to medium dense orange-brown and brown fine to coarse sand (Shirdley Hill Sand Deposits) and very soft to stiff, very low to high strength brown, grey, reddish brown and purplish brown sandy gravelly clay. The base of the superficial deposits was confirmed to depths of between 3.00 and 7.00m bgl.

The underlying bedrock (Chester Formation) was recovered as medium dense and very dense reddish brown slightly clayey medium to coarse sand.

A detailed description of the ground conditions encountered is provided below.

Made Ground

Made ground was recorded in all exploratory hole locations. The base of the made ground was confirmed in all exploratory locations to depths of between 0.40m (BH104, BH105 and TP104) and 0.80m (BH103, BH106 and TP101).

A summary of the made ground which was encountered is provided below:

- Topsoil was encountered at every exploratory hole location and comprised grey-brown and brown slightly silty fine to coarse sand with rootlets from the surface to a maximum depth of 0.60m (TP116).
- Subsoil was encountered at every exploratory hole location, apart from TP103, TP115 and TP116, and was found to comprise brown and orangish brown slightly silty fine to coarse sand with rootlets to a maximum depth of 0.80m (BH103 and TP101).

Natural Strata

The underlying superficial deposits were found to comprise the following:

- Loose to medium dense brown fine to coarse sand (BH101, BH102, BH104, BH105, TP103, TP114 to TP116, TP119 and TP120) to depths of between 0.70m (TP103) and 2.20m (BH101).
- Very soft (very low strength) to firm (low strength) brown, grey-brown, reddish brown and purplish brown slightly gravelly sandy clay with cobbles (BH101, BH103 to BH106, TP104 to TP106, TP110, TP111, TP113, TP116, TP118 and TP119) to depths of between 1.50m (TP106) and 4.70m (BH101). The granular constituents comprised sandstone and mudstone.



- Firm (medium strength) to stiff (high strength) brown, grey-brown, reddish brown and purplish brown slightly gravelly sandy clay with cobbles was encountered at every exploratory hole location (except BH105) to depths of between 1.50m (TP118) and 5.00m (BH101 and BH104). The granular constituents comprised sandstone and mudstone.
- Brown and reddish brown slightly gravelly clayey fine to coarse sand with occasional clay lenses was encountered in TP101 to a depth of 2.20m. The granular constituents comprised sandstone and mudstone.
- Brown and reddish brown slightly gravelly clayey fine to coarse sand, occasionally interbedded with slightly gravelly sandy clay (TP103, TP106, TP114, TP117, TP118 and TP120) to depths of between 2.75m (TP118) and 3.10m (TP114). The granular constituents comprised sandstone and mudstone.
- Medium dense to very dense brown sand and gravel was encountered in BH104 to a depth of 6.30m. The granular constituents comprised sandstone and mudstone.
- Firm (medium strength) brown slightly gravelly sandy clay was encountered in BH104 to a depth of 7.00m. The granular constituents comprised sandstone and mudstone.

The medium dense to very dense reddish-brown medium to coarse sand which was encountered in the base of the cable percussive boreholes at depths of between 3.00m (BH102) and 7.00m (BH104) is considered to comprise weathered sandstone of the Chester Formation.

No hydrocarbon odours were noted during the investigation.

The results of the in-situ penetration testing for the superficial deposits and the underlying bedrock which were carried out in the cable percussive boreholes have been plotted against level (m AOD). The results have been corrected in accordance with the energy ratio of the testing equipment.

The plot (which excludes bedrock) is presented as Figure 4 in Appendix A. The SPT data (uncorrected) is included on the exploratory hole logs contained in Appendix E.

There is a correlation of increasing strength/density with depth in the natural strata.

Geological cross-sections through the site are presented as Subsurface Sections A-A' to D-D' in Appendix A.

7.3 Laboratory Testing

In total, 17 samples of natural ground were submitted for geotechnical testing.



All the samples were submitted for moisture content testing and nine samples were submitted for Atterberg Limit testing. The results are summarised in Table 7.3.1 below:

Table 7.3.1 – Summary of Moisture Content and Atterberg Limit Testing

Material	Moisture Content (%)		Atterberg Limits Modified Plasticity Index (%)	
	No of samples	Range	No of samples	Range
Natural ground - Sand	2	11 & 12	-	-
Natural ground – Clay	15	14 to 22	9	11.05 to 19.60

The reported plasticity indices have been modified based on the percentage of particles smaller than 425µm. The results indicate that the natural ground can be classified as being of low plasticity. The results indicate a low potential for volume change.

Particle size distribution testing was carried out on eight samples in order to confirm the field descriptions of the materials. The results are summarised in Table 7.3.2 below.

Table 7.3.2 - Summary of Particle Size Distribution Testing

Exp. Hole	Depth (m bgl)	Material	Gravel (%)	Sand (%)	Silt/Clay (%)
TP102	0.70	Firm medium strength grey brown slightly gravelly sandy CLAY.	2	42	56
TP104	1.20	Firm low strength brown slightly gravelly sandy CLAY.	3	23	74
TP109	0.70	Stiff high strength brown grey slightly gravelly sandy CLAY.	5	52	43
TP110	1.50	Soft low strength purplish brown slightly sandy CLAY.	2	17	81
TP112	0.80	Stiff high strength brown slightly gravelly slightly sandy CLAY.	5	33	62
TP114	1.10	Light brown medium to coarse SAND.	0	98	2
TP116	0.75	Light brown medium to coarse SAND.	0	98	2
TP118	1.15	Soft low strength grey slightly gravelly very sandy CLAY.	1	26	73



Five samples, comprising four of cohesive natural ground and one of granular natural ground were submitted for dry density/moisture content relationship testing using both the 2.5kg and 4.5kg rammers. The results are summarised in Table 7.3.3 below.

Table 7.3.3 - Summary of Compaction Test Results

Exp. Hole	Depth (m bgl)	Material	Weight of Rammer	Natural Moisture Content (NMC)	Max. Dry Density (Mg/m³)	Optimum Moisture Content (OMC)	Suitability for Compaction and Range of Acceptable Moisture Contents*
TP102	0.70	Firm medium strength grey brown slightly gravelly sandy CLAY.	2.5kg	16	1.85	13	Suitable, 13.0-17.5%
			4.5kg	16	2.02	9	Unsuitable, too wet, 9.0-13.0%
TP104	1.20	Firm low strength brown slightly gravelly sandy CLAY.	2.5kg	19	1.88	13	Unsuitable, too wet, 12.5-18.0%
			4.5kg	19	2.02	10	Unsuitable, too wet, 9.0-14.0%
TP110	1.50	Soft low strength purplish brown slightly sandy CLAY.	2.5kg	19	1.83	13	Unsuitable, too wet, 13.5-18.0%
			4.5kg	19	2.00	10	Unsuitable, too wet, 9.0-13.5%
TP112	0.80	Stiff high strength brown slightly gravelly slightly sandy CLAY.	2.5kg	15	1.87	13	Suitable, 12.5-17.5%
			4.5kg	15	2.02	10	Unsuitable, too wet, 9.0-13.5%
TP114	1.10	Light brown medium to coarse SAND.	2.5kg	11	1.84	9	Suitable, 9.0-14.0%
			4.5kg	11	1.95	7	Suitable, 6.0-11.0%

* To achieve >95% of maximum dry density and <5% air voids

Based on the above results, the stiff clay and some of the firm clay can achieve suitable compaction under light compactive effort. However, under heavier compactive effort, all the cohesive material is too wet to achieve suitable compaction.

Suitable compaction could be achieved with the granular material under both light and heavy compactive effort.

California Bearing Ratio (CBR) tests were carried out on five samples, comprising four of cohesive natural ground and one of granular natural ground. The results are summarised in Table 7.3.4 below.

Table 7.3.4 – Summary of CBR Value Tests

Sample	Material	As Received Moisture Content (%)	CBR Value (%)		
			Sample Top	Sample Bottom	CBR Average
TP102 0.70m	Firm medium strength grey brown slightly gravelly sandy CLAY	16	2.2	2.7	N/A
TP104 1.20m	Firm low strength brown slightly gravelly sandy CLAY.	19	0.2	0.2	0.2
TP109 0.70m	Stiff high strength brown grey slightly gravelly sandy CLAY.	17	8.8	12.0	N/A
TP116 0.75m	Light brown medium to coarse SAND.	12	1.9	2.4	N/A
TP118 1.15m	Soft low strength grey slightly gravelly very sandy CLAY.	19	0.4	0.3	N/A

* To report a CBR average, the results for the top and base must be within 10%.

The results of the CBR testing are variable and range between 0.2% and 12.0%.



CBR values of between 0.2% and 0.4% were obtained in the soft to firm low strength cohesive natural ground and CBR values of between 2.2% and 2.7% were obtained in the firm medium strength cohesive natural ground. CBR values of between 8.8% and 12.0% were obtained in the stiff high strength cohesive natural ground.

CBR values of between 1.9% and 2.4% were recorded in the granular natural ground.

7.4 Groundwater

During the investigation, water strikes, perched water and running sand were encountered in several exploratory holes. These are summarised in Table 7.4.1 below.

Table 7.4.1 – Summary Groundwater Levels encountered During Site Works

Exp. Hole	Groundwater Encountered
BH101	Water strike at 4.90m, no rise recorded.
TP101	Perched water encountered at 1.70m.
TP102	Perched water encountered at 2.20m.
TP103	Perched water encountered at 2.20m.
TP104	Perched water and running sand were encountered within sand lenses at 1.50m.
TP105	Perched water and running sand were encountered within sand lenses at 1.20m.
TP106	Perched water and running sand were encountered within sand lenses at 2.00m.
TP110	Perched water and running sand were encountered within sand lenses at 1.10m.
TP115	Perched water and running sand were encountered within sand lenses at 1.80m.
TP117	Perched water and running sand were encountered within sand lenses at 1.40m.
TP119	Perched water and running sand were encountered within sand lenses at 1.10m.
TP120	Perched water and running sand were encountered within sand lenses at 1.60m.

Gas and groundwater monitoring wells were installed in all the cable percussive boreholes. A summary of the monitored groundwater levels is presented in Table 7.4.2 below.

Table 7.4.2 – Summary of Monitored Groundwater Levels

Location	Water level during monitoring (m bgl)					
	3.05.2019	8.05.2019	15.05.2019	28/05/2019	13/06/2019	18/06/2019
BH101	1.95	1.78	1.78	1.87	1.80	1.55
BH102	1.52	1.46	1.43	1.48	1.31	DRY
BH103	1.30	1.33	1.42	1.55	0.90	1.17
BH104	6.70	6.80	6.83	DRY	DRY	DRY
BH105	0.90	0.80	0.95	0.98	0.66	0.76
BH106	3.29	3.30	3.33	3.30	2.43	3.20
BH107	3.28	3.40	3.34	DRY	0.81	0.97

Seven monitoring wells were installed and sealed within the natural ground.

Groundwater monitoring has been carried out on six occasions. Groundwater levels in BH101 to BH106 remained fairly consistent throughout the monitoring period.



However, in BH107, a significant rise in groundwater level was recorded during the fifth visit. The rise in groundwater level may be due to the heavy rain which fell between visits four and five.

It should be noted that the groundwater conditions recorded are based on observations made at the time that site work was carried out. Groundwater levels are likely to vary owing to seasonal and weather-related effects.

7.5 Ground Gas

Ground gas monitoring has been undertaken on six occasions. The works were carried out using a portable gas meter in accordance with the standard JPG methodology and included measurements of methane, carbon dioxide, oxygen, hydrogen sulphide, carbon monoxide, gas flows and atmospheric pressure. The results of the gas monitoring are presented in Appendix H and discussed in Section 9 of this report.



8.0 GEOTECHNICAL AND ENGINEERING ASSESSMENT

8.1 Development Proposals

It is proposed to construct six commercial units with internal office space, external car parking and service yards. A preliminary proposed site plan has been provided showing the development, this is referenced below, and a copy is provided in Appendix A.

- Fletcher Rae Architects. Proposed Site Plan. Knowsley Lane, Knowsley. Drawing No. 19011-FRA-AV-XX-DR-A-90-1001-P9. Dated May 2022, for Caddick Developments Limited.

8.2 Foundations

Ground conditions typically comprise made ground of topsoil and subsoil to a maximum depth of 0.80m.

The made ground is underlain by superficial deposits comprising loose to medium dense orange-brown and brown fine to coarse sand (Shirdley Hill Sand Deposits) and very soft to stiff, very low to high strength brown, grey, reddish brown and purplish brown sandy gravelly clay. The base of the superficial deposits was confirmed to depths of between 3.00 and 7.00m bgl.

The underlying bedrock (Chester Formation) was recovered as medium dense and very dense reddish brown slightly clayey medium to coarse sand.

The selection of foundation type will be largely governed by the thickness of any made ground and the nature of the underlying natural strata.

The made ground and zones of very soft and soft material within the superficial deposits are unsuitable for the support of structural loads due to variations in material properties. If shallow spread foundations were to be placed within or within influencing depth of these materials then they would become over-stressed, leading to failure and significant settlements.

It is therefore recommended that foundation loads are transferred to deeper natural strata of suitable bearing capacity.

Where the unsuitable materials are absent or are present at shallow depth (i.e. above founding depth) and where the underlying natural strata comprises medium dense granular deposits an allowable bearing capacity of 125kN/m² for total settlements of less than 25mm will be available. Under the same circumstances, and where the underlying natural strata comprises firm medium strength cohesive deposits an allowable bearing capacity of 100kN/m² for total settlements of less than 25mm will be available.



If foundations were to be sited partly in the firm/stiff clay and partly in the medium dense/dense sand, then this could lead to differential settlements which could affect the serviceability of the buildings. It is therefore recommended that foundations are locally over deepened in order to provide a uniform formation.

In areas of proposed cut, consideration could be given to siting spread foundations within the underlying weathered bedrock. In this material an allowable bearing capacity of 300kN/m² for total settlements of less than 25mm will be available.

The allowable bearing capacity is a function of the foundation configuration, depth and the ability of the structure to tolerate such movements and should therefore be validated during detailed design.

Alternatively, the shallow natural ground could be subject to some form of ground improvement in order to increase the allowable bearing capacity for the proposed structure.

The advice of a specialist contractor will be required to confirm that ground conditions are suitable ground improvement techniques, and that adequate bearing values and tolerable settlements can be achieved. The stability of any proposed column should be assessed with respect to the risk of loss of lateral support from the softer materials.

Should ground improvement prove unsuitable, then a piled foundation solution is recommended.

The carrying capacity of piles depends on their size, the ground conditions and on their method of installation. Pile design and installation is an evolving process for contractors. It is recommended that specialist piling contractors are consulted as to the suitability and carrying capacity of their piles for the ground conditions on site.

8.3 Ground Floor Construction

In the absence of the very soft and soft cohesive deposits and where the ground floor slab of the proposed building is underlain by medium dense granular deposits, firm to stiff cohesive deposits or a suitable thickness of engineered fill. A lightly loaded ground bearing floor slab could be utilised.

Where the ground floor slab is underlain by, or within influencing depth of, very soft and soft superficial deposits. Some ground improvement, e.g. vibro-stone columns, will be required in order to enable the use of a ground-bearing floor slab.

The advice of a specialist contractor will be required to confirm that ground conditions are suitable ground improvement techniques, and that adequate bearing values and tolerable settlements can be achieved for the proposed ground floor slab.



8.4 Earthworks

Any earthworks should be carried out in accordance with the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Series 600 Earthworks.

The formation level should be proof rolled and inspected. Any soft or loose material should be removed and replaced with suitably compacted granular materials.

Based on the results of the compaction testing, the natural granular materials should be suitable for compaction to achieve >95% of the maximum dry density and <5% air voids. Proper selection and control will be required as part of the works to use these materials.

The natural cohesive materials are considered to be too wet to achieve adequate compaction. Consideration should be given to the addition of lime and/or cement to improve these materials for use as general fill.

The following document provides guidance on the suitability of materials for improvement or stabilisation and should be consulted.

- The Highways Agency Design Manual for Roads and Bridges, Advice Note HA 74/07, Volume 4, Section 1, Part 6, 'Treatment of Fill and Capping Materials Using Either Lime or Cement or Both' (HA74/07).

Placed materials should not be allowed to deteriorate during excavation and compaction and must be sufficiently protected from traffic and adverse weather conditions after placement.

8.5 Roads, Pavements and Hardstanding Surfaces

Based on the results of the laboratory CBR testing, it is recommended that a CBR value of <1% is adopted for the soft and firm low strength materials.

A CBR value of 2.5% should be adopted for the firm medium strength material and the granular material.

A higher CBR value of 5% should be adopted for the stiff high strength material.

Prior to roads and hardstanding being formed, the formation should be proof rolled and any soft or loose materials should be removed and replaced with well compacted suitable granular materials. Any substructure remains should be "grubbed out" to a minimum depth of 500mm below the underside of formation to prevent hard spots from forming.

Where soft and firm low strength materials are present to a depth where they cannot practically be removed, then consideration should be given to thickening the road construction and incorporating a geogrid into the design.



Materials with high fines content will deteriorate rapidly due to water ingress and tracking by construction plant. Adequate protection of formation levels will be required to maintain the strength of the material.

8.6 Excavations

The stability of the underlying natural ground is likely to be poor. During the ground investigation several trial pits collapsed during excavation.

It is considered likely that if excavations were left unsupported, then collapse would occur, and this is likely to increase in the presence of perched groundwater.

Good working practice with respect to drainage of excavations and formations will be required to protect materials. Any excavation for structural foundations must be covered without delay with blinding concrete to prevent softening by water.

The requirement for temporary support of excavations should be assessed on an individual basis and in any case, excavations of greater than 1.20m depth requiring man entry will require temporary support in accordance with HSE guidance. Alternatively, the sides of the excavation will need to be battered back for the safety of operatives. Guidance on safe batter slopes can be obtained from CIRIA Report 97 Trenching Practice.

8.7 Obstructions

Based on the history of the site, the presence of significant sub-surface obstructions, e.g. relic foundations, services should be expected locally in the previously developed parts of the site.

It is recommended that an allowance should be made for dealing with these obstructions as part of the proposed earthworks.

8.8 Chemical Attack on Buried Concrete

Laboratory testing has been undertaken on samples of the made ground, natural ground and groundwater to determine the sulphate content and acidity and hence the concrete class required for buried concrete.

Laboratory testing in the made ground recorded water-soluble sulphate contents ranging between <10mg/l and 32mg/l and pH values between 5.7 and 7.4.

In the natural ground, recorded water-soluble sulphate contents ranged between <10mg/l and 76mg/l and pH values ranged between 5.9 and 7.4.

In the groundwater, recorded sulphate contents ranged between 20mg/l and 35mg/l and pH values ranged between 5.4 and 6.8.

Foundations are likely to encounter made ground, natural ground and groundwater.



On this basis, it is recommended that concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-1 and ACEC Class AC-2z.

This assessment has been made in accordance with BRE Special Digest 1:2005, entitled 'Concrete in Aggressive Ground'.



9.0 ENVIRONMENTAL RISK ASSESSMENT

9.1 Introduction

Legislation and guidance on the assessment of contaminated sites acknowledges the need for a tiered risk-based approach comprising:

- Tier 1 Assessment** Comparison of site contaminant concentrations against generic assessment criteria (GAC), i.e. a generic quantitative risk assessment (GQRA). Including an assessment of risk using the source-pathway-receptor model.
- Tier 2 Assessment** Derivation of site specific risk assessment criteria and calculation of site specific clean up goals, i.e. a detailed quantitative risk assessment (DQRA).

A Tier 1 Assessment has been completed; however, a Tier 2 Assessment has not been undertaken as part of this report.

The statutory definition of contaminated land is given in the Environmental Protection Act, Part IIA, Section 78, 1990, which was introduced by the Environment Act, Section 57, Department of Environment, 1995 and is defined as:

Land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that:

- Significant harm is being caused or there is a significant possibility of such harm being caused (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and/or,
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused (by the land).

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. The potential for harm to occur requires three conditions to be satisfied:

- Sources – The presence of substances (potential contaminants/pollutants), in or under the ground, that may cause harm or pollution.
- Receptors - The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora; and,
- Pathway - The existence of a linkage between the Source and the Receptor.

In order to assess the contamination risk at the site, the above rationale has been applied and is discussed in the context of Contamination Sources and Potential Pollutant Linkages.



In summary, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and an unacceptable risk of harm to available receptors.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the sensitivity of the intended end use of the site and the sites characteristics and environmental setting.

9.2 Assessment Approach

Human Health

The results of the chemical analysis for each determinand will be assessed against their respective GAC.

These include the LQM/CIEH Suitable 4 Use Levels (S4UL) and Category 4 Screening Levels (C4SL), which were developed using the UK Contaminated Land Exposure Assessment (CLEA) Framework Documents and Software.

The CLEA model uses generic assumptions about the fate and transport of chemicals in the environment and a generic conceptual model (referred to as generic land use scenarios) for site conditions and human behaviour, to estimate child and adult exposures to soil contaminants for those living, working and/or playing on contaminated sites over long-time periods.

The S4UL and C4SL screening levels have been derived for a variety of land uses including residential, allotments, commercial and public open space.

In the absence of S4UL and C4SL for potential contaminants, appropriate alternative GAC will be used.

Controlled Waters

No standards currently exist in the UK which provides threshold values for potential contamination in groundwater. Alternative guidance is therefore used, against which the significance of potential contaminants can be assessed.

The results of the leachate analyses will be compared to the same standards as for groundwater.

9.3 Evaluation of Soils Analysis

Initially, the results of the chemical analysis for each potential contaminant will be compared directly with their respective GAC. Based on the current development proposals for the site, i.e. commercial, the results of the chemical analysis for the soil samples have been assessed against GAC for a commercial end use.

If any significant exceedances of the GAC are noted, then the results will be subject to statistical analysis. An outline of the methodology of the statistical analysis is presented in Appendix F.



Twelve samples, consisting of eight made ground and four natural ground, were submitted for total soil analysis and an asbestos screen. The results of the chemical analysis are summarised below.

Human Health

The results have been compared directly with their respective GAC and are summarised in Table 9.3.1 below:

Table 9.3.1 – Summary of Chemical Analysis for Samples of Made Ground

Determinand	GAC for Commercial End Use (mg/kg)	Sample Mean (mg/kg)	Range of Results (mg/kg)	Do any samples exceed the GAC?
Arsenic	640(1)	3.17	0.20 to 5.70	No
Cadmium	190(1)	0.32	0.10 to 1.20	No
Chromium	8600(1)	14.08	2.60 to 35.00	No
Chromium, hexavalent	33 (1)	ALL 1.00	ALL 1.00	No
Copper	68000(1)	79.78	6.00 to 260.00	No
Lead	2300(2)	28.15	3.50 to 62.00	No
Mercury (Inorganic)	1100(1)	0.06	0.05 to 0.15	No
Nickel	980(1)	28.34	2.90 to 100.00	No
Selenium	12000(1)	0.50	<0.50 to 0.50	No
Zinc	730000(1)	39.92	11.00 to 74.00	No
Cyanide (free)	20(3)	0.19	0.10 to 0.40	No
Total Phenols	3200(1)	ALL 0.30	ALL 1.00	No
Naphthalene	190*(1)	ALL 0.10	ALL 1.00	No
Acenaphthylene	83000*(1)	ALL 0.10	ALL 1.00	No
Acenaphthene	84000*(1)	ALL 0.10	ALL 1.00	No
Fluorene	63000*(1)	0.10	<0.10 to 0.10	No
Phenanthrene	22000*(1)	0.10	<0.10 to 0.10	No
Anthracene	520000*(1)	0.14	0.10 to 0.60	No
Fluoranthene	23000*(1)	0.13	0.10 to 0.30	No
Pyrene	54000*(1)	0.16	0.10 to 0.30	No
Benzo(a)anthracene	170*(1)	0.18	0.10 to 0.60	No
Chrysene	350*(1)	0.12	0.10 to 0.30	No
Benzo(b)fluoranthene	44*(1)	0.14	0.10 to 0.40	No
Benzo(k)fluoranthene	1200*(1)	0.10	<0.10 to 0.10	No
Benzo(a)pyrene	35*(1)	0.13	0.10 to 0.30	No
Indeno(123-cd)pyrene	500*(1)	0.11	0.10 to 0.20	No
Dibenzo(ah)anthracene	3.5*(1)	ALL 0.10	ALL 1.00	No
Benzo(ghi)perylene	3900*(1)	0.28	0.10 to 1.00	No

(1) S4UL (2) C4SL (3) DUTCH * BASED ON 1% SOM

None of the above determinands were detected at concentrations in excess of their respective GAC.

All 12 samples were submitted for an asbestos screen. Asbestos fibres, described as 'amosite in occasional small clumps', were detected in the sample from TP110 at 0.50m.

In order to more accurately assess the percentage of asbestos by mass, the sample from TP110 was submitted for gravimetric analysis in order to calculate the total mass (%) of asbestos.



The Control of Asbestos at Work Regulations (2012) state the following with respect to working with asbestos: 'worker exposure must be below the airborne exposure limit (control limit) of 0.1 fibres per cm³. A control limit is a maximum concentration of asbestos fibres in the air (averaged over any continuous four-hour period) that must not be exceeded'. In addition, 'short term exposure must not exceed 0.6 fibres per cm³ over any continuous ten-minute period'.

The total mass of asbestos present in the sample was <0.001%. Based on this result, it is considered unlikely that the airborne exposure limit will be exceeded.

Three samples were submitted for analysis for organochlorine pesticides (OCP), organophosphorus pesticides (OPP) and triazine herbicides analysis. No elevated concentrations were detected, all were below their respective limits of detection.

9.4 Evaluation of Controlled Waters Analysis

Four samples, comprising three of made ground and one of natural ground were submitted for leachability analysis. The results for each determinand were compared directly against their respective GAC, the results are summarised in Table 9.4.1 below:

Table 9.4.1 – Summary of Leachability Results

Determinand	GAC (µg/l)	TP102 0.20m	TP105 0.70m	TP113 0.50m	TP117 0.40m
Arsenic	50(1)	0.90	<0.16	0.34	0.17
Cadmium	5(1)	<0.03	<0.03	<0.03	<0.03
Chromium	50(1)	0.32	<0.25	0.91	0.28
Copper	2000(1)	2.90	<0.40	1.60	1.10
Lead	10(1)	0.72	0.14	0.28	0.10
Mercury	1(1)	0.01	<0.01	<0.01	<0.01
Nickel	20(1)	<0.50	<0.50	0.90	<0.50
Selenium	10(1)	<0.25	<0.25	<0.25	<0.25
Zinc	5000(1)	<1.30	<1.30	<1.30	<1.30
Sulphate	250000(1)	940	1400	1100	1400
Cyanide free	50(1)	<20	<20	<20	<20
pH	6.5-9.5(1)	8.0	7.7	7.5	7.4
Naphthalene	4.24(2)	<0.05	<0.05	0.09	<0.05
Anthracene	0.193(2)	0.01	<0.01	0.03	<0.01
Fluoranthene	0.0122(2)	0.04	0.01	0.04	<0.01
Sum of benzo(b)fluoranthene, benzo(k) fluoranthene, indeno(1,2,3-c,d) pyrene and benzo(g,h,i)perylene	0.1(1)	0.09	<0.004	<0.004	<0.004
Benzo(a)pyrene	0.01(1)	0.01	<0.01	<0.01	<0.01
Phenol	14.9(2)	<0.50	<0.50	<0.50	<0.50

(1) Water Supply (Water Quality) Regulations 2001 (UKWSWQR)

(2) Environmental Quality Standards (EQS)

Slightly elevated concentrations of fluoranthene were detected in the samples from TP102 0.20m and TP113, 0.50m.

No other determinands were detected at concentrations in excess of their respective GAC.



Three samples of groundwater, obtained from wells sealed within the natural ground, were submitted for chemical analysis. The results for each determinand were compared directly with their respective GAC. The results are summarised in Table 9.4.2 below.

Table 9.4.2 – Summary of Groundwater Results

Determinand	GAC (µg/l)	BH101 1.80m	BH103 1.40m	BH105 1.0m
pH	6.5-9.5(1)	5.40	6.80	6.80
Arsenic	50(1)	0.87	10	4.40
Cadmium	5(1)	1.10	0.05	0.08
Chromium (total)	50(1)	3.50	4.0	11
Copper	2000(1)	34	7.1	14
Lead	10(1)	0.78	1.8	0.60
Mercury	1(1)	<0.01	<0.01	<0.01
Nickel	20(1)	13	22	9.4
Selenium	10(1)	4.5	4.2	1.3
Zinc	5000(1)	280	98	150
Cyanide (Free)	50(1)	<20	<20	<20
Phenol	14.9(2)	<0.50	20	<0.50
Naphthalene	4.24(2)	<0.05	<0.05	0.54
Anthracene	0.193(2)	<0.01	<0.01	<0.10
Fluoranthene	0.0122(2)	0.01	<0.01	<0.01
Benzo(a)pyrene	0.01(1)	<0.01	<0.01	<0.10
Benzo(b)fluoranthene	0.1(1)	<0.01	<0.01	<0.10
Benzo(k)fluoranthene		<0.01	<0.01	<0.10
Indeno(1,2,3-c,d)pyrene		<0.01	<0.01	<0.10
Benzo(g,h,i)perylene		<0.01	<0.01	<0.10
Sulphate as SO ₄	250000(1)	20000	21000	35000

(1) Environmental Quality Standards (EQS)

(2) Water Supply (Water Quality) Regulations 2001 (UKWSWQR)

A slightly elevated concentration of phenol was detected in BH103 at 1.40m.

No other determinands were detected at concentrations in excess of their respective GAC.

9.6 Evaluation of Hazardous Ground Gases

Based on the desk study information and ground conditions encountered, it is considered unlikely that there is the potential for the presence of significant hazardous ground gases on the site.

9.7 Ground Gas Monitoring

In order to assess the potential risks posed to the proposed development from hazardous gases, monitoring wells were installed in seven boreholes, all were sealed within the natural ground.



Ground gas monitoring has been undertaken on six occasions. The works were carried out using a portable infrared gas meter in accordance with the standard JPG methodology and included the measurement of methane, carbon dioxide, oxygen, hydrogen sulphide, carbon monoxide, gas flows and atmospheric pressure.

9.8 Summary of Results

The results of the gas monitoring are presented on the site visit record sheets in Appendix H and are summarised below:

- No peak or steady concentrations of methane in excess of 1% v/v were recorded. Maximum peak and steady concentration of 0.2% v/v were recorded in BH101 and BH104 during the fourth visit.
- No steady concentrations of carbon dioxide in excess of 5% v/v were recorded. A maximum steady concentration of 4.1% v/v was recorded in BH101 during the second visit.
- Reduced oxygen concentration (i.e. <16%v/v) were recorded in BH104 during the second and fourth visits.
- Positive peak and steady flows of 10.5 l/hr, 2.1 l/hr and 3.9 l/hr were recorded in BH104 during the second, fourth and fifth visits respectively. Positive peak and steady flow of 0.1 l/hr and 0.2 l/hr were recorded in the remaining boreholes except BH103 in which no steady flows were recorded.
- Concentrations of carbon monoxide in excess of 30ppm were recorded in BH104 (97ppm and 71ppm during the second and fourth visits respectively).
- No concentrations of hydrogen sulphide in excess of 5ppm were recorded. Maximum concentrations of 5ppm and 2ppm were recorded in BH104 and BH105 respectively.

Three monitoring visits were carried out during periods of regionally falling atmospheric pressure. Barometric pressures during the monitoring period ranged between 989mB and 1024mB.

9.9 Requirements for Gas Protection Measures

The results of the gas monitoring have been assessed in accordance with CIRIA Report C665 'Assessing risks posed by hazardous ground gases to buildings' and BS8485:2015, 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.'

The response zone for BH104 in which the reduced oxygen concentrations, elevated carbon monoxide concentrations and elevated flows were recorded extends from 4.00m to 7.00m and includes a band of gravel (within the superficial deposits) from 5.00m to 6.30m.

The remaining monitoring wells were installed to a maximum depth of 4.50m. Their response zones do not intercept this granular material. No significant concentrations of hazardous ground gases or flows were recorded in these boreholes.



Gas screening values (GSV) have been calculated based on the data set including and excluding the results from BH104.

If proposed excavations or ground improvement works, i.e. stone columns do not intercept the underlying granular deposits then no gas protection measures would be required, i.e. Characteristic Situation 1.

However, it is understood that consideration is being given to ground improvement using vibro-stone columns which are likely to intercept the underlying gravel band. Therefore, in order to mitigate the potential risk from hazardous ground gases, it is recommended that gas protection measures in accordance with Characteristic Situation 2 are incorporated into the development.

9.10 Radon Risks

The site is not in a radon affected area, as less than 1% of properties are above the action level for radon gas. Therefore, no radon gas protective measures will be required.

9.11 Summary of Sources, Pathways and Receptors

Sources

Based on the results of the chemical analysis and ground gas monitoring, the following potential sources of contamination are considered to be present on the site:

- Slightly elevated concentrations of potentially leachable fluoranthene.
- A slightly elevated concentration of phenol was detected in the shallow perched groundwater in BH103 at 1.40m.
- Slightly elevated concentrations of hazardous ground gases.

Pathways

Based on the available information and the proposed redevelopment of the site for a commercial end use, the following potential exposure pathways will require consideration, both during the redevelopment works and on completion of construction:

- Inhalation of hazardous ground gases.
- Leaching/migration of potential contaminants from soil into groundwater via groundwater and surface water flow.
- Permeation of water supply pipes and other services by organic and aggressive contaminants.



Receptors

The potential receptors considered are:

- Development workers and future maintenance workers involved in excavations, e.g. foundations or where services are being installed.
- Future site end users (i.e. employees).
- Groundwater in the underlying Secondary A Aquifer (drift) and Principal Aquifer (bedrock).
- Surface water in the watercourse present on the site.
- Buildings and services.

9.12 Source – Pathway – Receptor Linkages

Based on the above sources, pathways and receptors, the following linkage assessments have been considered. A conceptual site model illustrating the active pollutant linkages at the site is presented as Figure 5 in Appendix A and discussed below.

This assessment is based on current site conditions (unless stated) and does not consider exposure pathways following any remediation of the site.

Development and Maintenance Workers

Based on the potential sources of contamination which have been identified on the site, there is a potential risk to development and maintenance workers of exposure to hazardous ground gases.

Future Site End Users

Based on the potential sources of contamination which have been identified on the site, there is a potential risk to site end users from exposure to hazardous ground gases.

Groundwater in the Underlying Secondary A and Principal Aquifers and Surface Waters on the Site

Slightly elevated concentrations of potentially leachable fluoranthene and a slightly elevated concentration of phenol was detected in the shallow soils and shallow perched groundwater in the drift deposits.

An assessment of risk to controlled waters should also consider the environmental setting of the site, which is summarised below:

- The Water Supply (Water Quality) Regulations, from which many of the GAC for leachate and groundwater have been derived, is based on the concentrations of potential contaminants at the point of use, i.e. consumers' taps. The adoption of this assessment criteria is considered to be conservative when applied to an assessment of risks to controlled waters.



- The proposed development comprises buildings surrounded by hardstanding and car parking with limited soft landscaping. The building and hardstanding will be impermeable, thereby reducing infiltration and limiting the potential for the generation of leachate and mobilisation of potential contaminants.
- The nearest active groundwater abstraction licence is located approximately 241m to the north east of the site.
- There are no surface water abstractions within 2km of the site.

Based on the low concentrations of potential contaminants recorded, conservative GAC and environmental setting of the site, it is concluded that the risk to controlled waters is negligible.

9.13 Mitigation Measures

In order to mitigate the risks posed by the potential contaminants which have been identified on the site, consideration should be given to the following mitigation measures.

Construction and Maintenance Workers

In order to mitigate the risks posed by the potential contamination present on the site, consideration should be given to the following mitigation measures:

- Site workers involved in groundworks should take the necessary measures to ensure that all works in excavations and confined spaces are carried out in accordance with best practice in order to prevent exposure to potentially hazardous ground gases.
- Site workers involved in groundworks should use appropriate PPE, i.e. overalls and gloves and where appropriate facemasks. Appropriate health and safety measures, e.g. washing hands prior to eating or drinking, should also be enforced.

During development of the site, all workers should remain vigilant to the possible risk of encountering areas of potentially contaminated material. Should potentially contaminated material be encountered, site management should be informed. Further testing may then be required to assess the risk to health and safety of the site workers and the environment.

All employers involved in works at the site should produce an appropriate method statement and risk assessment, to which all employees should comply. Reference should also be made to appropriate HSE and other guidance for working on contaminated and potentially contaminated sites.

Future Site Users

It is unlikely that future site end users will come into contact with the site in its current condition.



It is understood that consideration is being given to ground improvement using vibro-stone columns. Therefore, in order to mitigate the potential risk from hazardous ground gases, it is recommended that gas protection measures in accordance with Characteristic Situation 2 are incorporated into the development.

9.14 Classification of Materials for Disposal Offsite

Twelve samples of made ground were assessed using HazWasteOnline™ in order to determine the classification of the materials for disposal offsite.

Based on the results of the chemical analysis all samples can be classified as non-hazardous. Details of the classification generated by HazWasteOnline™, is presented in Appendix F.

The results of the chemical analysis and the waste classification should be forwarded to the landfill operator to confirm this assessment and provide a price for disposal.



Appendix A Figures/Drawings

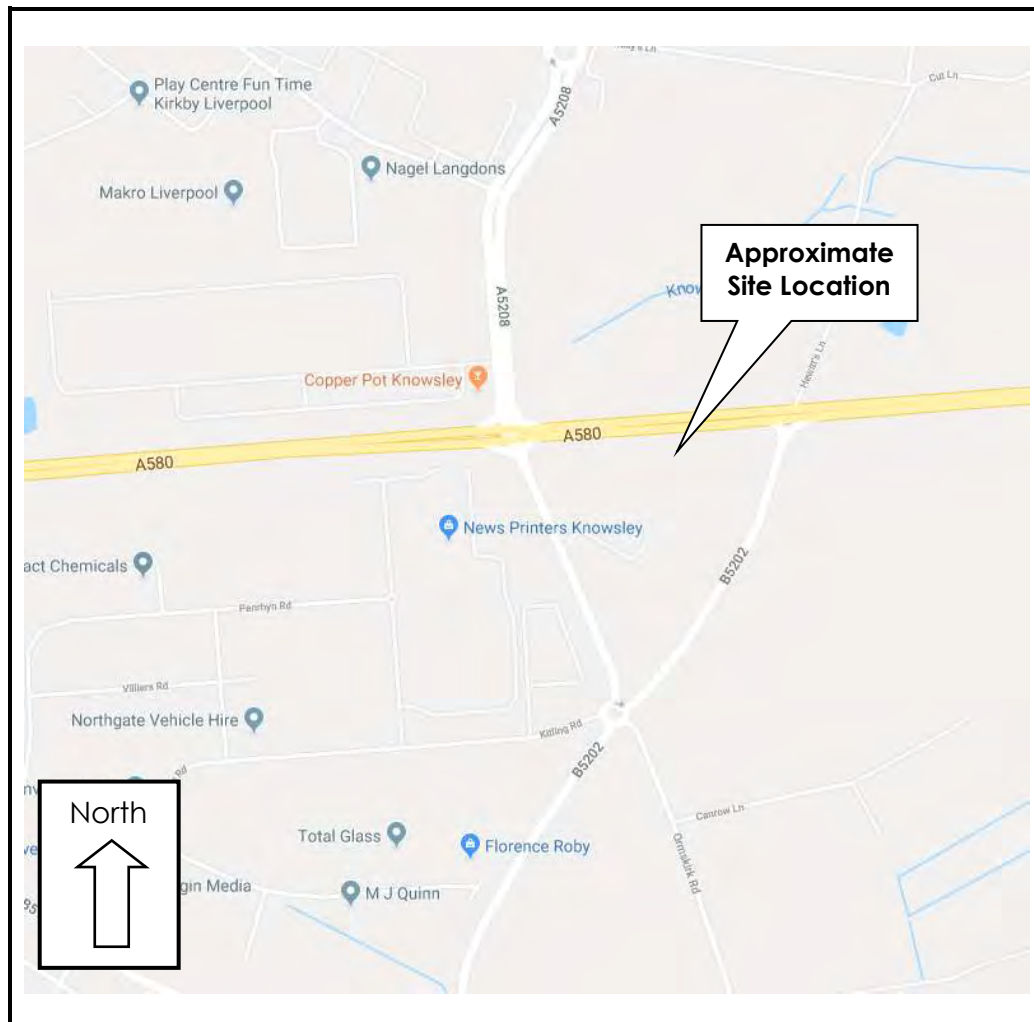


Figure 1 – Site Location Plan

Site	Knowsley Lane, Knowsley
Client	Caddick Developments Limited
Job Number	5570
Scale	NTS

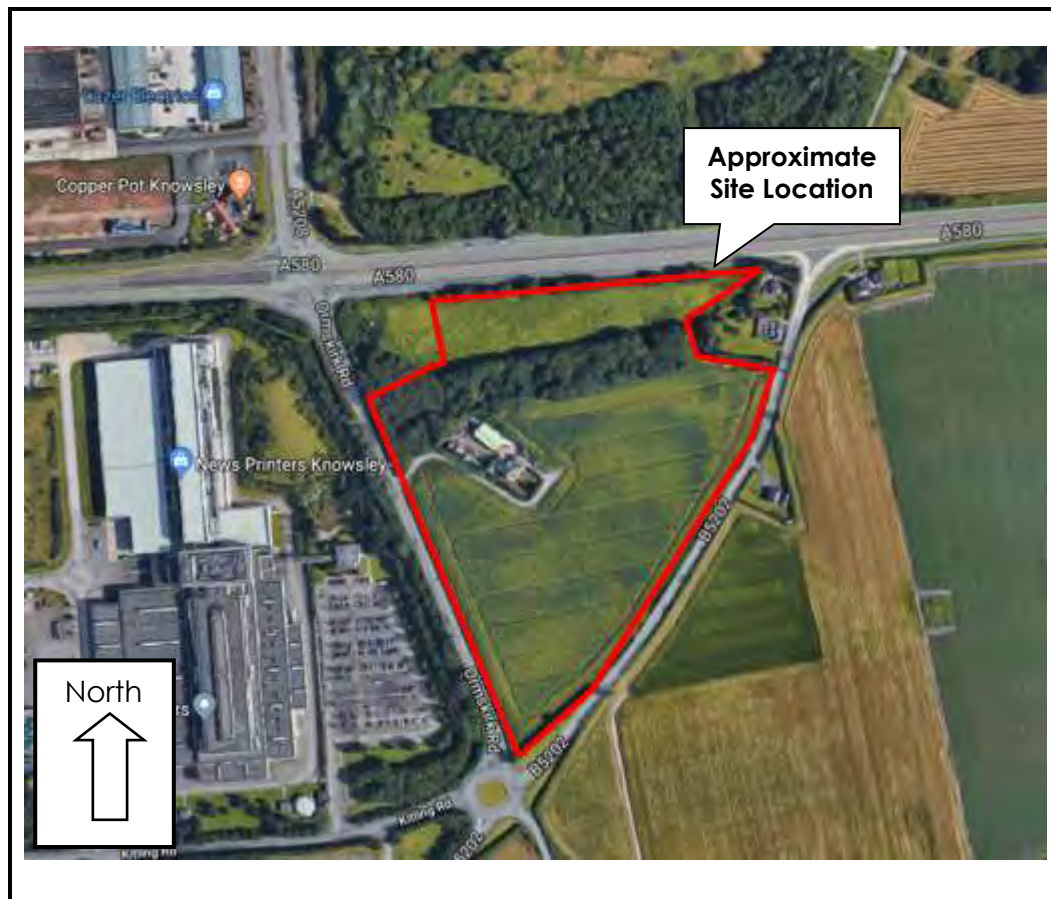
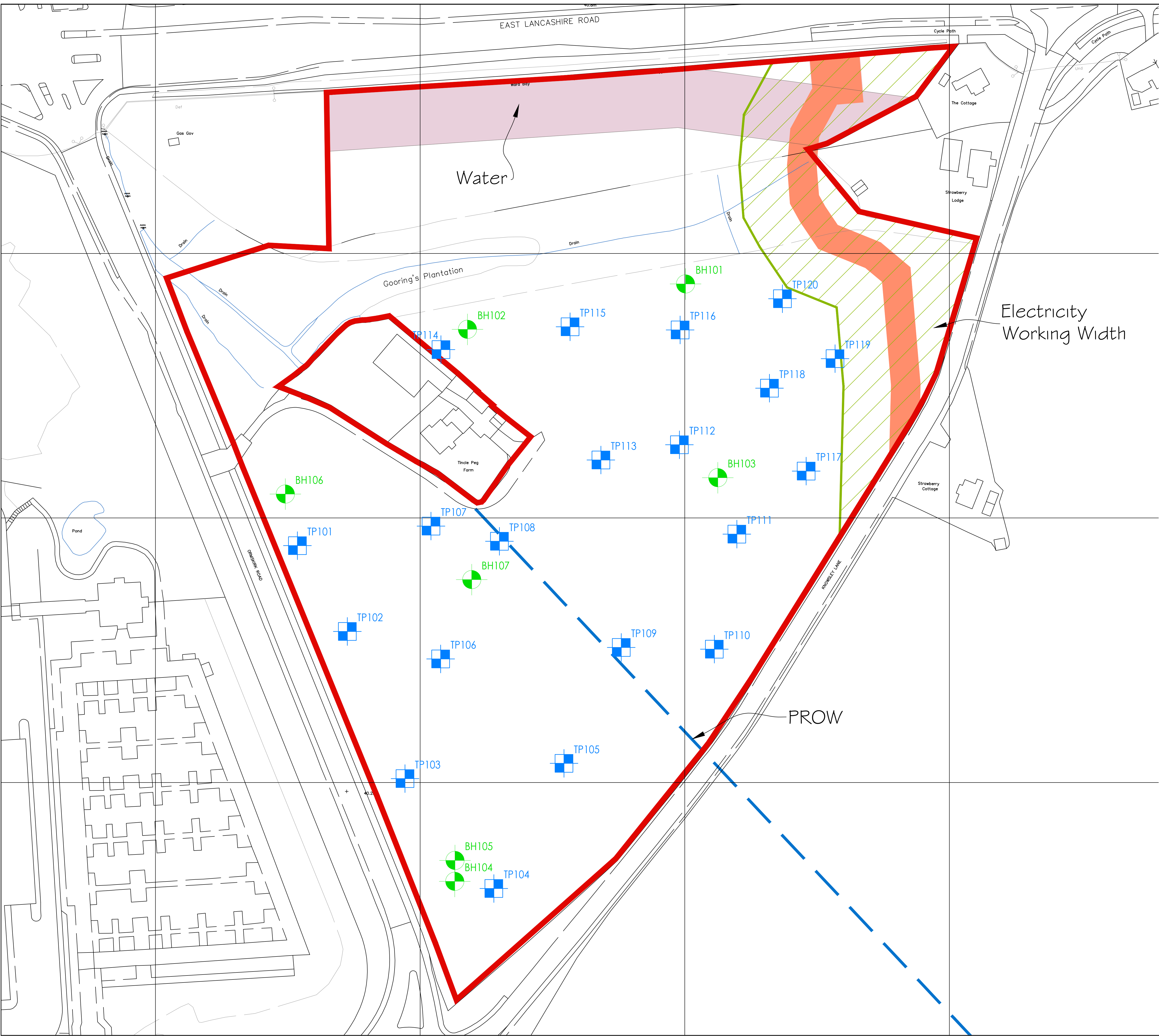


Figure 2 – Aerial Photograph	
Site	Knowsley Lane, Knowsley
Client	Caddick Developments Limited
Job Number	5570
Scale	NTS



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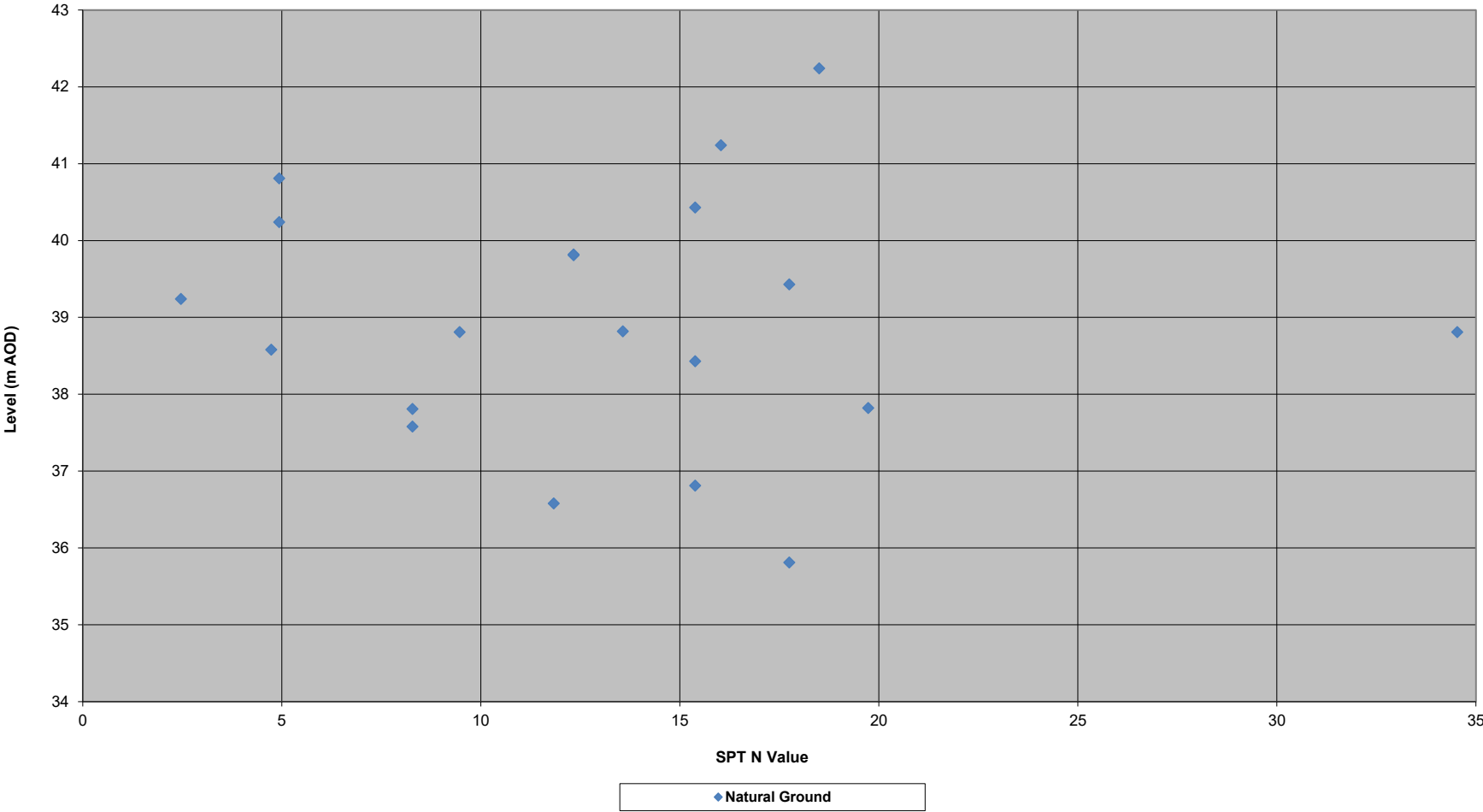
DO NOT SCALE

NOTES

REF	EASTINGS	NORTHINGS	ELEVATION
TP101	343653.369	396691.659	39.6874
TP102	343673.046	396657.810	39.9341
TP103	343695.790	396599.776	40.0891
TP104	343730.814	396556.418	39.9787
TP105	343758.482	396605.789	41.2983
TP106	343709.838	396646.977	40.5173
TP107	343706.036	396699.376	40.4849
TP108	343733.023	396693.380	41.0244
TP109	343781.049	396651.508	41.6071
TP110	343817.747	396650.831	41.9695
TP111	343826.630	396696.206	41.8349
TP112	343803.986	396731.447	41.6982
TP113	343773.025	396725.439	41.4013
TP114	343709.972	396768.989	41.1425
TP115	343760.872	396777.993	41.9130
TP116	343804.259	396776.746	42.1518
TP117	343853.962	396721.057	42.4063
TP118	343839.497	396753.782	42.1706
TP119	343865.346	396765.423	43.1343
TP120	343844.618	396789.059	43.0582
REF	EASTINGS	NORTHINGS	ELEVATION
BH101	343806.407	396794.886	43.2432
BH102	343720.420	396776.978	41.4262
BH103	343819.117	396718.440	41.8078
BH104	343715.414	396559.204	39.8054
BH105	343715.414	396567.489	39.9354
BH106	343648.610	396712.021	39.5809
BH107	343722.091	396678.246	40.8203

REV	DESCRIPTION	DATE	BY
Project			
Drawing Title			
INFORMATION ISSUE			
Architect			
JPG www.jpg.group Leeds London Birmingham 0113 263 1155			
JPG Project Ref 5570	Scale at A1 1:1000	Date MAY 19	Checked DMH
5570 - JPG - SW - 00 - DR - G - 1100			Drawn SH
S2			

Figure 4: SPT N Value vs Level (m AOD) Excluding Bedrock



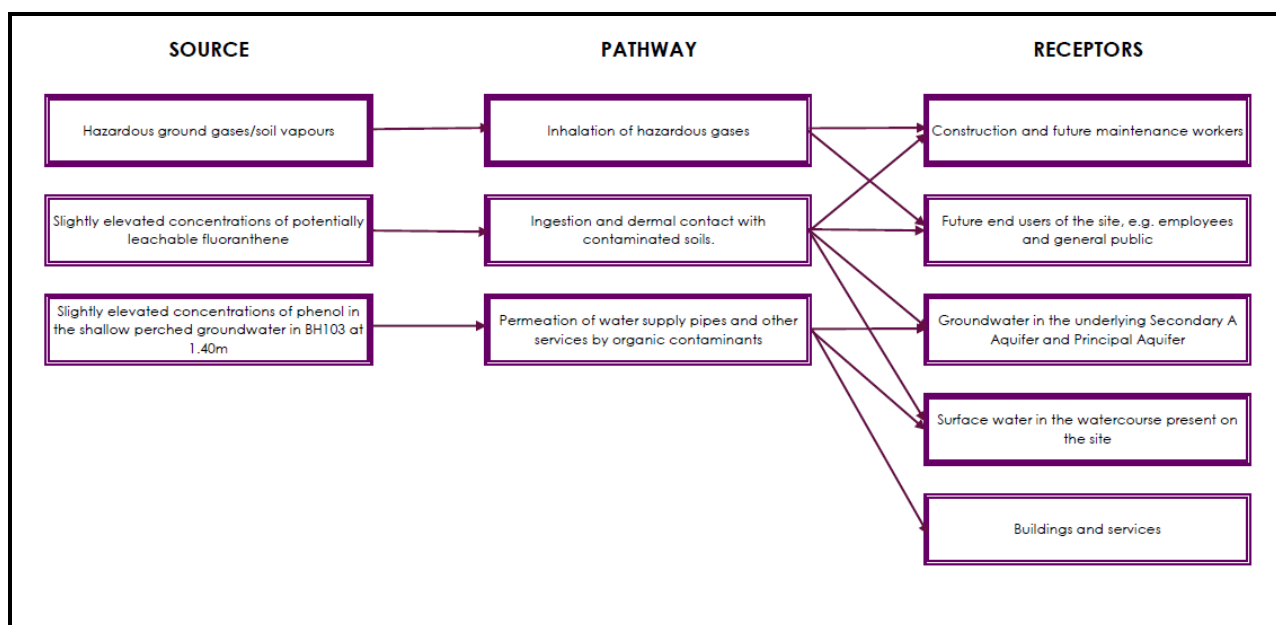


Figure 5 – Conceptual Site Model

Site	Knowsley Lane, Knowsley
Client	Caddick Developments Limited
Job Number	5570
Scale	NTS



Proposed Site Plan
Scale: 1:1000

Key

- Site Boundary
- Retaining Wall
- Public Right of Way
- Acoustic Fencing
- Council owned land, no new landscaping proposed in these areas
- Refer to Urban Green drawings & reports for details of the existing and proposed landscaping
- NHO Non Habitable Outbuildings

General Notes

All site dimensions shall be verified by the Contractor on site prior to commencing any works.

Do not scale from this drawing.

Only work to written dimensions.

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Site Area

62,254 sq.m. / 6.25 hectares / 15.3 acres
(Area Excludes Tincle Peg Farm)

Accommodation Schedule

Building 1		
GF Warehouse	6,510sqm / 70,000sqft	
5% FF Office	325sqm / 3,500sqft	
Total	6,835sqm / 73,500sqft	
Building 2		
GF Warehouse	2,790sqm / 30,000sqft	
5% FF Office	139sqm / 1,500sqft	
Total	2,929sqm / 31,500sqft	
Building 3		
GF Warehouse	4,645sqm / 50,000sqft	
5% FF Office	232sqm / 2,500sqft	
Total	4,877sqm / 52,500sqft	

Total Unit Area

Approx. 150,000sqft Excl. Officers at First Floor Level
Approx. 157,500sqft Incl. 5% Offices at First Floor Level

Parking Schedule

Building 1	
Car parking spaces (Based on B8:B2 70:30 Split): 93	
Including 5% accessible spaces (B2 Standards): 5	
Including 10% EV spaces: 10	
Cycle spaces (BREEAM): 16 external, 15 internal, total: 31	
Motorcycles at 1 space per 1000sqm (B2 Standards): 7	
Building 2	
Car parking spaces (Based on B8:B2 70:30 Split): 43	
Including 5% accessible spaces (B2 Standards): 3	
Including 10% EV spaces: 5	
Cycle spaces (BREEAM): 8 external, 8 internal, total 16	
Motorcycles at 1 space per 1000sqm (B2 Standards): 3	
Building 3	
Car parking spaces (Based on B8:B2 70:30 Split): 67	
Including 5% accessible spaces (B2 Standards): 4	
Including 10% EV spaces: 7	
Cycle spaces (BREEAM): 12 external, 12 internal, total 24	
Motorcycles at 1 space per 1000sqm (B2 Standards): 5	

P9	Red line boundary amended along Ormskirk Road, 1.8m acoustic fence heights amended to 2m, extent of Council owned land hatch reduced to identify no new planting areas only	26.05.22	AT	JC
P8	Amenity area and ramped access added, retaining wall added to building 2 yard, building 2 acoustic fence line updated, post and rail fence added to high side of retaining walls	23.05.22	AT	JC
P7	Legend updated to reflect BREEAM cycle space provision, retaining wall positions amended, 1.2m pedestrian route added to building 3 car park, dim between Tincle Peg Farm & Building 1 clarified, EV charging provision increased from 5% to 10%	19.05.22	AT	JC
Rev.	Description	Date	ISS	APP
Scale	1:1000@A1			
Status	S2 Information			
Drawn by	AT			
Checked by	JC			
Date	27.01.2022			
Client:	Caddick Developments			

Project:
Knowsley Lane, Knowsley

Sheet Name:
Proposed Site Plan



General Notes

All site dimensions shall be verified by the Contractor on site prior to commencing any works.

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NB: PLEASE NOTE EASEMENT LINES ARE INDICATIVE, BASED ON PDFs AND SUBJECT TO FURTHER SURVEY

EASEMENTS

- Water
- Electricity

Revision

Scale 1:1000@A1

Status SKETCH

Drawn by NP

Date 28.02.19

Client Caddick Developments

Project Knowsley Lane, Knowsley

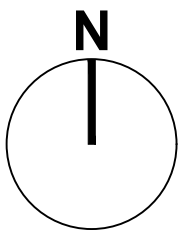
Drawing Description Proposed Site Plan_Option 4

Drawing No. PR1171_SK10 Rev.

fletcher|rae
Architects | Master Planners | Designers

Hill Quays, 5 Jordan Street, Manchester, M15 4PY

t ■ +44 (0)161 242 1140
f ■ +44 (0)161 242 1141
w ■ www.fletcher-rae.com
e ■ info@fletcher-rae.com



Project Title: Knowsley Lane, Knowsley

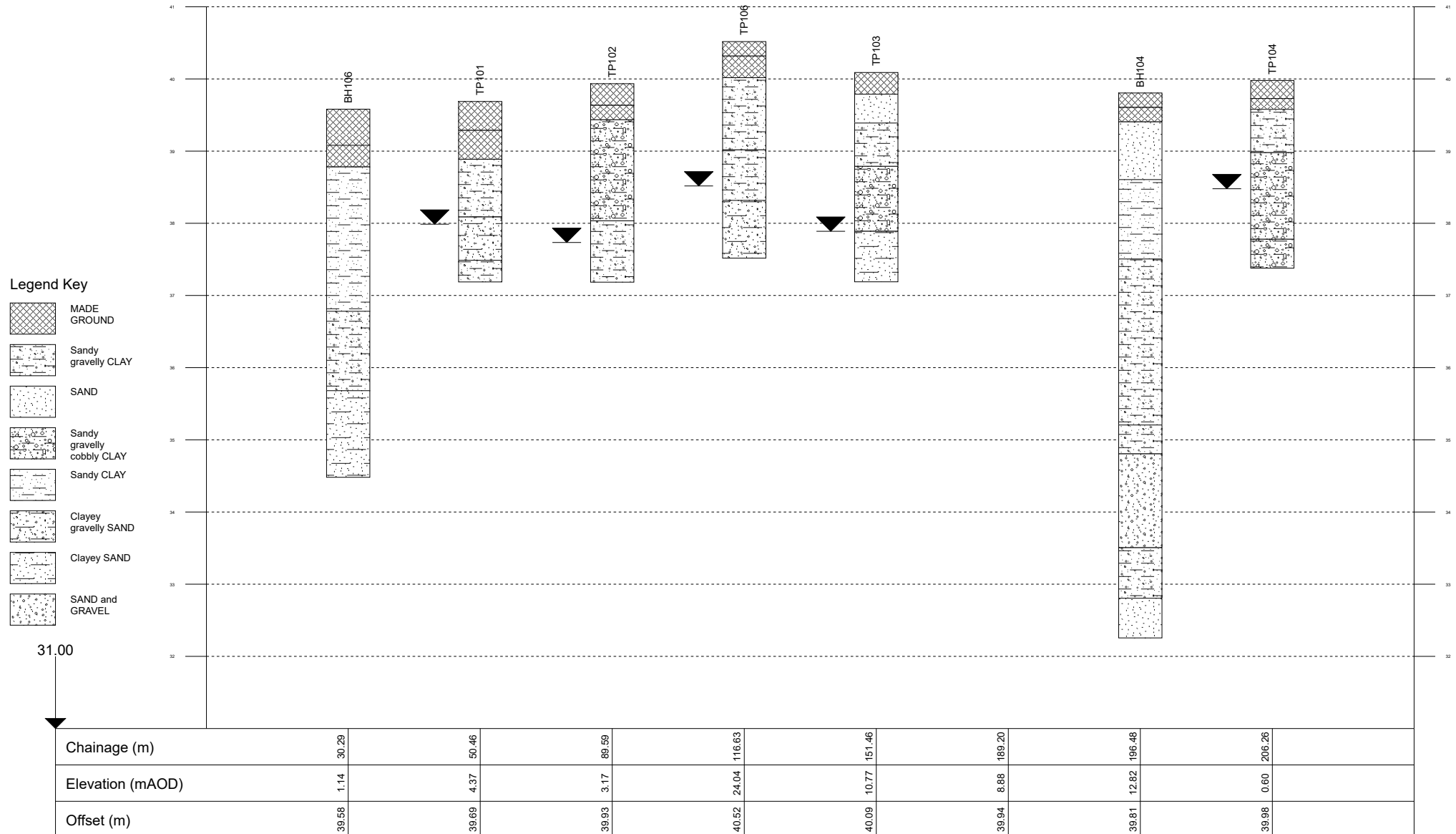
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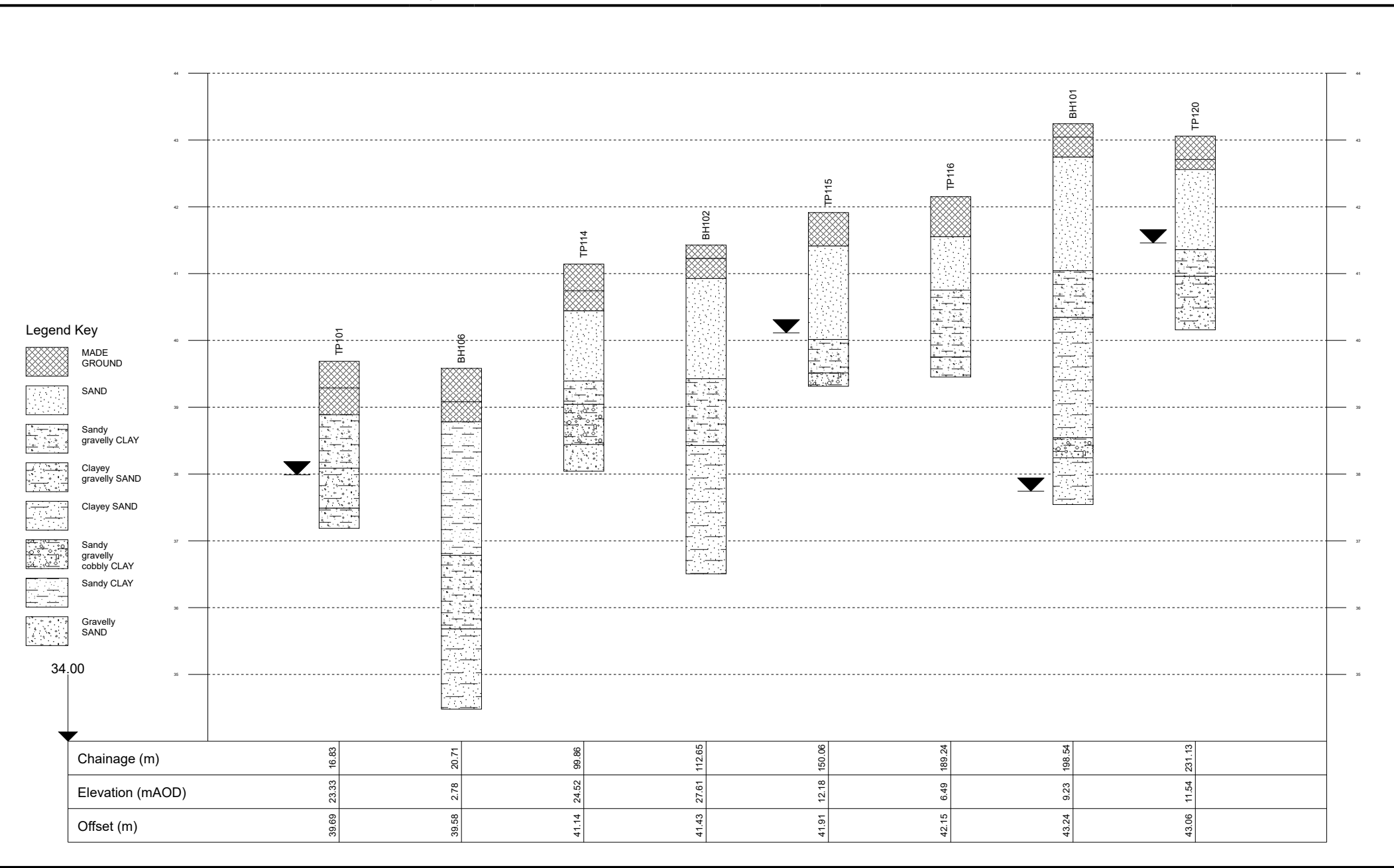
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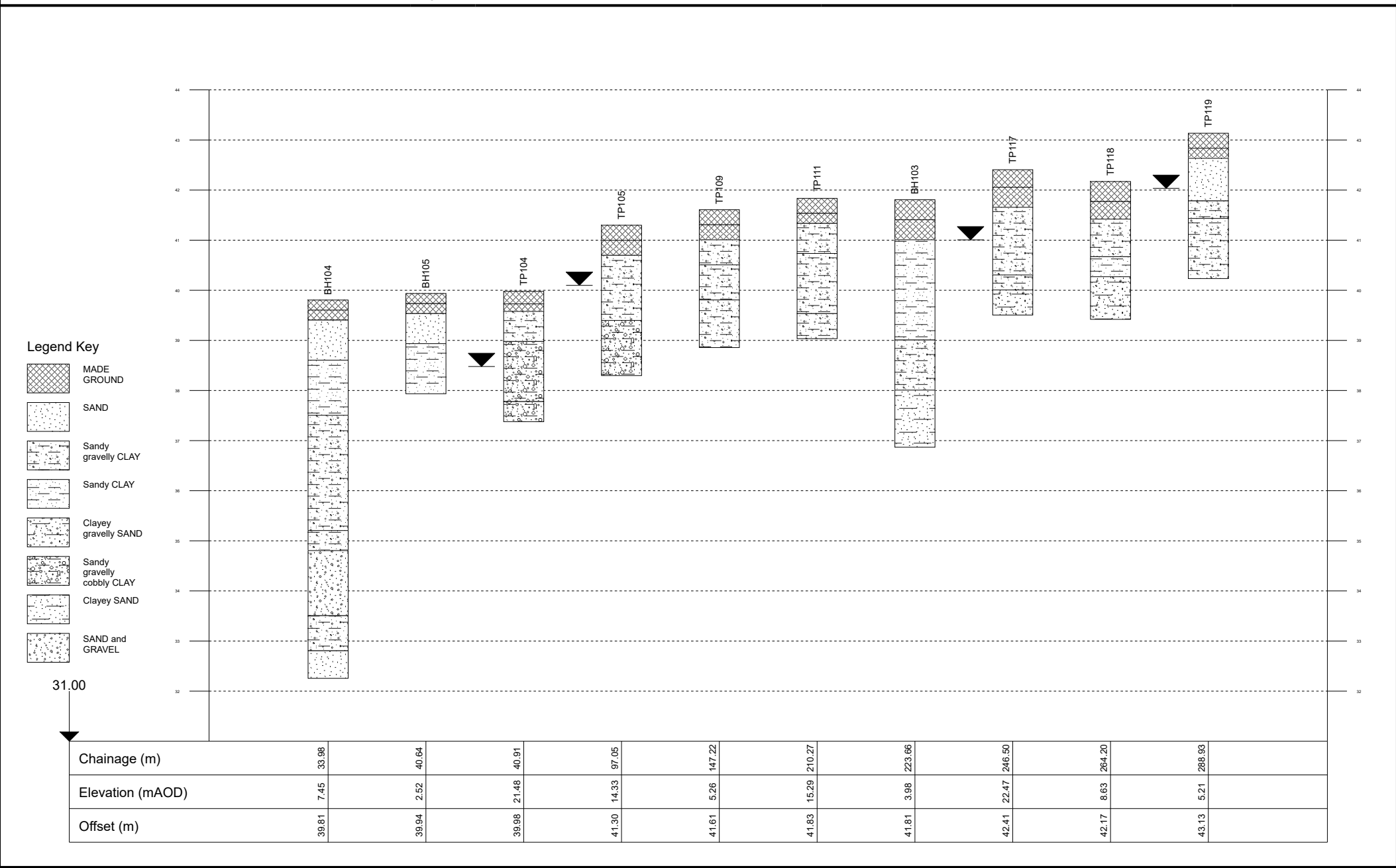
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Client: Caddicks Development Limited

Engineer: D. Horne







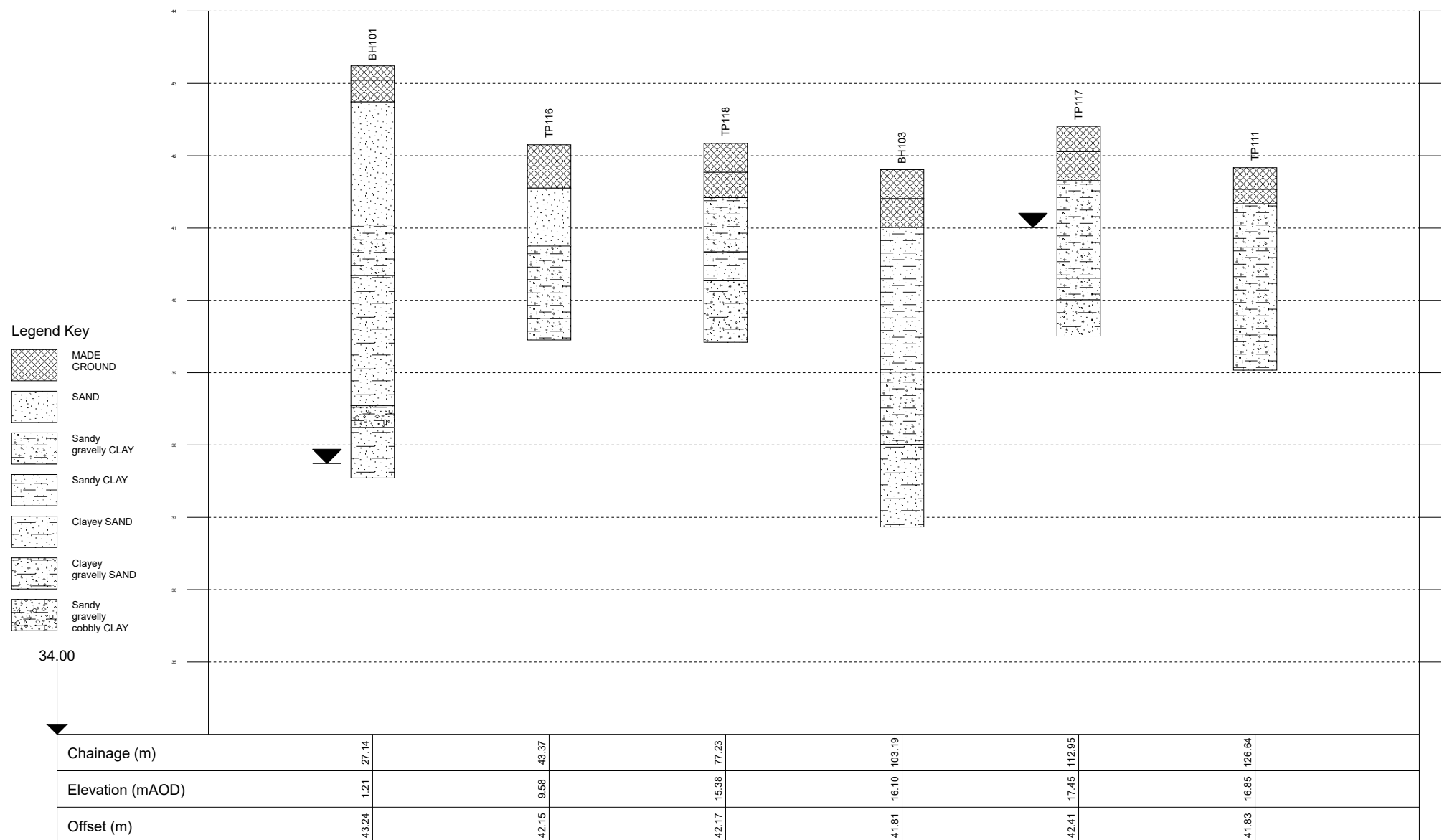
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Vertical Scale: 1:75

Horizontal Scale: Not to scale

Engineer: D. Horne





Appendix B Site Photographs



Photograph 1: Entrance onto site via the western boundary.



**Photograph 2: View of the western boundary, looking south.
Site dipping from east to west.**



**Photograph 3: View of the site, looking to the north eastern corner.
Site dipping towards the southwest.**



**Photograph 4: View of the northern boundary/treeline.
View of the second entrance onto site via the eastern boundary**



Photograph 5: View of Tingle Peg Farm.



Photograph 6: View of TP105.



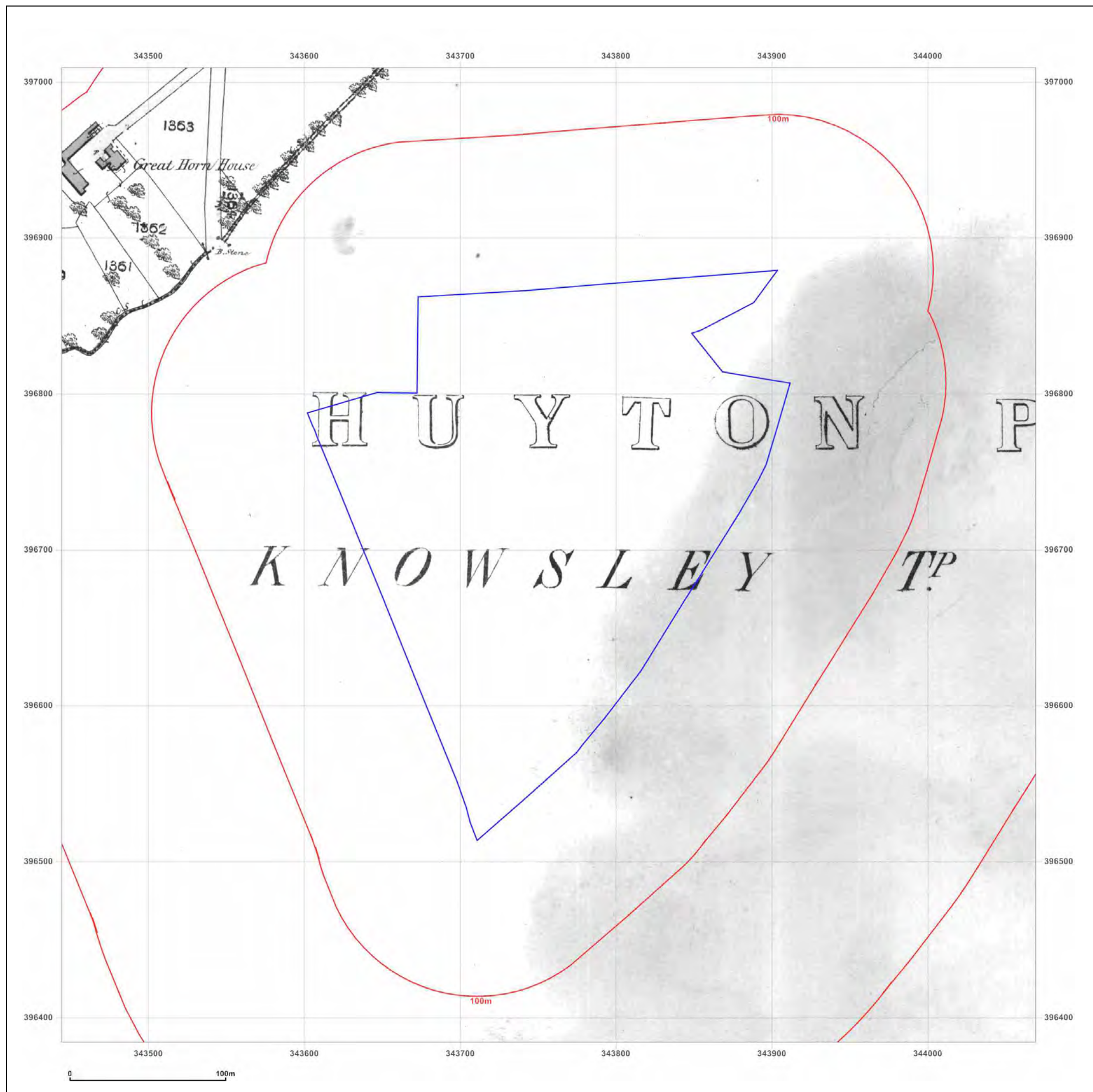
Photograph 7: A view of the side walls collapsing in TP115.



Photograph 8: A view of the running sand (within sand lenses) in TP119.



Appendix C Historical Plans



Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

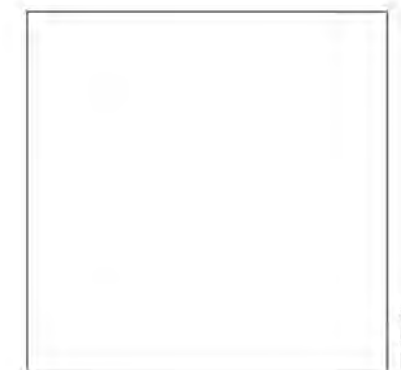
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Map Name: County Series

Map date: 1867

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Surveyed 1867
Revised 1867
Edition N/A
Copyright N/A
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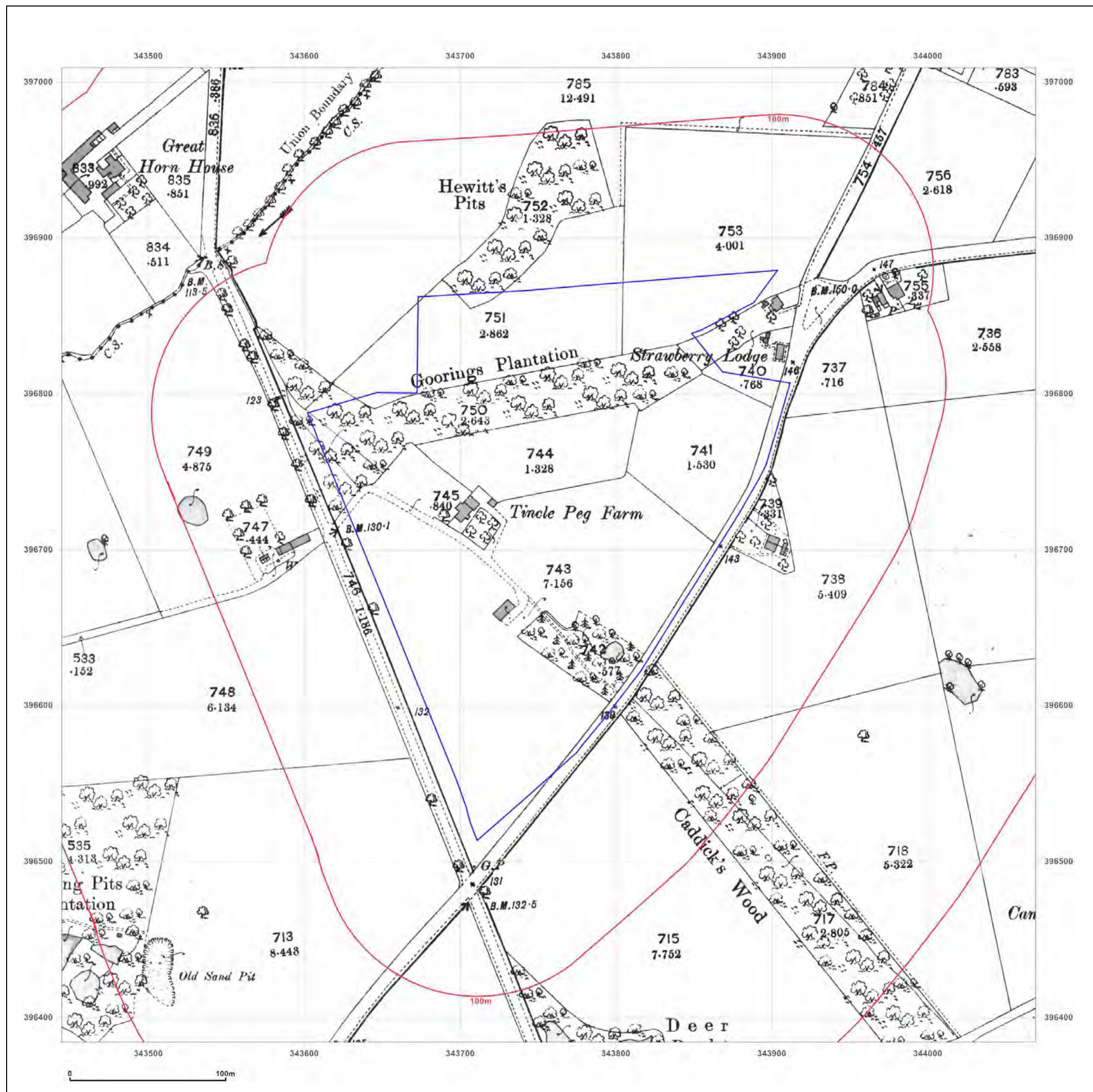


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Production date: 15 April 2019

Map legend available at:
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Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

Client Ref: 42593
Report Ref: CMAPS-JPG-793135-42593-150419HIS
Grid Ref: 343757, 396697

Map Name: County Series

Map date: 1893

Scale: 1:2,500

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Surveyed 1893
Revised 1893
Edition N/A
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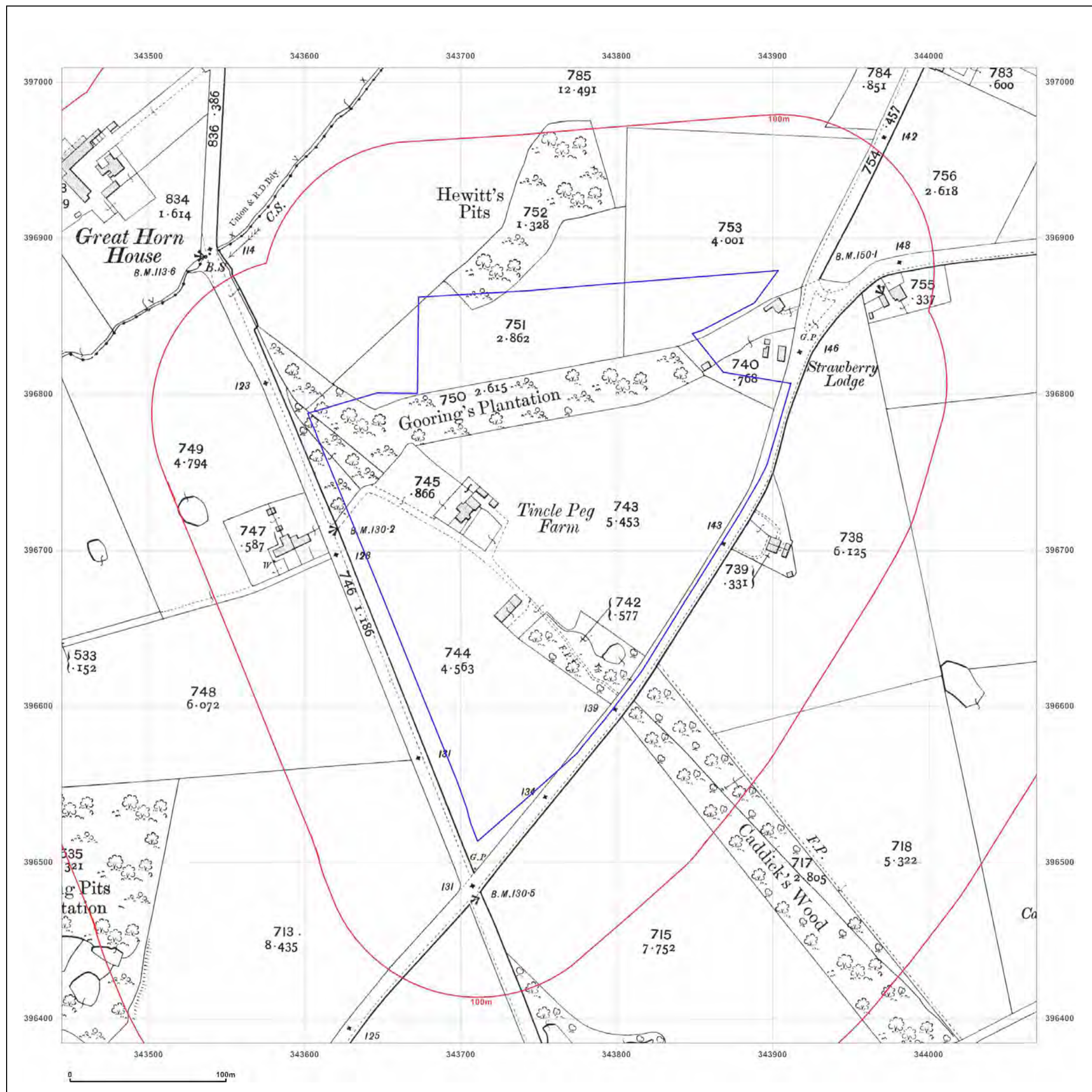


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Production date: 15 April 2019

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Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

Client Ref: 42593
Report Ref: CMAPS-JPG-793135-42593-150419HIS
Grid Ref: 343757, 396697

Map Name: County Series

Map date: 1908

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1908
Revised 1908
Edition N/A
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Production date: 15 April 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

Client Ref: 42593
Report Ref: CMAPS-JPG-793135-42593-150419HIS
Grid Ref: 343757, 396697

Map Name: County Series

Map date: 1927

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1927
Revised 1927
Edition N/A
Copyright N/A
Levelled N/A



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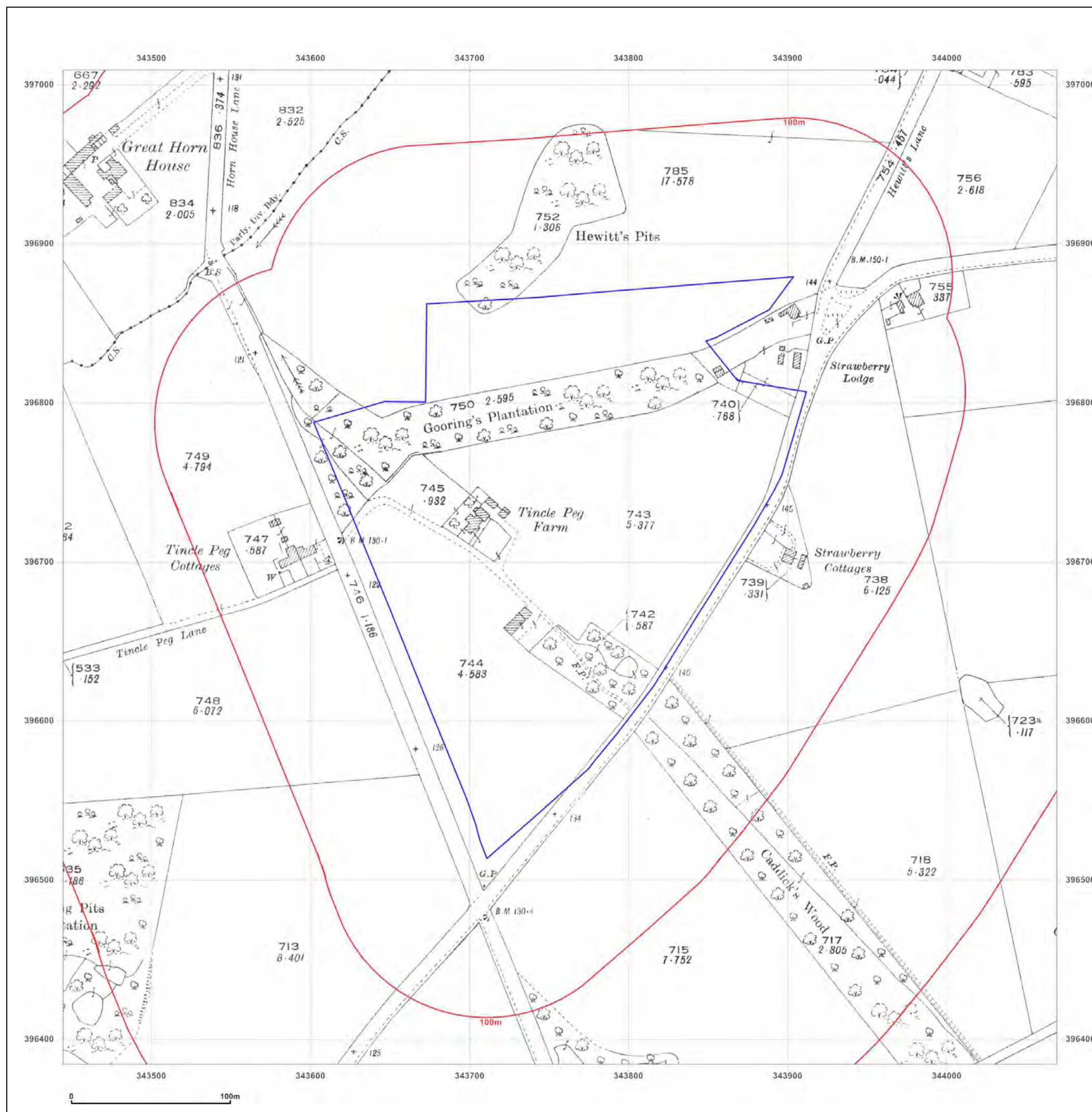


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Production date: 15 April 2019

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Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

Client Ref: 42593
Report Ref: CMAPS-JPG-793135-42593-150419HIS
Grid Ref: 343757, 396697

Map Name: County Series

Map date: 1937

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1937
Revised 1937
Edition N/A
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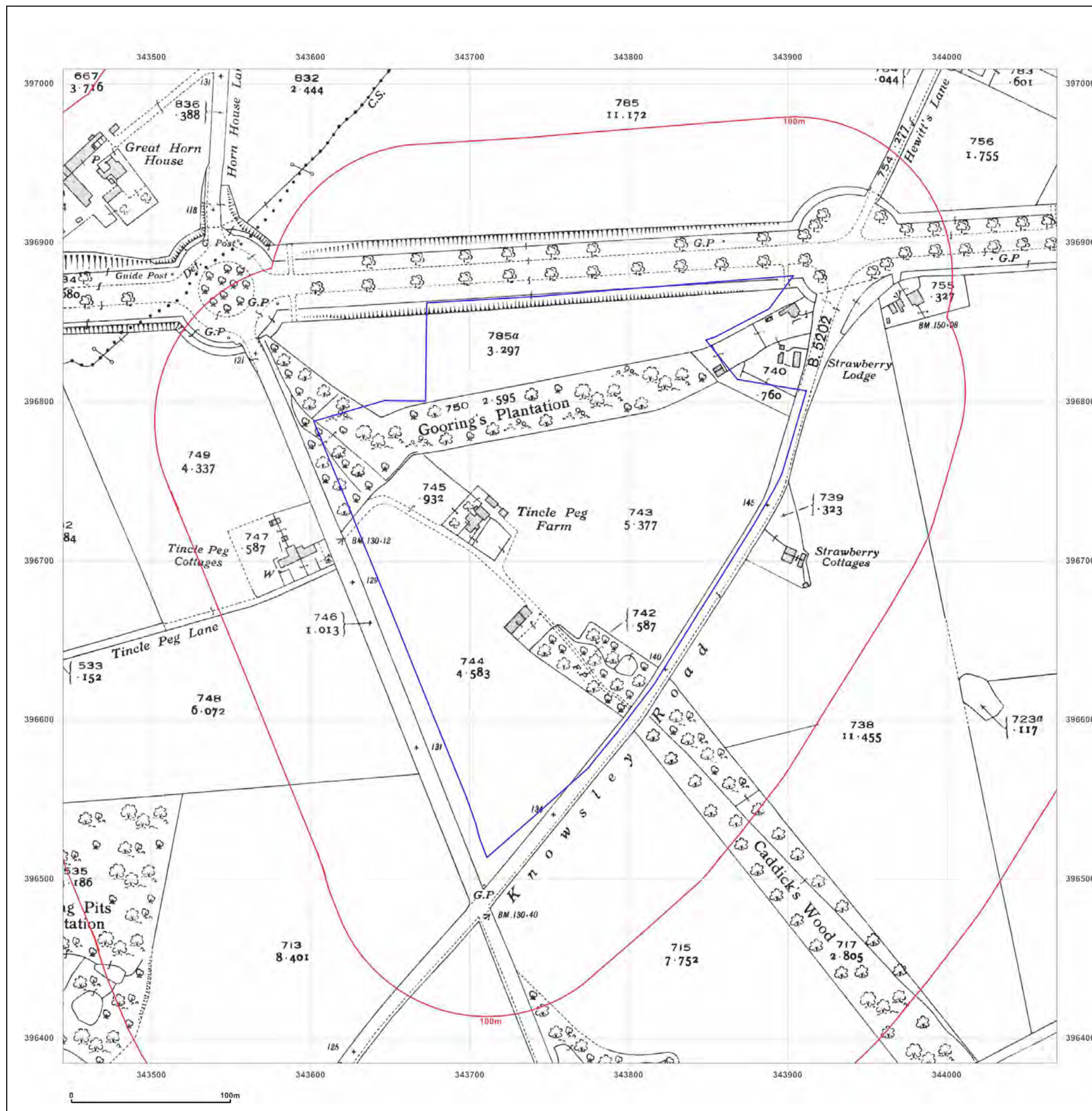


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Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

Client Ref: 42593
Report Ref: CMAPS-JPG-793135-42593-150419HIS
Grid Ref: 343757, 396697

Map Name: National Grid

Map date: 1959

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1959
Revised 1959
Edition N/A
Copyright 1959
Levelled 1946

Surveyed 1959
Revised 1959
Edition N/A
Copyright 1959
Levelled 1946



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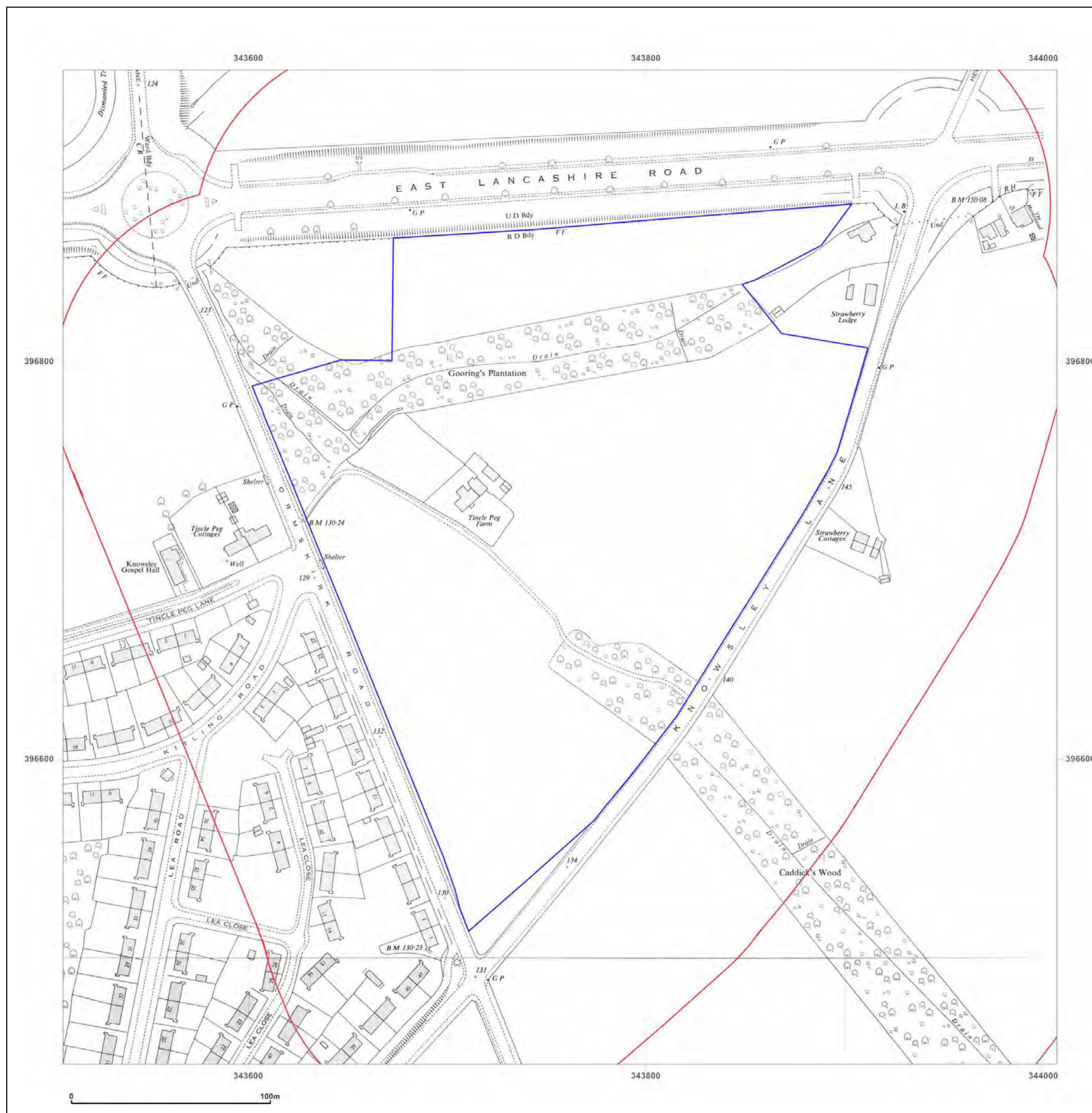


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Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

Client Ref: 42593
Report Ref: CMAPS-JPG-793135-42593-150419HIS
Grid Ref: 343757, 396697

Map Name: National Grid

Map date: 1959-1960

Scale: 1:2,500

Printed at: 1:2,500



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Revised 1959
Edition 1960
Copyright 1960
Levelled 1957

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1959
Revised 1959
Edition 1960
Copyright 1960
Levelled 1946

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1957



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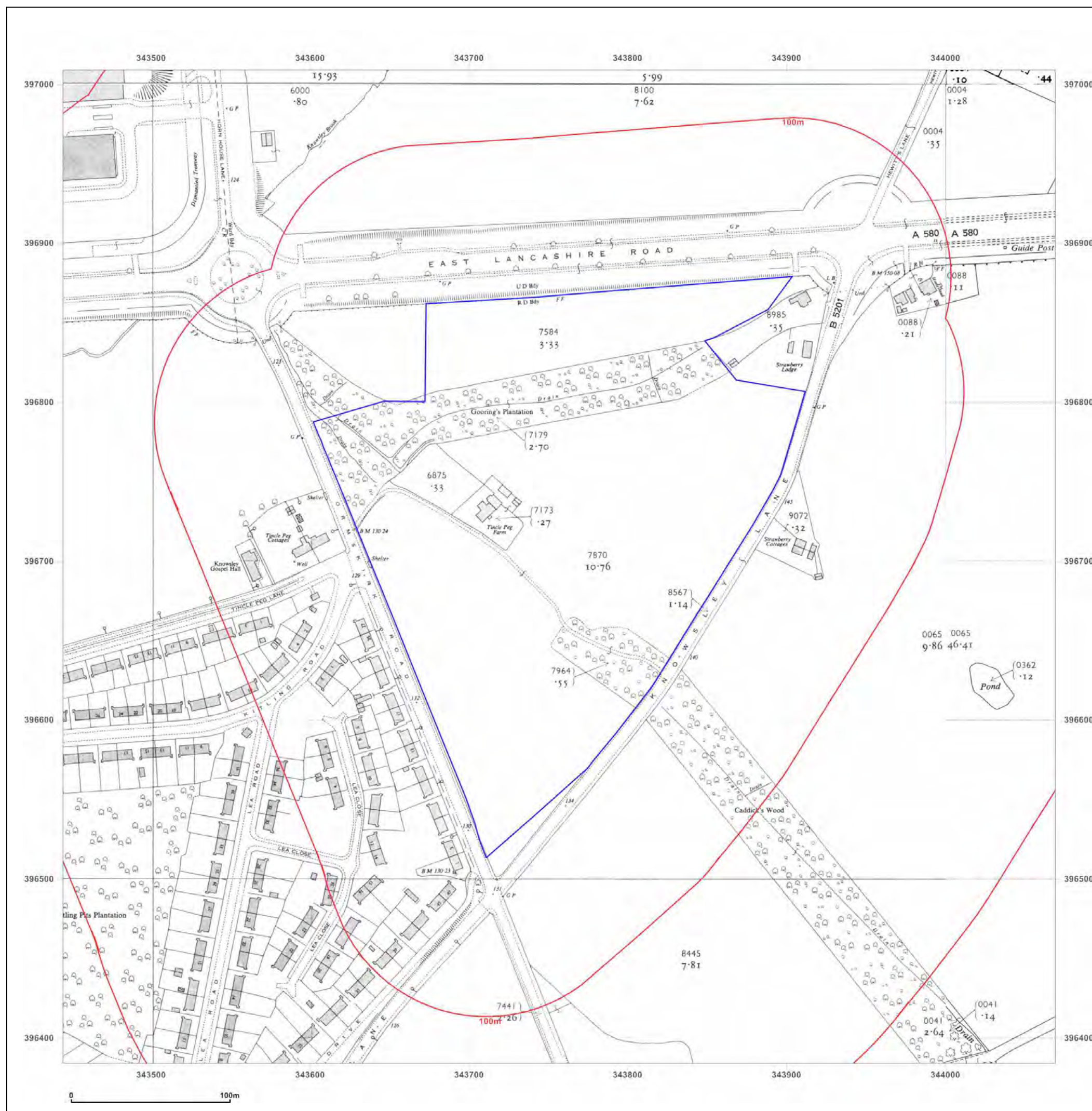


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Production date: 15 April 2019

Map legend available at:
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Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

Client Ref: 42593
Report Ref: CMAPS-JPG-793135-42593-150419HIS
Grid Ref: 343757, 396697

Map Name: National Grid

Map date: 1977

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1959
Revised 1975
Edition N/A
Copyright 1977
Levelled 1957

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



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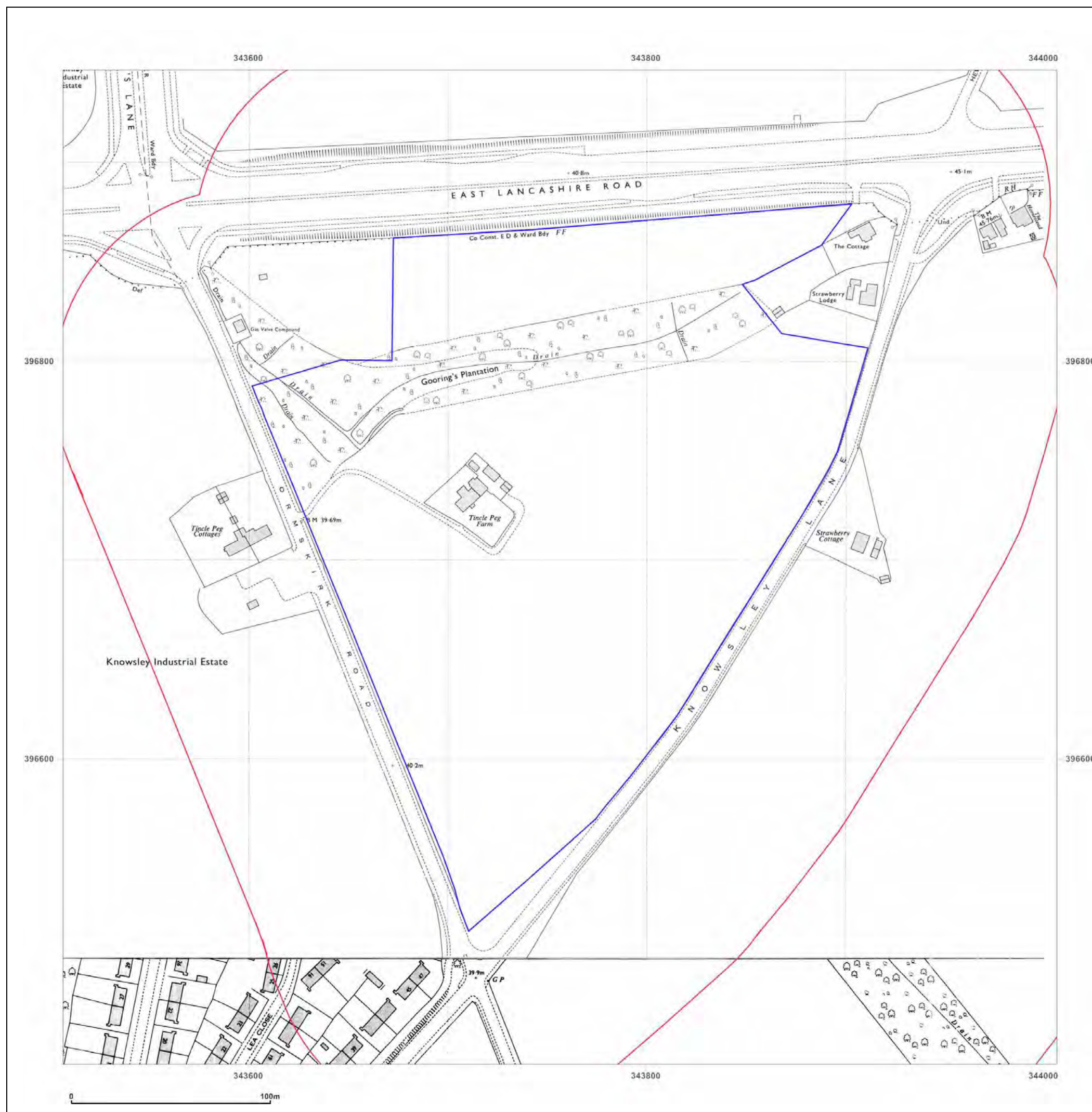


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Production date: 15 April 2019

Map legend available at:
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Site Details:

Land at Tingle Peg Farm,
Knowsley Lane, Knowsley, L34
9HN

Client Ref: 42593
Report Ref: CMAPS-JPG-793135-42593-150419HIS
Grid Ref: 343757, 396697

Map Name: National Grid

Map date: 1991

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1957
Revised 1991
Edition N/A
Copyright 1991
Levelled 1957

Surveyed 1991
Revised 1991
Edition N/A
Copyright 1991
Levelled N/A



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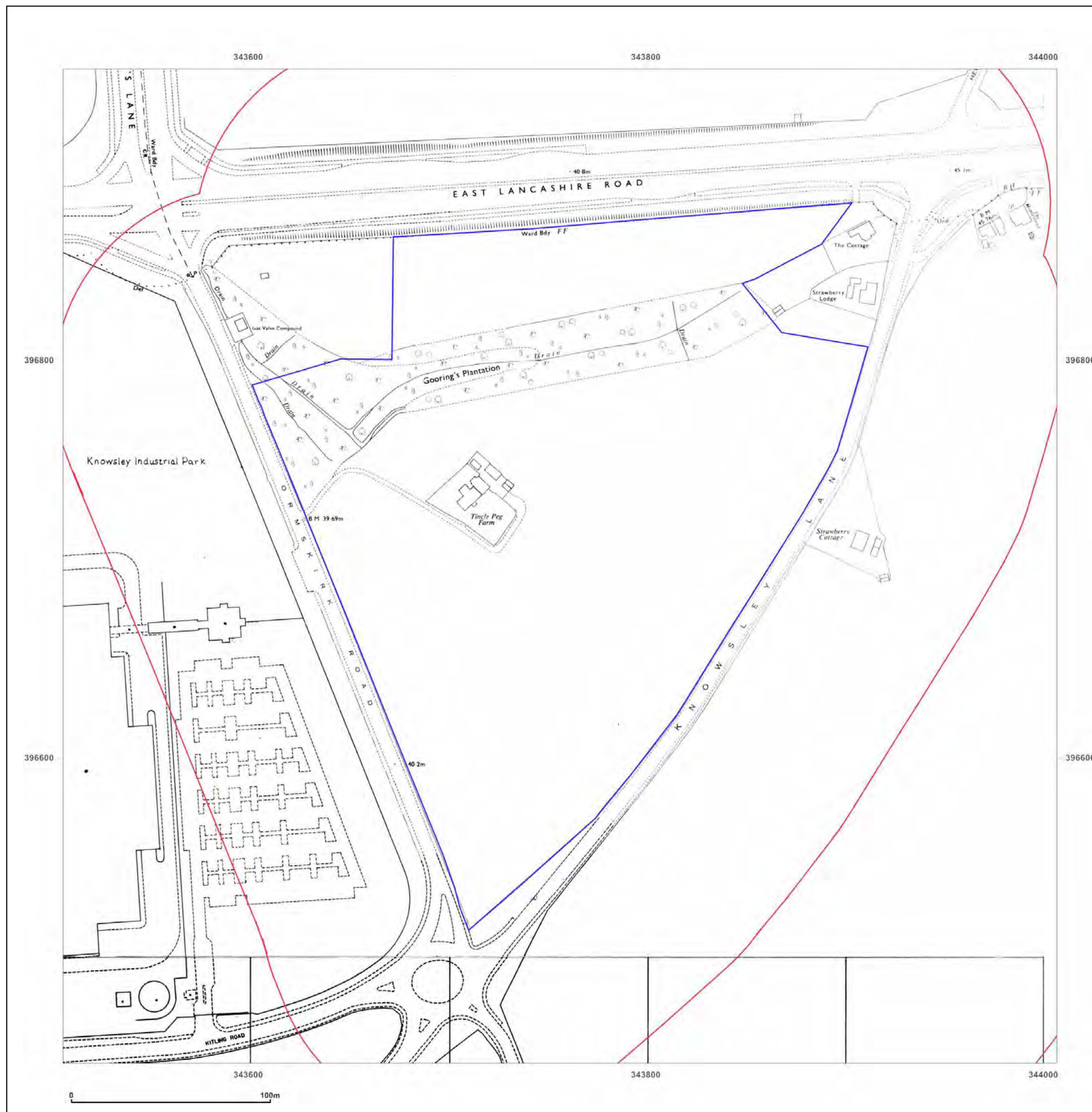


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Production date: 15 April 2019

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Appendix D Historical Borehole Logs

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

57, NEW YORK ROAD

LEEDS, 2

43648, 916529

SJ49NW - 151

Contract No. M.1691/F.1217

Location Knowsley

Client Liverpool City Engineer

Borehole No. 21

Ground Level

Date 30th April 1969

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	φ deg.	m.c %	γ lb/cu. ft.	N
Topsoil		6"	6"						
Brown slightly organic sand with bands of grey silty clay			2'0"						
			6'0"		500	26	13.2	117	
		6'6"		7'0"					
				"	1930	0	15.7	137	
Stiff red/Brown boulder clay			13'6"						
			12'0"		1960	0	14.9	132	
			17'0"		1800	0	17.7	136	
		20'0"							

Water Struck at 4'0"

Maximum Observed Water Level 2'6"

Undisturbed Sample □
Disturbed Sample ○
Water Sample Δ
Penetration Test I

c = Cohesion
φ = Angle of Internal Friction
m.c = Moisture Content
γ = Bulk Density
N = Standard Penetration Value

Water levels are subject to seasonal or tidal variation and should not be taken as constant

IAN FARMER ASSOCIATES						Site		Borehole Number	
Boring Method		Diameter		Ground Level (mOD)		Client		Job Number	
Cable Percussion		150mm cased to 3.00m		37.02		Waterman Partnership		4511	
Depth (m)		Sample / Tests		Casing Depth (m)		Water Depth (m)		Field Records	
Location		Dates		Engineer		Sheet			
343527.8 E 398772.5 N		29/07/2004		Waterman Partnership		1/1			
Depth (m)		Sample / Tests		Casing Depth (m)		Water Depth (m)		Field Records	
Level (mOD)		Depth (m) (Thickness)		Description		Legend		Instr	
0.10-1.20	B								
1.20-1.65	CPT N=10 B	1.20	Dry	1.20/2.2	35.82	1.20	MADE GROUND: Scrub over firm brown sandy gravelly CLAY with sand bands. Gravel is angular to subangular, fine to coarse including brick.		
1.80	D								
2.10-2.55	CPT N=6 B	1.50	Dry	2.1/2.1-2		(1.70)	MADE GROUND: Loose brown clayey gravelly fine to coarse SAND with clay pockets. Gravel is angular to subangular, fine to coarse including brick fragments and sandstone.		
2.90	D								
3.00-3.45	SPT N=30 D B	2.80	Dry	3.4/5.7-9.9	34.12	2.90	Very weak red brown fine to coarse grained SANDSTONE recovered as clayey sandy gravel.		
3.70	D								
4.00-4.45	SPT N=37 D B	3.00	Dry	6.6/8.7-10.12		(2.70)			
5.00-5.45	SPT N=36 D B	3.00	Dry	1.5/7.7-9.13					
5.60	D				31.42	5.60	Moderately weak red brown fine to coarse grained SANDSTONE recovered as sandy gravel size fragments.		
6.00-6.06	CPT 25/30 50/25 D	3.00	Dry	25/50	30.96	6.06	Complete at 6.06m		
6.00									
Remarks							Figure No.	Scale (approx)	Logged By
Piezometer installed. Tip at 5.50m in gravel filter from 4.00m to 6.06m. Chiselling from 5.60m to 6.00m for 1 hour. Excavating from 0.00m to 1.20m for 1 hour.							4511.BH1	1:50	LI

C4026.RC4



Appendix E Exploratory Hole Logs



5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 23/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343806.41 N396794.89

Project No. : 5570

Crew Name: D. Cahill & A Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH101	BH	43.24m AoD	D. Horne	1:20	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.20	43.04		MADE GROUND: Grey brown and brown slightly silty fine to coarse SAND with rootlets. (Topsoil).	
					0.50	42.74		MADE GROUND: Dark brown and orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.70	D					Medium dense brown fine to coarse SAND. (Shirdley Hill Sand Deposits).	
		1.00 - 1.45 1.00	D SPT	N=15 (2,3/3,4,4,4)					1
		2.00 - 2.45 2.00	D SPT	N=13 (2,2/3,3,3,4)	2.20	41.04		Firm medium strength brown and grey slightly gravelly sandy CLAY. Gravel is fine to medium subangular to subrounded of mudstone and sandstone.	2
		3.00 - 3.45 3.00 - 3.50 3.00	D B SPT	N=4 (1,1/1,1,1,1)	2.90	40.34		Very soft very low strength brown sandy CLAY.	3
		4.00 - 4.45	D						4

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
				5.00	5.50	01:00		0.00		90	

Remarks

Groundwater was encountered at 4.90m and remained at 4.90m after 20 minutes. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 23/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

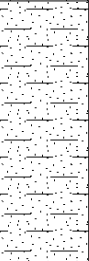
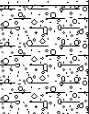
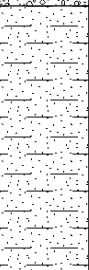
Co-ords: E343806.41 N396794.89

Project No. : 5570

Crew Name: D. Cahill & A Gallagher

Drilling Equipment: Dando 2000

Borehole Number BH101	Hole Type BH	Level 43.24m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 2 of 2
---------------------------------	-----------------	---------------------	-----------------------	---------------	-----------------------------

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.00	SPT	N=2 (1,1/0,0,1,1)				Very soft very low strength brown sandy CLAY.	
		5.00 - 5.45 5.00	D SPT	50 (2,12/50 for 200mm)	4.70 5.00	38.54 38.24		Firm brown slightly gravelly sandy CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of sandstone. Cobbles are subangular to subrounded of sandstone.	5
		5.50 - 5.70 5.50	D SPT	50 (25 for 115mm/50 for 85mm)	5.70	37.54		Very dense reddish brown slightly clayey medium to coarse SAND. (Weathered sandstone of the Chester Formation).	
		End of Borehole at 5.70m							6 7 8

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
				5.00	5.50	01:00		0.00		90	

Remarks

Groundwater was encountered at 4.90m and remained at 4.90m after 20 minutes. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 23/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343720.42 N396776.98

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH102	BH	41.43m AoD	D. Horne	1:20	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			0.20	41.23		MADE GROUND: Grey brown and brown slightly silty fine to coarse SAND with rootlets. (Topsoil).	
		0.30	D					MADE GROUND: Dark brown and orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.50	D		0.50	40.93		Medium dense brown fine to coarse SAND. (Shirdley Hill Sand Deposits).	
		1.00 - 1.45 1.00 - 1.50 1.00	D B SPT	N=13 (1,1/2,3,4,4)					1
		2.00 - 2.45 2.00	D SPT	N=15 (2,2/3,3,4,5)	2.00	39.43		Firm medium strength brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium subangular to subrounded of sandstone and mudstone.	2
		3.00 - 3.45 3.00	D SPT	N=13 (1,2/2,3,4,4)	3.00	38.43		Medium dense reddish brown slightly clayey medium to coarse SAND with rare grey sand lenses. (Weathered sandstone of the Chester Formation).	3
		4.00 - 4.45	D						4

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
				4.00	4.50	01:00		0.00		90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 23/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343720.42 N396776.98

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH102	BH	41.43m AoD	D. Horne	1:20	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.00	SPT	N=50 (2,4/50 for 275mm)	4.92	36.51		Medium dense reddish brown slightly clayey medium to coarse SAND with rare grey sand lenses. (Weathered sandstone of the Chester Formation). <i>Becoming very dense at 4.00m.</i>	5
		4.50 - 4.92 4.50	D SPT	N=50 (6,12/50 for 265mm)					
								End of Borehole at 4.92m	6
									7
									8

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
				4.00	4.50	01:00		0.00		90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 23/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

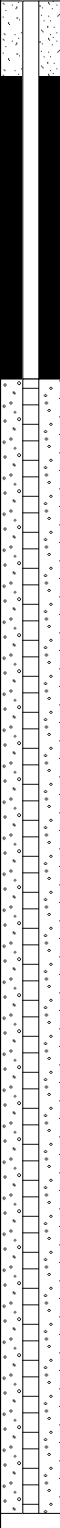
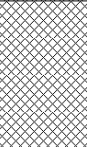
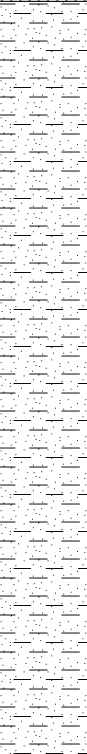
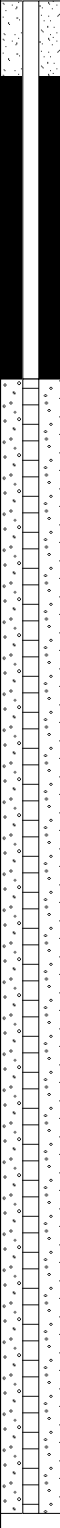
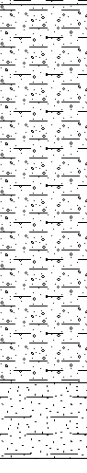
Co-ords: E343819.12 N396718.44

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH103	BH	41.81m AoD	D. Horne	1:20	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D					MADE GROUND: Grey brown and brown slightly silty fine to coarse SAND with rootlets. (Topsoil).	
		0.40	D		0.40	41.41		MADE GROUND: Dark brown and orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.80	D		0.80	41.01		Soft low strength grey brown sandy CLAY.	1
		1.00 - 1.45 1.00	D SPT	N=4 (1,0/1,1,1,1)					
		2.00 - 2.45 2.00	D SPT	N=10 (1,2/2,2,3,3)	2.80	39.01		<u>Becoming firm medium strength at 2.00m.</u>	2
		3.00 - 3.45 3.00	D SPT	N=28 (3,5/6,6,7,9)	3.80	38.01		Stiff high strength brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium subangular to subrounded of sandstone and mudstone.	3
		4.00 - 4.45	D					Very dense reddish brown slightly clayey medium to coarse SAND with rare grey sand lenses. (Weathered sandstone of the Chester Formation).	4

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
				4.00	4.50	01:00		0.00	4.94	90	

Remarks
No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 23/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343819.12 N396718.44

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number BH103	Hole Type BH	Level 41.81m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 2 of 2
---------------------------------	-----------------	---------------------	-----------------------	---------------	-----------------------------

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.00	SPT	N=50 (6,10/50 for 235mm)				Very dense reddish brown slightly clayey medium to coarse SAND with rare grey sand lenses. (Weathered sandstone of the Chester Formation).	
		4.50 - 4.94 4.50	D SPT	N=50 (7,10/50 for 285mm)					
					4.94	36.87		End of Borehole at 4.94m	5
									6
									7
									8

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
				4.00	4.50	01:00		0.00	4.94	90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 24/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343715.41 N396559.20

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH104	BH	39.81m AoD	D. Horne	1:20	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.20	39.61		MADE GROUND: Grey brown and brown slightly silty fine to coarse SAND with rootlets. (Topsoil).	
		0.40	D		0.40	39.41		MADE GROUND: Dark brown and orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		1.00 - 1.45 1.00	B SPT	N=8 (1,0/1,2,2,3)	1.20	38.61		Loose brown fine to coarse SAND. (Shirdley Hill Sand Deposits).	1
		2.00 - 2.45 2.00	D SPT	N=7 (1,1/1,2,2,2)	2.30	37.51		Soft low strength brown sandy CLAY.	2
		3.00 - 3.45 3.00	D SPT	N=13 (1,2/2,3,4,4)				Firm medium strength brown slightly gravelly sandy CLAY. Gravel is fine to coarse subrounded to rounded of mudstone and sandstone.	3
		4.00 - 4.45	D						4

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
				7.00	7.30	01:00		0.00	7.60	90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 24/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343715.41 N396559.20

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH104	BH	39.81m AoD	D. Horne	1:20	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.00	SPT	N=15 (1,2/3,3,4,5)				Firm medium strength brown slightly gravelly sandy CLAY. Gravel is fine to coarse subrounded to rounded of mudstone and sandstone.	
					4.60	35.21		Stiff brown slightly gravelly sandy CLAY. Gravel is fine to coarse subrounded to rounded of mudstone and sandstone.	
		5.00 - 5.45 5.00	D SPT	N=50 (4,10/50 for 245mm)	5.00	34.81		Very dense brown SAND and GRAVEL. Sand if medium to coarse. Gravel is fine to coarse subrounded to rounded of sandstone and mudstone.	5
		6.00 - 6.45 6.00	D SPT	N=14 (3,4/5,3,3,3)				<u>Becoming medium dense at 6.00m.</u>	6
					6.30	33.51		Firm medium strength brown slightly gravelly sandy CLAY. Gravel is fine to coarse subrounded to rounded of mudstone and sandstone.	
		7.00 - 7.22 7.00	D SPT	50 (25 for 125mm/50 for 95mm)	7.00	32.81		Very dense white and light brown medium to coarse SAND. (Weathered sandstone of the Chester Formation).	7
		7.30 - 7.55 7.30	D SPT	50 (25 for 95mm/50 for 105mm)					
					7.55	32.26		End of Borehole at 7.55m	8

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
				7.00	7.30	01:00		0.00	7.60	90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 24/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

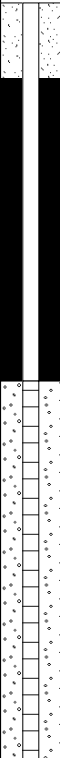
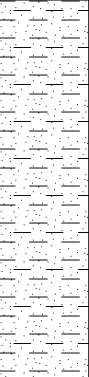
Co-ords: E343715.41 N396567.49

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH105	BH	39.94m AoD	D. Horne	1:20	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	39.74		MADE GROUND: Grey brown and brown slightly silty fine to coarse SAND with rootlets. (Topsoil).	
					0.40	39.54		MADE GROUND: Dark brown and orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
					1.00	38.94		Brown fine to coarse SAND. (Shirdley Hill Sand Deposits).	1
					2.00	37.94		Soft brown sandy CLAY.	2
								End of Borehole at 2.00m	3
									4

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
								0.00	2.00	90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 24/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343648.61 N396712.02

Project No. : 5570

Crew Name:

Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH106	BH	39.58m AoD		1:20	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D					MADE GROUND: Grey brown and brown slightly silty fine to coarse SAND with rootlets. (Topsoil).	
		0.50	D		0.50	39.08		MADE GROUND: Dark brown and orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		1.00 - 1.45 1.00	D SPT	N=4 (1,1/1,1,1,1)	0.80	38.78		Soft low strength brown and grey brown sandy CLAY.	1
		2.00 - 2.45 2.00	D SPT	N=7 (1,1/1,2,2,2)				<u>Becoming firm low strength at 2.00m.</u>	2
		3.00 - 3.45 3.00	D SPT	N=10 (1,2/2,2,3,3)	2.80	36.78		Firm medium strength reddish brown slightly gravelly slightly sandy CLAY. Gravel is fine to medium subangular to subrounded of mudstone and sandstone.	3
		4.00 - 4.44	D		3.90	35.68		Very dense reddish brown slightly clayey medium	4

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
				4.20	4.70	01:00		0.00	5.10	90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
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Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 24/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343648.61 N396712.02

Project No. : 5570

Crew Name:

Drilling Equipment:

Borehole Number BH106	Hole Type BH	Level 39.58m AoD	Logged By	Scale 1:20	Page Number Sheet 2 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.00	SPT	N=50 (6,8/50 for 285mm)	5.10	34.48		Very dense reddish brown slightly clayey medium to coarse SAND. (Weathered sandstone of the Chester Formation).	5
		4.70 - 5.10 4.70	D SPT	50 (8,12/50 for 215mm)				Becoming slightly gravelly with depth. Gravel is medium to coarse subrounded to rounded sandstone.	
								End of Borehole at 5.10m	6
									7
									8

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
				4.20	4.70	01:00		0.00	5.10	90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
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Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 24/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343722.09 N396678.25

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH107	BH	40.82m AoD	D. Horne	1:20	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.40	40.42		MADE GROUND: Grey brown and brown slightly silty fine to coarse SAND with rootlets. (Topsoil).	
		0.50	D		0.60	40.22		MADE GROUND: Dark brown and orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		1.00 - 1.45 1.00	D SPT	N=10 (1,2/2,2,3,3)				Firm medium strength grey and brown grey slightly gravelly slightly sandy CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Cobbles are subangular of sandstone and mudstone.	1
		2.00 - 2.45 2.00	D SPT	N=11 (1,2/2,3,3,3)				<u>Becoming brown at 1.70m.</u>	2
		3.00 - 3.45 3.00	D SPT	N=16 (2,3/3,4,4,5)	2.80	38.02		Stiff high strength reddish brown slightly gravelly slightly sandy CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Cobbles are subangular of sandstone and mudstone.	3
		4.00 - 4.45	D		3.80	37.02		Dense reddish brown slightly clayey medium to coarse SAND. (Weathered sandstone of the Chester Formation).	4

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
				4.00	4.45	01:00		0.00	4.89	90	

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





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LS12 6QA

Cable Percussion Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 24/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343722.09 N396678.25

Project No. : 5570

Crew Name: D. Cahill & A. Gallagher

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH107	BH	40.82m AoD	D. Horne	1:20	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.00	SPT	N=48 (5,8/10,12,14,12)				Dense reddish brown slightly clayey medium to coarse SAND. (Weathered sandstone of the Chester Formation).	
		4.50 - 4.89 4.50	D SPT	N=50 (6,10/50 for 255mm)				Becoming very dense at 4.50m.	
					4.89	35.93		End of Borehole at 4.89m	
									5
									6
									7
									8

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
				4.00	4.45	01:00		0.00	4.89	90	

Remarks
No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343653.37 N396691.66

Project No. : 5570

Crew Name: Boundary Plant

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP101	Location Type TP	Level 39.69m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	
		0.50	ES		0.40	39.29		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.90 0.90	D	HSV=75	0.80	38.89		Firm medium strength grey and light grey slightly gravelly sandy CLAY with rootlets. Gravel is fine to medium subrounded to rounded of mudstone and sandstone.	1
		1.30		HSV=60					
					1.60	38.09		Brown and reddish brown slightly gravelly clayey fine to coarse SAND with occasional clay lenses. Gravel is fine to coarse subangular to subrounded of sandstone.	2
		2.30		HSV=77	2.20	37.49		Stiff high strength brown slightly gravelly slightly sandy CLAY with occasional sand lenses. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.	
					2.50	37.19		End of Trial Pit at 2.50m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Unstable						

Remarks

Perched water was encountered at 1.70m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





5 John Charles Way
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Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343673.05 N396657.81

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP102	Location Type TP	Level 39.93m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.30	39.63		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	
					0.50	39.43		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.70 0.70	B	HSV=57				Firm medium strength grey brown slightly gravelly sandy CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Cobbles are subangular of mudstone.	
								<u>Becoming brown at 0.90m.</u>	1
		1.10		HSV=47					
		1.60	D						
					1.90	38.03		Stiff high strength brown slightly gravelly slightly sandy CLAY with occasional light brown sand lenses. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.	2
		2.10		HSV=87					
					2.75	37.18		End of Trial Pit at 2.75m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Unstable.						

Remarks

Perched water was encountered at 2.20m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343695.79 N396599.78

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP103	Location Type TP	Level 40.09m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	39.79		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	
					0.70	39.39		Orangish brown fine to coarse SAND. (Shirdley Hill Sand Deposits).	
		0.80 0.80	ES	HSV=70				Firm brown slightly gravelly sandy CLAY interbedded with light brown and purplish brown clayey fine to coarse SAND. Gravel is fine to medium subangular to subrounded of sandstone and mudstone.	1
		1.60 1.70	D	HSV=52	1.30	38.79		Firm medium strength reddish brown and purplish brown slightly gravelly slightly sandy CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone. Cobbles are subangular to subrounded of sandstone and mudstone.	2
		1.90		HSV=72				Brown slightly clayey fine to coarse SAND with occasional thin clay lenses.	
					2.20	37.89			
					2.90	37.19		End of Trial Pit at 2.90m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Unstable.						

Remarks

Perched water was encountered at 2.20m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343730.81 N396556.42

Project No. : 5570

Crew Name: Boundary Plant

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP104	Location Type TP	Level 39.98m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.25	39.73		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
					0.40	39.58		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.80 0.80	B	HSV=74				Firm medium strength grey slightly gravelly sandy CLAY with rootlets. Gravel is fine to medium subrounded to rounded of mudstone and sandstone.	
		1.20	B		1.00	38.98		Firm low strength (soft in places) brown and purplish brown slightly gravelly sandy CLAY with low cobble content and occasional light brown sand lenses. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Cobbles are subangular of mudstone.	
		1.50		HSV=31					
		2.40		HSV=92	2.20	37.78		Stiff high strength brown and purplish brown slightly sandy slightly gravelly CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone. Cobbles are subangular of mudstone.	
					2.60	37.38		End of Trial Pit at 2.60m	4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Unstable.						

Remarks

Perched water and running sand was encountered within sand lenses at 1.50m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343758.48 N396605.79

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP105	Location Type TP	Level 41.30m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30			0.30	41.00		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	
					0.60	40.70		MADE GROUND: Yellowish brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.70 0.70 0.80	ES D	HSV=30				Firm low strength (soft in places) brown and purplish brown slightly gravelly very sandy CLAY with occasional light brown sand lenses. Gravel is fine to medium subangular to subrounded of sandstone and mudstone.	1
		1.50		HSV=32				<u>Land drain encountered at 1.10m.</u>	
		2.10		HSV=92	1.90	39.40		Stiff high strength brown and purplish brown slightly sandy slightly gravelly CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone. Cobbles are subangular of mudstone.	2
		2.80		HSV=84	3.00	38.30		End of Trial Pit at 3.00m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Unstable.						

Remarks

Perched water and running sand was encountered within sand lenses at 1.20m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





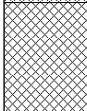
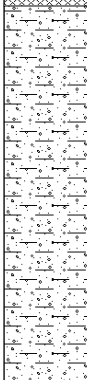
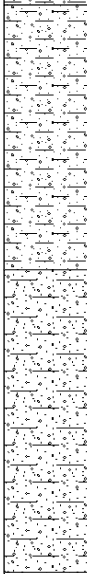
Trial Pit Log

Date: 25/04/2019

Co-ords: E343709.84 N396646.98

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

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	D	HSV=50	0.20	40.32		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
				HSV=50	0.50	40.02		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		1.20		HSV=30	1.50	39.02		Firm medium strength brown slightly gravelly sandy CLAY interbedded with brown and light brown slightly clayey fine to coarse SAND. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	2
				<u>Becoming soft low strength at 1.20m.</u>					
		1.70		HSV=65	2.20	38.32		Firm medium strength brown slightly gravelly sandy CLAY with frequent light brown sand lenses. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.	
		2.00 2.00		HSV=75				Brown slightly gravelly very clayey fine to coarse SAND with occasional clay lenses. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	
		3.00	37.52		End of Trial Pit at 3.00m			3	
								4	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
2.00	0.60	Unstable, sides collapsing in.					

Perched water and running sand was encountered within sand lenses at 2.00m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.

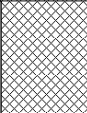
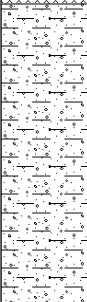




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Trial Pit Log

Project Name: Knowsley Lane, Knowsley		Client: Caddicks Development Limited		Date: 25/04/2019	
Location: Knowsley		Contractor: DPD and Boundary Plant		Co-ords: E343706.04 N396699.38	
Project No. : 5570		Crew Name: Boundary Plant.		Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket	
Location Number TP107	Location Type TP	Level 40.48m AoD	Logged By D. Horne	Scale 1:20	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 0.60	B	HSV=94	0.30	40.18		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
					0.50	39.98		MADE GROUND: Orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		1.50	HSV=55	1.30	39.18		Stiff high strength grey and light grey slightly gravelly sandy CLAY with rootlets. Gravel is fine to medium subrounded to rounded of mudstone and sandstone.		
				2.40	HSV=83	2.80	37.68		
		End of Trial Pit at 2.80m					3		
								4	

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Stable.						

Remarks
No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343733.02 N396693.38

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP108	Location Type TP	Level 41.02m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES	HSV=43	0.40	40.62		MADE GROUND: Dark brown slightly gravelly silty fine to coarse SAND with low cobble content and rootlets. Gravel is fine to coarse angular to subangular of brick, concrete and ceramic. Cobbles are angular of concrete and brick. (Topsoil).	1
					0.60	40.42		MADE GROUND: Orange brown and light brown slightly gravelly slightly silty fine to coarse SAND with rootlets. Gravel is fine to medium angular to subangular of brick and concrete. (Subsoil).	
		0.80						Firm medium strength grey, brown and brown grey slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	
				1.10	39.92		<u>Land drain encountered at 0.90m.</u>		
		1.20	D					Firm medium strength purplish brown and reddish brown slightly gravelly sandy CLAY. Gravel is medium to coarse subangular to subrounded of sandstone and mudstone.	
		1.50		HSV=47				2	
		2.50		HSV=89			<u>Becoming stiff high strength at 2.50m.</u>	3	
					2.90	38.12		4	
									End of Trial Pit at 2.90m



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Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343781.05 N396651.51

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP109	Location Type TP	Level 41.61m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.30	41.31		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
					0.60	41.01		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.70		HSV=115				Stiff high strength brownish grey slightly gravelly sandy CLAY with rootlets. Gravel is fine to medium subrounded to rounded of mudstone and sandstone.	
		0.80							
		1.30		HSV=77	1.10	40.51		Stiff high strength brown slightly gravelly sandy CLAY with frequent sand lenses. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	
					1.80	39.81		Stiff medium strength purplish brown and reddish brown slightly gravelly slightly sandy CLAY. Gravel is medium to coarse subangular to subrounded of sandstone and mudstone.	2
					2.10				
					2.75	38.86		End of Trial Pit at 2.75m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Stable.						

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





Trial Pit Log

Client: Caddicks Development Limited

Date: 25/04/2019

Contractor: DPD and Boundary Plant

Co-ords: E343817.75 N396650.83

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number
TP110

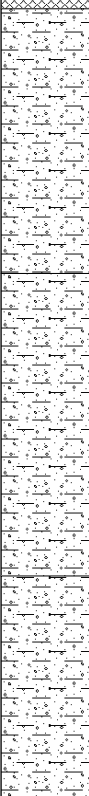
Location Type
TP

Level
41.97m AoD

Logged By
D. Horne

Scale
1:20

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						
								MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1 2 3 4	
		0.50	ES		0.40	41.57		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).		
		0.70	D		0.60	41.37		Firm low strength grey slightly gravelly very sandy CLAY. Gravel is fine to medium subangular to subrounded of sandstone and mudstone.		
		0.80		HSV=40				<u>Land drain encountered at 1.10m.</u>		
					1.30	40.67		Soft low strength purplish brown and reddish brown slightly sandy CLAY with occasional sand lenses.		
		1.50	B							
		1.50		HSV=25						
		2.20		HSV=66	2.10	39.87		Firm medium strength becoming stiff high strength brown and reddish brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.		
		2.50		HSV=75						
					2.70	39.27		End of Trial Pit at 2.70m		

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
2.00	0.60	Unstable.					

Remarks

Perched water was encountered at 1.10m, most likely due to the land drain. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343826.63 N396696.21

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP111	Location Type TP	Level 41.83m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 0.50	ES	HSV=38	0.30	41.53		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
					0.50	41.33		MADE GROUND: Orange brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.75 0.80		HSV=35	1.10	40.73		Firm low strength (soft in places) grey and light grey slightly gravelly sandy CLAY with rootlets. Gravel is fine to medium subrounded to rounded of mudstone and sandstone. Land drain encountered at 0.70m.	
		1.40						Firm low strength reddish brown slightly gravelly sandy CLAY with occasional grey sand lenses. Gravel is medium to coarse subangular to subrounded of mudstone and sandstone.	
		2.10		HSV=63	2.30	39.53		Becoming medium strength at 2.10m.	2
		2.50		HSV=72				Stiff medium strength brown and reddish brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	
		2.80			2.80	39.03		End of Trial Pit at 2.80m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks	
2.00	0.60	Stable.						

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 25/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343803.99 N396731.45

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP112	Location Type TP	Level 41.70m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
			B		0.40	41.30		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
					0.60	41.10		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.80						Stiff high strength brown, grey brown and grey slightly gravelly slightly sandy CLAY with occasional light brown sand lenses. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone.	
		1.10		HSV=75				<u>Land drain encountered at 0.90m.</u>	
		1.80		HSV=40	1.40	40.30		Firm medium strength brown slightly gravelly sandy CLAY. Gravel is fine to medium subangular to subrounded of mudstone and sandstone.	
		2.30		HSV=74	2.20	39.50		Stiff medium strength brown and reddish brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	
					2.80	38.90		End of Trial Pit at 2.80m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Unstable.						

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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Trial Pit Log

Project Name: Knowsley Lane, Knowsley	Client: Caddicks Development Limited	Date: 26/04/2019
Location: Knowsley	Contractor: DPD and Boundary Plant	Co-ords: E343773.02 N396725.44
Project No. : 5570	Crew Name: Boundary Plant.	Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP113	Location Type TP	Level 41.40m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	
		0.50	ES		0.40	41.00		MADE GROUND: Orange brown and light brown fine to coarse SAND. (Subsoil).	
		0.80		HSV=33	0.60	40.80		Soft low strength grey slightly gravelly sandy CLAY with rootlets. Gravel is fine to medium subrounded to rounded of mudstone and sandstone.	
		1.10		HSV=27	1.10	40.30		<u>Land drain encountered at 1.00m.</u>	1
								Soft low strength reddish brown and brown slightly gravelly sandy CLAY with low cobble content and occasional light brown sand lenses. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Cobbles are subangular to subrounded of mudstone.	
		2.00	D	HSV=63				<u>Becoming firm medium strength at 2.00m.</u>	2
		2.00						<u>Becoming very sandy at 2.60m.</u>	
									3
					3.10	38.30		End of Trial Pit at 3.10m	
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Stable.						

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley		Client: Caddicks Development Limited		Date: 26/04/2019	
Location: Knowsley		Contractor: DPD and Boundary Plant		Co-ords: E343709.97 N396768.99	
Project No. : 5570		Crew Name: Boundary Plant.		Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket	
Location Number TP114	Location Type TP	Level 41.14m AoD	Logged By D. Horne	Scale 1:20	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	40.74		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
					0.70	40.44		MADE GROUND: Orange brown and light brown fine to coarse SAND. (Subsoil).	
		0.90	ES					Light brown medium to coarse SAND. (Shirdley Hill Sand Deposits).	
		1.10	B						2
		1.80		HSV=45	1.75	39.39		Firm medium strength grey slightly gravelly sandy CLAY. Gravel is fine subangular to subrounded of mudstone.	
		2.30		HSV=45	2.10	39.04		Firm medium strength purplish brown, reddish brown and brown slightly gravelly sandy CLAY with low cobble content and rare sand lenses. Gravel is fine to coarse subrounded to rounded of sandstone and mudstone. Cobbles are subrounded of mudstone.	
		2.50		HSV=70	2.70	38.44		Light brown and reddish brown slightly gravelly fine to coarse SAND. Gravel is medium to coarse subrounded to rounded of sandstone.	
					3.10	38.04			
								End of Trial Pit at 3.10m	
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Unstable, sides collapsing in.						

Remarks
No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 26/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

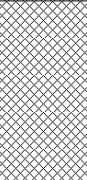
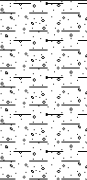
Co-ords: E343760.87 N396777.99

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP115	Location Type TP	Level 41.91m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.50	41.41		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	
								Light brown medium to coarse SAND. (Shirdley Hill Sand Deposits).	1
		2.10	D		1.90	40.01		Friable bluey grey slightly gravelly very sandy CLAY with occasional grey sand lenses.	2
		2.50		HSV=60	2.40	39.51		Firm medium strength purplish brown, reddish brown and brown slightly gravelly sandy CLAY with low cobble content and rare sand lenses. Gravel is fine to coarse subrounded to rounded of sandstone and mudstone. Cobbles are subrounded of mudstone.	
					2.60	39.31		End of Trial Pit at 2.60m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks	
2.00	0.60	Unstable, sides collapsing in.						

Remarks

Perched water and running sand encountered within sand lenses at 1.80m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 26/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343804.26 N396776.75

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP116	Location Type TP	Level 42.15m AoD	Logged By D. horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES	HSV=65	0.60	41.55		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
		0.75	B					Light brown medium to coarse SAND. (Shirdley Hill Sand Deposits).	
								<u>Land drain encountered at 0.85m.</u>	
		1.70						Firm medium strength bluey grey and grey slightly gravelly very sandy CLAY with occasional grey sand lenses.	
		2.50						Soft low strength reddish brown slightly gravelly very sandy CLAY. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	
				HSV=35	2.40	39.75			2
					2.70	39.45		End of Trial Pit at 2.70m	
									3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks	
2.00	0.60	Unstable, sides collapsing in.						

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 26/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343853.96 N396721.06

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP117	Location Type TP	Level 42.41m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.35	42.06		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets and rare ceramic. (Topsoil).	
								MADE GROUND: Light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
								<u>Land drain encountered at 0.60m.</u>	
		0.90		HSV=63	0.75	41.66		Firm medium strength grey and light grey slightly gravelly sandy CLAY with rootlets. Gravel is fine to medium subrounded to rounded of mudstone and sandstone.	1
		1.40	D					<u>Becoming soft low strength at 1.30m.</u>	
		1.50		HSV=34					
					2.10	40.31		Firm medium strength brown slightly gravelly very sandy CLAY. Gravel is fine to medium subangular to subrounded of mudstone.	2
		2.30		HSV=53	2.40	40.01		Brown and reddish brown slightly gravelly very clayey fine to coarse SAND interbedded with brown slightly gravelly slightly sandy CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Cobbles are subangular to subrounded of mudstone.	
					2.90	39.51		End of Trial Pit at 2.90m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Stable.						

Remarks

Perched water and running sand was encountered within sand lenses at 1.40m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





5 John Charles Way
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Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 26/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343839.50 N396753.78

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP118	Location Type TP	Level 42.17m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.40	B	HSV=63	0.40	41.77		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets and rare ceramic. (Topsoil).	1	
								MADE GROUND: Light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).		
		0.75		41.42		Firm medium strength grey and bluey grey slightly gravelly very sandy CLAY. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.				
						<u>Becoming soft low strength at 1.15m.</u>				
		1.50		40.67		Firm low strength (soft in places) reddish brown very sandy CLAY, with frequent light brown sand lenses.				
						1.90	40.27			Brown and reddish brown slightly gravelly very clayey fine to coarse SAND interbedded with brown slightly gravelly slightly sandy CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Cobbles are subangular to subrounded of mudstone.
		2.75		39.42						End of Trial Pit at 2.75m

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length 2.00	Pit Width 0.60	Pit Stability Stable.	Shoring Used	Remarks		Date	Rate	Remarks

Remarks

No groundwater encountered. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 26/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343865.35 N396765.42

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP119	Location Type TP	Level 43.13m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.30	42.83		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	1
		0.50			0.50	42.63		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
		0.75						Light brown and brown medium to coarse SAND. (Shirdley Hill Sand Deposits).	
		1.35	HSV=45		1.35	41.78		Firm medium strength grey and light grey slightly gravelly sandy CLAY with rootlets. Gravel is fine to medium subrounded to rounded of mudstone and sandstone.	2
		1.50			1.50	41.43		Very soft very low strength reddish brown slightly gravelly very sandy CLAY with occasional light brown sand lenses. Gravel is fine to medium subangular to subrounded of sandstone and mudstone.	
		1.90	HSV=12		1.90				
		2.30	HSV=22		2.30			<u>Becoming soft low strength at 2.30m.</u>	
		2.90			2.90	40.23		End of Trial Pit at 2.90m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
2.00	0.60	Unstable, sides collapsing in.						

Remarks

Perched water and running sand was encountered within sand lenses at 1.10m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





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Trial Pit Log

Project Name: Knowsley Lane, Knowsley

Client: Caddicks Development Limited

Date: 26/04/2019

Location: Knowsley

Contractor: DPD and Boundary Plant

Co-ords: E343844.62 N396789.06

Project No. : 5570

Crew Name: Boundary Plant.

Equipment: 13 Tonne Rubber Tracked Excavator with a 2 foot toothed bucket

Location Number TP120	Location Type TP	Level 43.06m AoD	Logged By D. Horne	Scale 1:20	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.35	42.71		MADE GROUND: Dark brown silty fine to coarse SAND with rootlets. (Topsoil).	
					0.50	42.56		MADE GROUND: Orange brown and light brown slightly silty fine to coarse SAND with rootlets. (Subsoil).	
								Light brown and brown medium to coarse SAND. (Shirley Hill Sand Deposits).	
		1.80	D		1.70	41.36		Firm medium strength grey slightly gravelly sandy CLAY. Gravel is fine to medium subangular to subrounded of sandstone and mudstone.	1
		1.90		HSV=45	2.10	40.96		Brown and reddish brown slightly gravelly very clayey fine to coarse SAND interbedded with brown slightly gravelly slightly sandy CLAY with low cobble content. Gravel is fine to coarse subangular to subrounded of mudstone and sandstone. Cobbles are subangular to subrounded of mudstone.	2
					2.90	40.16		End of Trial Pit at 2.90m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks	
2.00	0.60	Unstable, sides collapsing in.						

Remarks

Perched water and running sand was encountered within sand lenses at 1.60m. No visual or olfactory evidence of potential hydrocarbon contamination. Hand shear vane tests undertaken in the upper 1.20m were undertaken as insitu tests and those taken below 1.20m were undertaken as exsitu tests.





Appendix F Chemical Analysis Certificates and HazWasteOnline™ Waste Classification



STATISTICAL ASSESSMENT OF CHEMICAL ANALYSIS

The results of the chemical analysis have been assessed in accordance with CL:AIRE (Contaminated Land: Applications in Real Environments) 'Guidance on Comparing Soil Contamination Data with a Critical Concentration' published by the CIEH, May 2008.

This guidance provides a statistical approach to objectively evaluate the evidence for and against particular propositions/hypothesis and has the useful attribute of enabling decision makers to reach conclusions about the available evidence, with at least some understanding of the validity of the results.

The guidance approaches this in the context of assessing the results from two different perspectives, the Planning Scenario and Part 2A.

When assessing in terms of the Planning Scenario, the key question would be 'can we confidently say that the level of contamination on this land is low relative to some appropriate measure of risk?' Under Part 2A, the question would be 'can we confidently say that the level of contamination is high relative to some appropriate measure of risk?'

These questions are addressed through the use of formal hypothesis – the "Null Hypothesis" and the "Alternative Hypothesis".

This assessment will be carried out in accordance with the Planning Scenario, where the aim is to demonstrate 'suitability for use'. The Null Hypothesis is that the level of contamination is the same as, or higher than the critical concentration/GAC. The Alternative Hypothesis is that the level of contamination is lower than the critical concentration/GAC. Under Part 2A the opposite set of propositions are applicable.

By convention, the Null Hypothesis is the starting proposition against which the key question, as expressed by the Alternative Hypothesis, can be tested.

The assessment of the results relies on there being a normal distribution of results for a particular contaminant and that the data set under consideration is representative of the particular material which is being assessed. If more than one dataset is present, then the hypothesis should be applied individually for each data set.

Under the Planning Scenario, the statistical test is used to demonstrate that there is a 95% probability that the true population mean falls below the critical concentration/GAC.

Appropriate data sets must be created to enable the statistical testing to be carried out and three key elements must be considered prior to statistical analysis. These are as follows:

- Dealing with non-detects;
- Understanding the statistical distribution of data; and
- Dealing with outliers.

The results can then be assessed, and the results will be compared against the following:

- Sample Mean – if the sample mean of the data set is in excess of the GAC then the Upper Confidence Limit of the true population mean will be higher than the critical concentration.
- 95% of the Upper Confidence Limit.
- One Sample T Test (parametric test) carried out at the 95% confidence level.

On the basis of these tests, the validity of the Null Hypothesis can be assessed.



Certificate of Analysis

Certificate Number 19-07907-1

10-May-19

Client JPG (Leeds) LTD
Civil & Structural Engineers
5 John Charles Way
Leeds
LS12 6QA

Our Reference 19-07907-1

Client Reference 5570

Order No (not supplied)

Contract Title Knowsley Lane, Knowsley

Description 12 Soil samples, 4 Leachate samples.

Date Received 30-Apr-19

Date Started 30-Apr-19

Date Completed 10-May-19

Test Procedures Identified by prefix DETSn (details on request).

Notes This test supersedes 19-07907, extra testing.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1494327	1494328	1494329	1494330	1494331	1494332
Sample ID	TP101	TP102	TP003	TP104	TP105	TP108
Depth	0.50	0.20	0.80	0.20	0.70	0.30
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19	26/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Asbestos Quantification	DETSC 1102	0							
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	3.6	5.7	2.5	4.4	2.3	5.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	0.4	< 0.1	0.3	< 0.1	0.3
Chromium	DETSC 2301#	0.15	mg/kg	10	14	35	10	35	9.0
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0		< 1.0	< 1.0		< 1.0
Copper	DETSC 2301#	0.2	mg/kg	65	72	41	46	34	63
Lead	DETSC 2301#	0.3	mg/kg	30	46	13	36	11	39
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.15	< 0.05	0.07	< 0.05	0.06
Nickel	DETSC 2301#	1	mg/kg	17	11	34	8.7	33	9.1
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	45	44	45	35	47	37
Inorganics									
pH	DETSC 2008#			6.5	5.9	6.2	5.7	6.1	6.3
Cyanide, Free	DETSC 2130#	0.1	mg/kg	0.2	0.4	< 0.1	0.3	< 0.1	0.2
Organic matter	DETSC 2002#	0.1	%	3.0	6.4	0.8	3.6	0.6	3.5
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	4.1		5.1	3.0		3.0
Chloride	DETSC 2055	1	mg/kg	20.0		21.5	9.0		9.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	18	10	25	< 10	24	< 10
Sulphide	DETSC 2024*	10	mg/kg	24		12	< 10		< 10
Sulphate as SO4, Total	DETSC 2321#	100	mg/kg	500		400	300		400
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.6	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.3	< 0.1	< 0.1	< 0.1	0.2
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.1	< 0.1	< 0.1	< 0.1	0.3
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	0.3	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	0.5	< 0.1	< 0.1	< 0.1	0.7
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	2.2	< 1.6	< 1.6	< 1.6	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1494327	1494328	1494329	1494330	1494331	1494332
Sample ID	TP101	TP102	TP003	TP104	TP105	TP108
Depth	0.50	0.20	0.80	0.20	0.70	0.30
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19	26/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
OCPs									
alpha-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
beta-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
delta-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Heptachlor	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Aldrin	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
gamma-Chlordane	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
4,4-DDE	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Dieldrin	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Endrin	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Endrin aldehyde	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
4,4-DDT	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Methoxychlor	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
Endrin ketone	DETSC 3441*	0.1	mg/kg		< 0.1		< 0.1		
OPPs									
Dichlorvos	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Mevinphos	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Demeton-O	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Ethoprop	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Naled	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Phorate	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Demeton-S	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Diazinon	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Disulfoton	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Methylparathion	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Ronnel	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Fenthion	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Chlopyrifos	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Trichlorinate	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Merphos	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Stirofos	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Tokuthion	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Fensulfothion	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Bolstar	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Azinphos methyl	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		
Coumaphos	DETSC 3443*	0.1	mg/kg		< 0.1		< 0.1		

Summary of Chemical Analysis Soil Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1494327	1494328	1494329	1494330	1494331	1494332
Sample ID	TP101	TP102	TP003	TP104	TP105	TP108
Depth	0.50	0.20	0.80	0.20	0.70	0.30
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	25/04/19	25/04/19	25/04/19	25/04/19	25/04/19	26/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Triazines									
Atraton	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Prometon	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Simazine	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Atrazine	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Propazine	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Terbutylazine	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Secbumeton	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Symetryn	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Ametryn	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Prometryne	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		
Terbutryn	DETSC 3445*	0.1	mg/kg		< 0.1		< 0.1		

Summary of Chemical Analysis

Soil Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1494333	1494335	1494336	1494337	1494338	1494339
Sample ID	TP110	TP113	TP114	TP116	TP117	TP119
Depth	0.50	0.50	0.90	0.40	0.40	0.75
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	26/04/19	26/04/19	26/04/19	26/04/19	26/04/19	26/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Asbestos Quantification	DETSC 1102	0		Y					
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	3.3	2.9	< 0.2	5.3	1.1	1.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	1.2	< 0.1	0.7	< 0.1	0.3
Chromium	DETSC 2301#	0.15	mg/kg	13	14	2.6	15	4.6	6.7
Chromium, Hexavalent	DETSC 2204*	1	mg/kg			< 1.0		< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	41	260	8.4	240	6.0	81
Lead	DETSC 2301#	0.3	mg/kg	21	56	5.3	62	3.5	15
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	10	100	2.9	79	3.4	32
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	36	74	11	67	11	27
Inorganics									
pH	DETSC 2008#			6.8	7.4	6.9	6.6	6.9	7.1
Cyanide, Free	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	< 0.1	0.4	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.3	1.3	0.8	4.1	1.1	1.2
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg			2.3		2.6	3.6
Chloride	DETSC 2055	1	mg/kg			7.9		17.4	15.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	22	30	< 10	32	11	21
Sulphide	DETSC 2024*	10	mg/kg			12		16	< 10
Sulphate as SO4, Total	DETSC 2321#	100	mg/kg			100		900	200
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	0.3	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.4	< 0.1	< 0.1	0.6	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	0.4	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1	0.3	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.4	< 0.1	< 0.1	1.0	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	2.5	< 1.6	< 1.6	3.0	< 1.6	< 1.6
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1494333	1494335	1494336	1494337	1494338	1494339
Sample ID	TP110	TP113	TP114	TP116	TP117	TP119
Depth	0.50	0.50	0.90	0.40	0.40	0.75
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	26/04/19	26/04/19	26/04/19	26/04/19	26/04/19	26/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
OCPs									
alpha-BHC	DETSC 3441*	0.1	mg/kg				< 0.1		
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg				< 0.1		
beta-BHC	DETSC 3441*	0.1	mg/kg				< 0.1		
delta-BHC	DETSC 3441*	0.1	mg/kg				< 0.1		
Heptachlor	DETSC 3441*	0.1	mg/kg				< 0.1		
Aldrin	DETSC 3441*	0.1	mg/kg				< 0.1		
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg				< 0.1		
gamma-Chlordane	DETSC 3441*	0.1	mg/kg				< 0.1		
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg				< 0.1		
4,4-DDE	DETSC 3441*	0.1	mg/kg				< 0.1		
Dieldrin	DETSC 3441*	0.1	mg/kg				< 0.1		
Endrin	DETSC 3441*	0.1	mg/kg				< 0.1		
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg				< 0.1		
Endrin aldehyde	DETSC 3441*	0.1	mg/kg				< 0.1		
4,4-DDT	DETSC 3441*	0.1	mg/kg				< 0.1		
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg				< 0.1		
Methoxychlor	DETSC 3441*	0.1	mg/kg				< 0.1		
Endrin ketone	DETSC 3441*	0.1	mg/kg				< 0.1		
OPPs									
Dichlorvos	DETSC 3443*	0.1	mg/kg				< 0.1		
Mevinphos	DETSC 3443*	0.1	mg/kg				< 0.1		
Demeton-O	DETSC 3443*	0.1	mg/kg				< 0.1		
Ethoprop	DETSC 3443*	0.1	mg/kg				< 0.1		
Naled	DETSC 3443*	0.1	mg/kg				< 0.1		
Phorate	DETSC 3443*	0.1	mg/kg				< 0.1		
Demeton-S	DETSC 3443*	0.1	mg/kg				< 0.1		
Diazinon	DETSC 3443*	0.1	mg/kg				< 0.1		
Disulfoton	DETSC 3443*	0.1	mg/kg				< 0.1		
Methylparathion	DETSC 3443*	0.1	mg/kg				< 0.1		
Ronnel	DETSC 3443*	0.1	mg/kg				< 0.1		
Fenthion	DETSC 3443*	0.1	mg/kg				< 0.1		
Chlopyrifos	DETSC 3443*	0.1	mg/kg				< 0.1		
Trichlorinate	DETSC 3443*	0.1	mg/kg				< 0.1		
Merphos	DETSC 3443*	0.1	mg/kg				< 0.1		
Stirofos	DETSC 3443*	0.1	mg/kg				< 0.1		
Tokuthion	DETSC 3443*	0.1	mg/kg				< 0.1		
Fensulfothion	DETSC 3443*	0.1	mg/kg				< 0.1		
Bolstar	DETSC 3443*	0.1	mg/kg				< 0.1		
Azinphos methyl	DETSC 3443*	0.1	mg/kg				< 0.1		
Coumaphos	DETSC 3443*	0.1	mg/kg				< 0.1		

Summary of Chemical Analysis Soil Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1494333	1494335	1494336	1494337	1494338	1494339
Sample ID	TP110	TP113	TP114	TP116	TP117	TP119
Depth	0.50	0.50	0.90	0.40	0.40	0.75
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	26/04/19	26/04/19	26/04/19	26/04/19	26/04/19	26/04/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Triazines									
Atraton	DETSC 3445*	0.1	mg/kg				< 0.1		
Prometon	DETSC 3445*	0.1	mg/kg				< 0.1		
Simazine	DETSC 3445*	0.1	mg/kg				< 0.1		
Atrazine	DETSC 3445*	0.1	mg/kg				< 0.1		
Propazine	DETSC 3445*	0.1	mg/kg				< 0.1		
Terbutylazine	DETSC 3445*	0.1	mg/kg				< 0.1		
Secbumeton	DETSC 3445*	0.1	mg/kg				< 0.1		
Symetryn	DETSC 3445*	0.1	mg/kg				< 0.1		
Ametryn	DETSC 3445*	0.1	mg/kg				< 0.1		
Prometryne	DETSC 3445*	0.1	mg/kg				< 0.1		
Terbutryn	DETSC 3445*	0.1	mg/kg				< 0.1		

Summary of Chemical Analysis

Leachate Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1494340	1494341	1494342	1494343
Sample ID	TP102	TP105	TP113	TP117
Depth	0.20	0.70	0.50	0.40
Other ID				
Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE
Sampling Date	25/04/19	25/04/19	26/04/19	26/04/19
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Preparation							
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y	Y
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.90	< 0.16	0.34	0.17
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.32	< 0.25	0.91	0.28
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.9	< 0.4	1.6	1.1
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.72	0.14	0.28	0.10
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	0.9	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	< 1.3	< 1.3	< 1.3
Inorganics							
pH	DETSC 2008			8.0	7.7	7.5	7.4
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20	< 20
Sulphate as SO4	DETSC 2055	0.1	mg/l	0.94	1.4	1.1	1.4
PAHs							
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	0.09	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.06	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.06	0.04	0.08	0.02
Anthracene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.03	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.04	0.01	0.04	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.04	< 0.01	0.03	< 0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.34	< 0.20	0.41	< 0.20
Phenols							
Phenol	DETSC 3451*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Asbestos Analysis Soil Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1494327	TP101 0.50	SOIL	NAD	none	Paul Nicholson
1494328	TP102 0.20	SOIL	NAD	none	Paul Nicholson
1494329	TP003 0.80	SOIL	NAD	none	Paul Nicholson
1494330	TP104 0.20	SOIL	NAD	none	Paul Nicholson
1494331	TP105 0.70	SOIL	NAD	none	Paul Nicholson
1494332	TP108 0.30	SOIL	NAD	none	Paul Nicholson
1494333	TP110 0.50	SOIL	Amosite	Amosite in occasiononel small clumps	Paul Nicholson
1494335	TP113 0.50	SOIL	NAD	none	Paul Nicholson
1494336	TP114 0.90	SOIL	NAD	none	Paul Nicholson
1494337	TP116 0.40	SOIL	NAD	none	Paul Nicholson
1494338	TP117 0.40	SOIL	NAD	none	Paul Nicholson
1494339	TP119 0.75	SOIL	NAD	none	Paul Nicholson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 19-07907-1

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1494333
Sample ID	TP110
Depth	0.50
Other ID	
Sample Type	SOIL
Sampling Date	26/04/19
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	< 0.001
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na

Breakdown of Gravimetric Analysis (a)

Mass of Sample		g	548.13
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	

Breakdown of Detailed Gravimetric Analysis (b)

% Amphibole bundles in sample		Mass %	<0.001
% Chrysotile bundles in sample		Mass %	na

Breakdown of PCOM Analysis (c)

% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na

Breakdown of Potentially Respirable Fibre Analysis (d)

Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
 % asbestos in Asbestos Containing Materials (ACMs) is determined by
 by reference to HSG 264.
 Recommended sample size for quantification is approximately 1kg
 # denotes deviating sample

Information in Support of the Analytical Results

Our Ref 19-07907-1
 Client Ref 5570
 Contract Knowsley Lane, Knowsley

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1494327	TP101 0.50 SOIL	25/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494328	TP102 0.20 SOIL	25/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494329	TP003 0.80 SOIL	25/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494330	TP104 0.20 SOIL	25/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494331	TP105 0.70 SOIL	25/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494332	TP108 0.30 SOIL	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494333	TP110 0.50 SOIL	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494334	TP111 0.80 SOIL	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494335	TP113 0.50 SOIL	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494336	TP114 0.90 SOIL	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494337	TP116 0.40 SOIL	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494338	TP117 0.40 SOIL	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494339	TP119 0.75 SOIL	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494340	TP102 0.20 LEACHATE	25/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494341	TP105 0.70 LEACHATE	25/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494342	TP113 0.50 LEACHATE	26/04/19	GJ 250ml, GJ 60ml, PT 1L		
1494343	TP117 0.40 LEACHATE	26/04/19	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



Certificate of Analysis

Certificate Number 19-09159

24-May-19

Client JPG (Leeds) LTD
Civil & Structural Engineers
5 John Charles Way
Leeds
LS12 6QA

Our Reference 19-09159

Client Reference 5570

Order No (not supplied)

Contract Title Knowsley Lane, Knowsley

Description 3 Water samples.

Date Received 17-May-19

Date Started 17-May-19

Date Completed 24-May-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Water Samples

Our Ref 19-09159

Client Ref 5570

Contract Title Knowsley Lane, Knowsley

Lab No	1502425	1502426	1502427
Sample ID	BH101	BH103	BH105
Depth	1.80	1.40	1.00
Other ID			
Sample Type	WATER	WATER	WATER
Sampling Date	15/05/19	15/05/19	15/05/19
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.87	10	4.4
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	1.1	0.05	0.08
Chromium, Dissolved	DETSC 2306	0.25	ug/l	3.5	4.0	11
Copper, Dissolved	DETSC 2306	0.4	ug/l	34	7.1	14
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.78	1.8	0.60
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	13	22	9.4
Selenium, Dissolved	DETSC 2306	0.25	ug/l	4.5	4.2	1.3
Zinc, Dissolved	DETSC 2306	1.3	ug/l	280	98	150
Inorganics						
pH	DETSC 2008			5.4	6.8	6.8
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Sulphate as SO4	DETSC 2055	0.1	mg/l	20	21	35
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	0.54
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	0.01	< 0.10
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Phenanthrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	0.18
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Fluoranthene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.10
Pyrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.10
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.10
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 1.60
Phenols						
Phenol	DETSC 3451*	0.5	ug/l	< 0.50	20	< 0.50

Information in Support of the Analytical Results

Our Ref 19-09159
 Client Ref 5570
 Contract Knowsley Lane, Knowsley

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1502425	BH101 1.80 WATER	15/05/19	GB 1L, GV, PB 1L	pH/Cond/TDS (1 days)	
1502426	BH103 1.40 WATER	15/05/19	GB 1L, GV, PB 1L	pH/Cond/TDS (1 days)	
1502427	BH105 1.00 WATER	15/05/19	GB 1L, GV, PB 1L	pH/Cond/TDS (1 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial

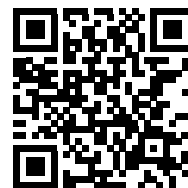
DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Waste Classification Report



MKWX3-USD6Y-4AMHT

Job name

5570 - Knowsley Lane, Knowsley

Description/Comments

Project

5570

Site

Knowsley

Related Documents

#	Name	Description
None		

Waste Stream Template

JPG CL WASTE STREAM V20

Classified by

Name:
Dominic Horne
Date:
13 May 2019 13:14 GMT
Telephone:
07814008742

Company:
JPG Leeds
5 John Charles Way
Leeds
LS12 6QA

Report

Created by: Dominic Horne
Created date: 13 May 2019 13:14 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP101	0.50	Non Hazardous		3
2	TP102	0.20	Non Hazardous		5
3	TP003	0.80	Non Hazardous		7
4	TP104	0.20	Non Hazardous		9
5	TP105	0.70	Non Hazardous		11
6	TP108	0.30	Non Hazardous		13
7	TP110	0.50	Non Hazardous		15
8	TP113	0.50	Non Hazardous		17
9	TP114	0.90	Non Hazardous		19
10	TP116	0.40	Non Hazardous		21
11	TP117	0.40	Non Hazardous		23

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
12	TP119	0.75	Non Hazardous		25

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	27
Appendix B: Rationale for selection of metal species	28
Appendix C: Version	29

Classification of sample: TP101

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	TP101	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.50 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number					
1	arsenic { arsenic trioxide }							
	033-003-00-0	215-481-4	1327-53-3					
2	cadmium { cadmium oxide }							
	048-002-00-0	215-146-2	1306-19-0					
3	chromium in chromium(III) compounds { chromium(III) oxide }							
		215-160-9	1308-38-9					
4	chromium in chromium(VI) compounds { chromium(VI) oxide }							
	024-001-00-0	215-607-8	1333-82-0					
5	copper { dicopper oxide; copper (I) oxide }							
	029-002-00-X	215-270-7	1317-39-1					
6	lead { lead chromate }							
	082-004-00-2	231-846-0	7758-97-6	1				
7	mercury { mercury(II) sulphide }							
		215-696-3	1344-48-5					
8	nickel { nickel chromate }							
	028-035-00-7	238-766-5	14721-18-7					
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }							
	034-002-00-8							
10	zinc { zinc chromate }							
	024-007-00-3							
11	pH							
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }							
	006-007-00-5							
13	naphthalene							
	601-052-00-2	202-049-5	91-20-3					

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0304 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP102

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	TP102	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.20 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	5.7 mg/kg	1.32	7.526 mg/kg	0.000753 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.4 mg/kg	1.142	0.457 mg/kg	0.0000457 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }	215-160-9	1308-38-9		14 mg/kg	1.462	20.462 mg/kg	0.00205 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	72 mg/kg	1.126	81.064 mg/kg	0.00811 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	46 mg/kg	1.56	71.751 mg/kg	0.0046 %		
6	mercury { mercury(II) sulphide }	215-696-3	1344-48-5		0.15 mg/kg	1.16	0.174 mg/kg	0.0000174 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	11 mg/kg	2.976	32.739 mg/kg	0.00327 %		
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
9	zinc { zinc chromate }	024-007-00-3			44 mg/kg	2.774	122.062 mg/kg	0.0122 %		
10	pH				5.9 pH		5.9 pH	5.9 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			0.4 mg/kg	1.884	0.754 mg/kg	0.0000754 %		
12	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
13	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
14	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
16	phenanthrene	201-581-5	85-01-8		0.1 mg/kg		0.1 mg/kg	0.00001 %			
17	anthracene	204-371-1	120-12-7		0.6 mg/kg		0.6 mg/kg	0.00006 %			
18	fluoranthene	205-912-4	206-44-0		0.3 mg/kg		0.3 mg/kg	0.00003 %			
19	pyrene	204-927-3	129-00-0		0.3 mg/kg		0.3 mg/kg	0.00003 %			
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.1 mg/kg		0.1 mg/kg	0.00001 %			
21	chrysene	601-048-00-0	205-923-4		0.3 mg/kg		0.3 mg/kg	0.00003 %			
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		0.5 mg/kg		0.5 mg/kg	0.00005 %			
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
Total:									0.0316 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP003

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP003	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.80 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				2.5 mg/kg	1.32	3.301 mg/kg	0.00033 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				35 mg/kg	1.462	51.154 mg/kg	0.00512 %		
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
5	copper { dicopper oxide; copper (I) oxide }				41 mg/kg	1.126	46.161 mg/kg	0.00462 %		
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	13 mg/kg	1.56	20.278 mg/kg	0.0013 %		
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
8	nickel { nickel chromate }				34 mg/kg	2.976	101.193 mg/kg	0.0101 %		
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
10	zinc { zinc chromate }				45 mg/kg	2.774	124.837 mg/kg	0.0125 %		
	024-007-00-3									
11	pH				6.2 pH		6.2 pH	6.2 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
29	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
Total:									0.0345 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
●	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP104

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	TP104	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.20 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number					
1	arsenic { arsenic trioxide }							
	033-003-00-0	215-481-4	1327-53-3					
2	cadmium { cadmium oxide }							
	048-002-00-0	215-146-2	1306-19-0					
3	chromium in chromium(III) compounds { chromium(III) oxide }							
		215-160-9	1308-38-9					
4	chromium in chromium(VI) compounds { chromium(VI) oxide }							
	024-001-00-0	215-607-8	1333-82-0					
5	copper { dicopper oxide; copper (I) oxide }							
	029-002-00-X	215-270-7	1317-39-1					
6	lead { lead chromate }							
	082-004-00-2	231-846-0	7758-97-6	1				
7	mercury { mercury(II) sulphide }							
		215-696-3	1344-48-5					
8	nickel { nickel chromate }							
	028-035-00-7	238-766-5	14721-18-7					
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }							
	034-002-00-8							
10	zinc { zinc chromate }							
	024-007-00-3							
11	pH							
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }							
	006-007-00-5							
13	naphthalene							
	601-052-00-2	202-049-5	91-20-3					

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0237 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
●	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP105

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	TP105	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.70 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number					
1	arsenic { arsenic trioxide }							
	033-003-00-0	215-481-4	1327-53-3					
2	cadmium { cadmium oxide }							
	048-002-00-0	215-146-2	1306-19-0					
3	chromium in chromium(III) compounds { chromium(III) oxide }							
		215-160-9	1308-38-9					
4	copper { dicopper oxide; copper (I) oxide }							
	029-002-00-X	215-270-7	1317-39-1					
5	lead { lead chromate }							
	082-004-00-2	231-846-0	7758-97-6					
6	mercury { mercury(II) sulphide }							
		215-696-3	1344-48-5					
7	nickel { nickel chromate }							
	028-035-00-7	238-766-5	14721-18-7					
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }							
	034-002-00-8							
9	zinc { zinc chromate }							
	024-007-00-3							
10	pH							
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }							
	006-007-00-5							
12	naphthalene							
	601-052-00-2	202-049-5	91-20-3					
13	acenaphthylene							
		205-917-1	208-96-8					
14	acenaphthene							
		201-469-6	83-32-9					

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
21	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
Total:									0.0336 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP108

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP108	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.30 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				5.4 mg/kg	1.32	7.13 mg/kg	0.000713 %			
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.3 mg/kg	1.142	0.343 mg/kg	0.0000343 %			
	048-002-00-0	215-146-2	1306-19-0								
3	chromium in chromium(III) compounds { chromium(III) oxide }				9 mg/kg	1.462	13.154 mg/kg	0.00132 %			
		215-160-9	1308-38-9								
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
5	copper { dicopper oxide; copper (I) oxide }				63 mg/kg	1.126	70.931 mg/kg	0.00709 %			
	029-002-00-X	215-270-7	1317-39-1								
6	lead { lead chromate }			1	39 mg/kg	1.56	60.833 mg/kg	0.0039 %			
	082-004-00-2	231-846-0	7758-97-6								
7	mercury { mercury(II) sulphide }				0.06 mg/kg	1.16	0.0696 mg/kg	0.00000696 %			
		215-696-3	1344-48-5								
8	nickel { nickel chromate }				9.1 mg/kg	2.976	27.084 mg/kg	0.00271 %			
	028-035-00-7	238-766-5	14721-18-7								
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %			<LOD
	034-002-00-8										
10	zinc { zinc chromate }				37 mg/kg	2.774	102.643 mg/kg	0.0103 %			
	024-007-00-3										
11	pH				6.3 pH		6.3 pH	6.3 pH			
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.2 mg/kg	1.884	0.377 mg/kg	0.0000377 %			
	006-007-00-5										
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
20	pyrene	204-927-3	129-00-0		0.2 mg/kg		0.2 mg/kg	0.00002 %			
21	benzo[a]anthracene	601-033-00-9	200-280-6		0.3 mg/kg		0.3 mg/kg	0.00003 %			
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		0.7 mg/kg		0.7 mg/kg	0.00007 %			
29	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
Total:									0.0267 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
●	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP110

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP110	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				3.3 mg/kg	1.32	4.357 mg/kg	0.000436 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.1 mg/kg	1.142	0.114 mg/kg	0.0000114 %		
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				13 mg/kg	1.462	19 mg/kg	0.0019 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				41 mg/kg	1.126	46.161 mg/kg	0.00462 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	21 mg/kg	1.56	32.756 mg/kg	0.0021 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				10 mg/kg	2.976	29.763 mg/kg	0.00298 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				36 mg/kg	2.774	99.869 mg/kg	0.00999 %		
	024-007-00-3									
10	pH				6.8 pH		6.8 pH	6.8 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.2 mg/kg	1.884	0.377 mg/kg	0.0000377 %		
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
18	fluoranthene	205-912-4	206-44-0		0.3 mg/kg		0.3 mg/kg	0.00003 %			
19	pyrene	204-927-3	129-00-0		0.3 mg/kg		0.3 mg/kg	0.00003 %			
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.4 mg/kg		0.4 mg/kg	0.00004 %			
21	chrysene	601-048-00-0	205-923-4		0.1 mg/kg		0.1 mg/kg	0.00001 %			
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.3 mg/kg		0.3 mg/kg	0.00003 %			
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.3 mg/kg		0.3 mg/kg	0.00003 %			
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.2 mg/kg		0.2 mg/kg	0.00002 %			
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		0.4 mg/kg		0.4 mg/kg	0.00004 %			
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
29	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		0.001 mg/kg		0.001 mg/kg	0.0000001 %			
Total:									0.0225 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP113

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP113	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				2.9 mg/kg	1.32	3.829 mg/kg	0.000383 %		
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				1.2 mg/kg	1.142	1.371 mg/kg	0.000137 %		
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				14 mg/kg	1.462	20.462 mg/kg	0.00205 %		
		215-160-9	1308-38-9							
4	copper { dicopper oxide; copper (I) oxide }				260 mg/kg	1.126	292.731 mg/kg	0.0293 %		
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	56 mg/kg	1.56	87.35 mg/kg	0.0056 %		
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
7	nickel { nickel chromate }				100 mg/kg	2.976	297.626 mg/kg	0.0298 %		
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
9	zinc { zinc chromate }				74 mg/kg	2.774	205.287 mg/kg	0.0205 %		
	024-007-00-3									
10	pH				7.4 pH		7.4 pH	7.4 pH		
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
12	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
13	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
15	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
19	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
21	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
Total:									0.0881 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP114

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP114	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.90 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				<0.2 mg/kg	1.32	<0.264 mg/kg	<0.0000264 %		<LOD
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide }				2.6 mg/kg	1.462	3.8 mg/kg	0.00038 %		
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
5	copper { dicopper oxide; copper (I) oxide }				8.4 mg/kg	1.126	9.457 mg/kg	0.000946 %		
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	5.3 mg/kg	1.56	8.267 mg/kg	0.00053 %		
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5							
8	nickel { nickel chromate }				2.9 mg/kg	2.976	8.631 mg/kg	0.000863 %		
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
10	zinc { zinc chromate }				11 mg/kg	2.774	30.516 mg/kg	0.00305 %		
	024-007-00-3									
11	pH				6.9 pH		6.9 pH	6.9 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.00634 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP116

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	TP116	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.40 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number					
1	arsenic { arsenic trioxide }							
	033-003-00-0	215-481-4	1327-53-3					
2	cadmium { cadmium oxide }							
	048-002-00-0	215-146-2	1306-19-0					
3	chromium in chromium(III) compounds { chromium(III) oxide }							
		215-160-9	1308-38-9					
4	copper { dicopper oxide; copper (I) oxide }							
	029-002-00-X	215-270-7	1317-39-1					
5	lead { lead chromate }							
	082-004-00-2	231-846-0	7758-97-6					
6	mercury { mercury(II) sulphide }							
		215-696-3	1344-48-5					
7	nickel { nickel chromate }							
	028-035-00-7	238-766-5	14721-18-7					
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }							
	034-002-00-8							
9	zinc { zinc chromate }							
	024-007-00-3							
10	pH							
11	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }							
	006-007-00-5							
12	naphthalene							
	601-052-00-2	202-049-5	91-20-3					
13	acenaphthylene							
		205-917-1	208-96-8					
14	acenaphthene							
		201-469-6	83-32-9					

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
15	fluorene	201-695-5	86-73-7		0.1 mg/kg		0.1 mg/kg	0.00001 %			
16	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
17	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
18	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
19	pyrene	204-927-3	129-00-0		0.3 mg/kg		0.3 mg/kg	0.00003 %			
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.6 mg/kg		0.6 mg/kg	0.00006 %			
21	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		0.4 mg/kg		0.4 mg/kg	0.00004 %			
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		0.1 mg/kg		0.1 mg/kg	0.00001 %			
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		0.3 mg/kg		0.3 mg/kg	0.00003 %			
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		1 mg/kg		1 mg/kg	0.0001 %			
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
Total:									0.0789 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD** Below limit of detection
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP117

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP117	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				1.1 mg/kg	1.32	1.452 mg/kg	0.000145 %			
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %			<LOD
	048-002-00-0	215-146-2	1306-19-0								
3	chromium in chromium(III) compounds { chromium(III) oxide }				4.6 mg/kg	1.462	6.723 mg/kg	0.000672 %			
		215-160-9	1308-38-9								
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
5	copper { dicopper oxide; copper (I) oxide }				6 mg/kg	1.126	6.755 mg/kg	0.000676 %			
	029-002-00-X	215-270-7	1317-39-1								
6	lead { lead chromate }			1	3.5 mg/kg	1.56	5.459 mg/kg	0.00035 %			
	082-004-00-2	231-846-0	7758-97-6								
7	mercury { mercury(II) sulphide }				<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %			<LOD
		215-696-3	1344-48-5								
8	nickel { nickel chromate }				3.4 mg/kg	2.976	10.119 mg/kg	0.00101 %			
	028-035-00-7	238-766-5	14721-18-7								
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %			<LOD
	034-002-00-8										
10	zinc { zinc chromate }				11 mg/kg	2.774	30.516 mg/kg	0.00305 %			
	024-007-00-3										
11	pH				6.9 pH		6.9 pH	6.9 pH			
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %			<LOD
	006-007-00-5										
13	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %			<LOD
	601-052-00-2	202-049-5	91-20-3								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.00645 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP119

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	TP119	LoW Code:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	0.75 m	Chapter:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
		Entry:	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	1.3 mg/kg	1.32	1.716 mg/kg	0.000172 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.3 mg/kg	1.142	0.343 mg/kg	0.0000343 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9	6.7 mg/kg	1.462	9.792 mg/kg	0.000979 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	81 mg/kg	1.126	91.197 mg/kg	0.00912 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	15 mg/kg	1.56	23.397 mg/kg	0.0015 %		
7	mercury { mercury(II) sulphide }		215-696-3	1344-48-5	<0.05 mg/kg	1.16	<0.058 mg/kg	<0.0000058 %		<LOD
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	32 mg/kg	2.976	95.24 mg/kg	0.00952 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
10	zinc { zinc chromate }	024-007-00-3			27 mg/kg	2.774	74.902 mg/kg	0.00749 %		
11	pH				7.1 pH		7.1 pH	7.1 pH		
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
13	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
14	acenaphthylene	205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
16	fluorene	201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	phenanthrene	201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	anthracene	204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	fluoranthene	205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	pyrene	204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	benzo[a]anthracene	601-033-00-9	200-280-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	chrysene	601-048-00-0	205-923-4		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	benzo[ghi]perylene	205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
Total:								0.0294 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
●	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

■ **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

■ **mercury(II) sulphide** (EC Number: 215-696-3, CAS Number: 1344-48-5)

Conversion factor: 1.16

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT RE 2 H373 , Acute Tox. 2 H300 , Acute Tox. 1 H310 , Acute Tox. 3 H331

■ **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

■ **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

CLP index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s)/Risk Phrase(s):

14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

■ **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

■ **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

■ **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

■ **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

■ **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

■ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

■ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 21 Aug 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings.

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides.

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass.

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight.

mercury {mercury(II) sulphide}

Worst case CLP species based on hazard statements/molecular weight.

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight.

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide]

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.1, May 2018**

HazWasteOnline Classification Engine Version: 2019.115.3847.7849 (25 Apr 2019)

HazWasteOnline Database: 2019.115.3847.7849 (25 Apr 2019)

This classification utilises the following guidance and legislation:

WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004

1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010

2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010



Appendix G Geotechnical Testing Results



LABORATORY REPORT



4043

Contract Number: PSL19/2828

Report Date: 22 May 2019
Client's Reference: 5570
Client Name: JPG Leeds
5 John Charles Way
Leeds
West Yorkshire
LS12 6QD

For the attention of: Dominic Horne

Contract Title: Knowsley Lane, Knowsley
Date Received: 8/5/2019
Date Commenced: 8/5/2019
Date Completed: 22/5/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

S Eyre
(Senior Technician)

L Knight
(Senior Technician)

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP101	1	D	0.90		15			27	13	14	88	Low plasticity CL.
TP102	2	B	0.70		16		2.60					
TP103	4	D	1.60		17			27	14	13	86	Low plasticity CL.
TP104	5	B	0.80		15			33	15	18	89	Low plasticity CL.
TP104	6	B	1.20		19		2.63					
TP105	7	D	0.60		16			33	15	18	87	Low plasticity CL.
TP107	9	D	0.60		14			29	15	14	86	Low plasticity CL.
TP109	11	B	0.70		17							
TP110	12	D	0.70		18			31	15	16	90	Low plasticity CL.
TP110	13	B	1.50		19		2.60					
TP112	14	B	0.80		15		2.60					
TP113	15	D	2.00		15			25	12	13	85	Low plasticity CL.
TP114	16	B	1.10		11		2.32					
TP116	18	B	0.75		12							
TP117	19	D	1.40		22			34	14	20	98	Low plasticity CL.
TP118	20	B	1.15		19							
TP120	21	D	1.80		17			32	15	17	98	Low plasticity CL.

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.



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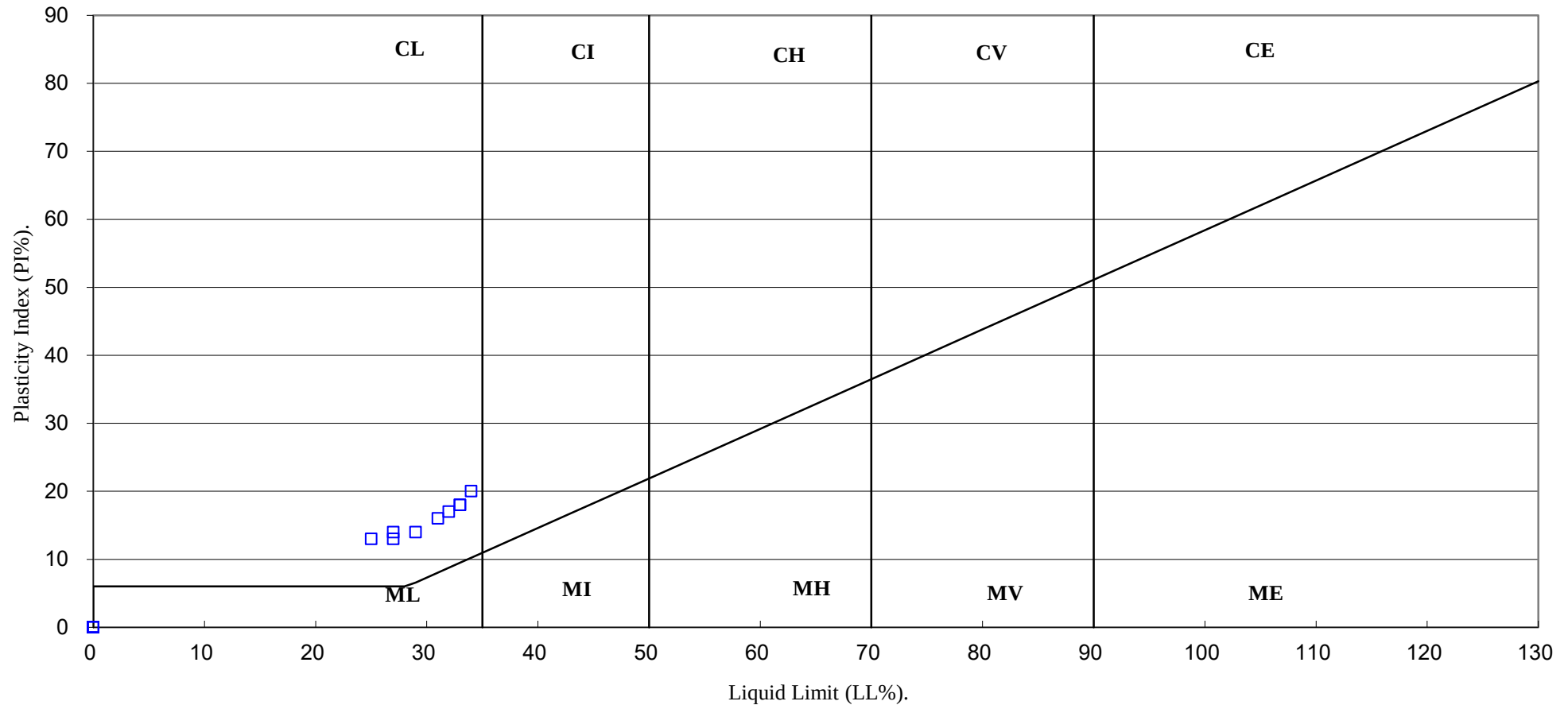
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PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

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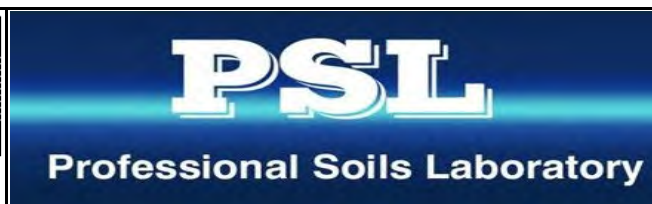
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SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP101	1	D	0.90		Brown slightly gravelly very sandy CLAY.
TP102	2	B	0.70		Grey slightly gravelly very sandy CLAY.
TP103	4	D	1.60		Brown slightly gravelly very sandy CLAY.
TP104	5	B	0.80		Grey slightly gravelly very sandy CLAY.
TP104	6	B	1.20		Brown mottled grey slightly gravelly very sandy CLAY.
TP105	7	D	0.60		Brown slightly gravelly very sandy CLAY.
TP107	9	D	0.60		Brown mottled grey slightly gravelly very sandy CLAY.
TP109	11	B	0.70		Brown mottled grey slightly gravelly very sandy CLAY.
TP110	12	D	0.70		Grey slightly gravelly very sandy very silty CLAY.
TP110	13	B	1.50		Brown mottled grey slightly gravelly sandy CLAY.
TP112	14	B	0.80		Brown mottled grey slightly gravelly very sandy CLAY.
TP113	15	D	2.00		Brown slightly gravelly very sandy CLAY.
TP114	16	B	1.10		Brown slightly silty SAND.
TP116	18	B	0.75		Brown slightly silty SAND.
TP117	19	D	1.40		Grey slightly gravelly very sandy CLAY.
TP118	20	B	1.15		Grey slightly gravelly very sandy CLAY.
TP120	21	D	1.80		Grey slightly gravelly very sandy CLAY.



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

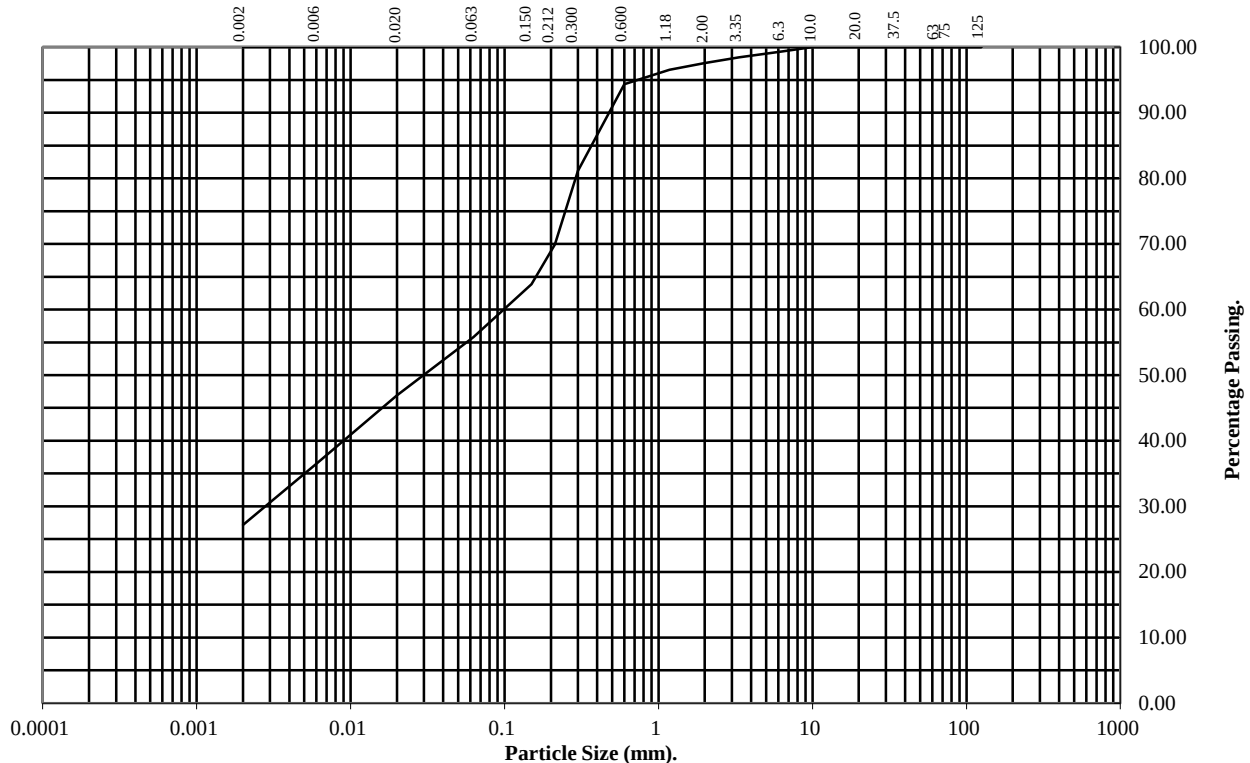
Hole Number: TP102

Top Depth (m): 0.70

Sample Number: 2

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	99
3.35	98
2	98
1.18	97
0.6	94
0.3	81
0.212	70
0.15	64
0.063	56

Particle Diameter	Percentage Passing
0.02	47
0.006	36
0.002	27

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	42
Silt	29
Clay	27

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

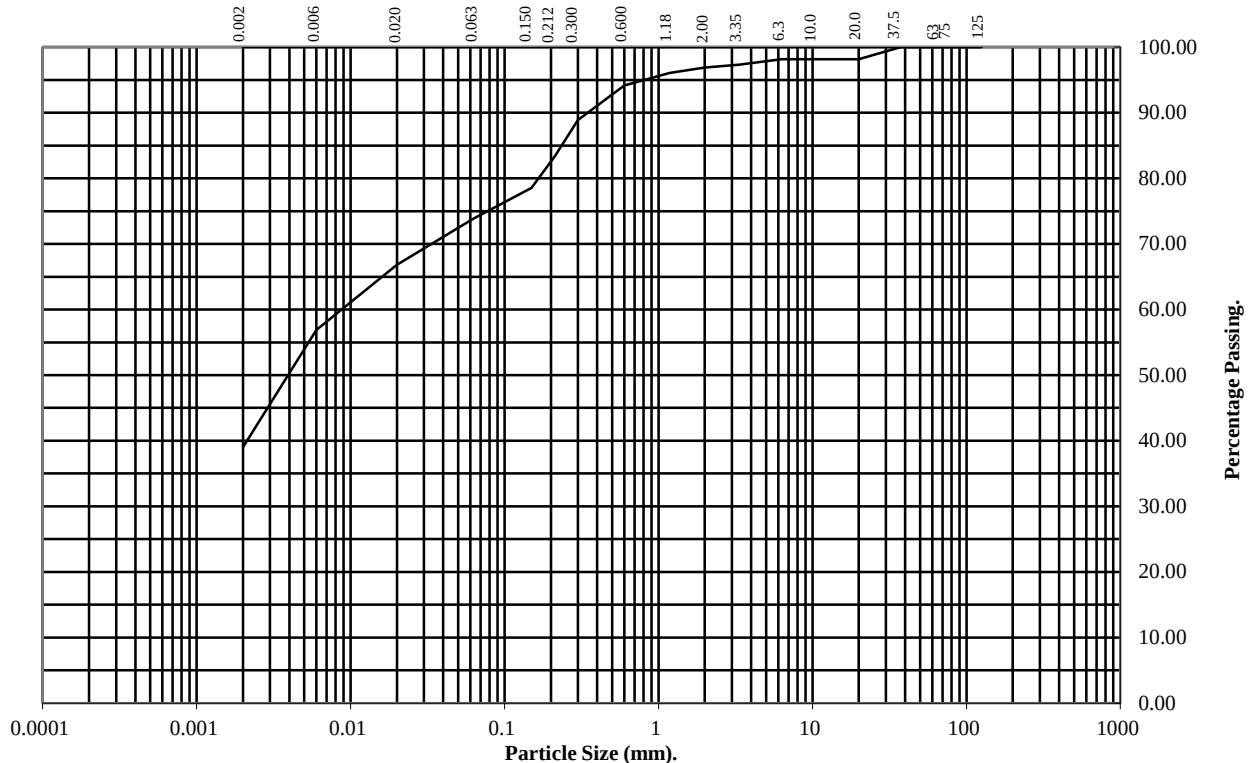
Hole Number: TP104

Top Depth (m): 1.20

Sample Number: 6

Base Depth(m):

Sample Type: B

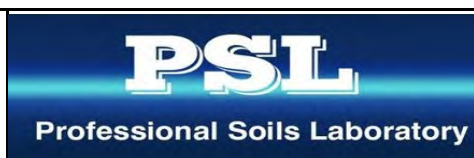


BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	98
10	98
6.3	98
3.35	97
2	97
1.18	96
0.6	94
0.3	89
0.212	83
0.15	79
0.063	74

Particle Diameter	Percentage Passing
0.02	67
0.006	57
0.002	39

Soil Fraction	Total Percentage
Cobbles	0
Gravel	3
Sand	23
Silt	35
Clay	39

Remarks:
See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

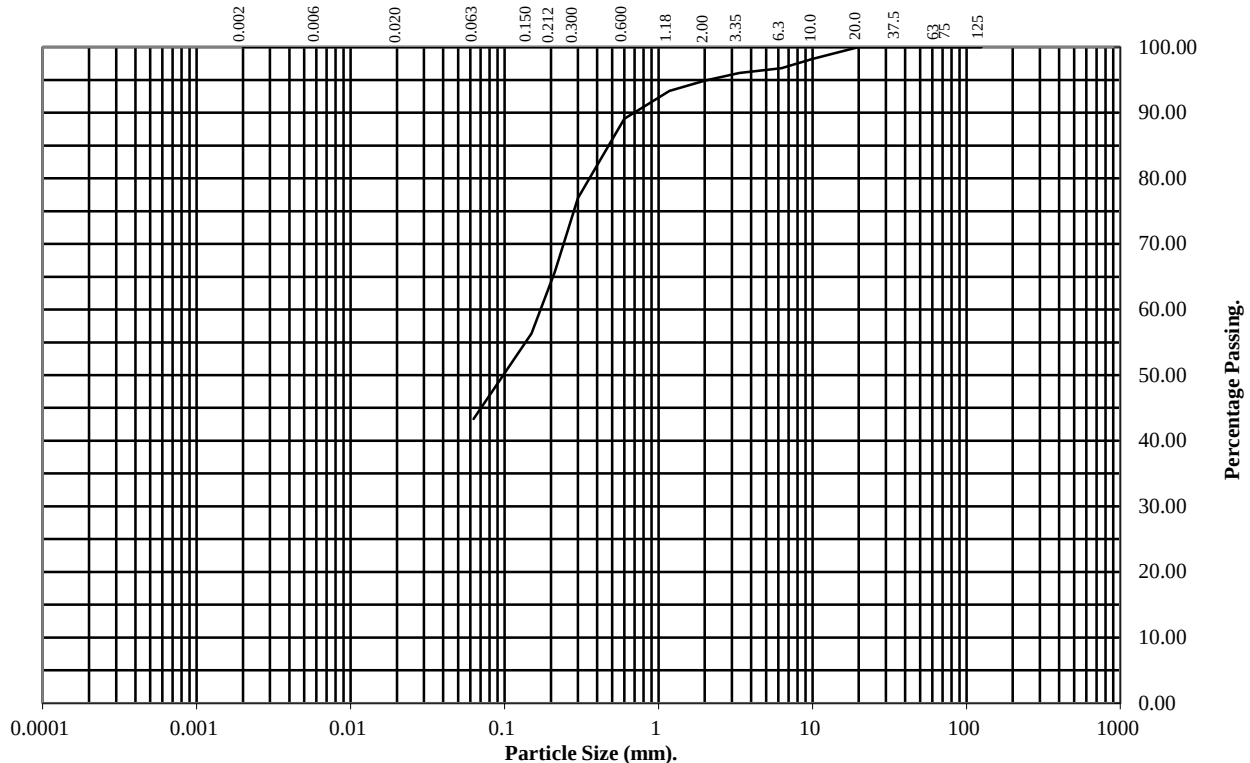
Hole Number: TP109

Top Depth (m): 0.70

Sample Number: 11

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	98
6.3	97
3.35	96
2	95
1.18	93
0.6	89
0.3	77
0.212	66
0.15	56
0.063	43

Soil Fraction	Total Percentage
Cobbles	0
Gravel	5
Sand	52
Silt/Clay	43

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

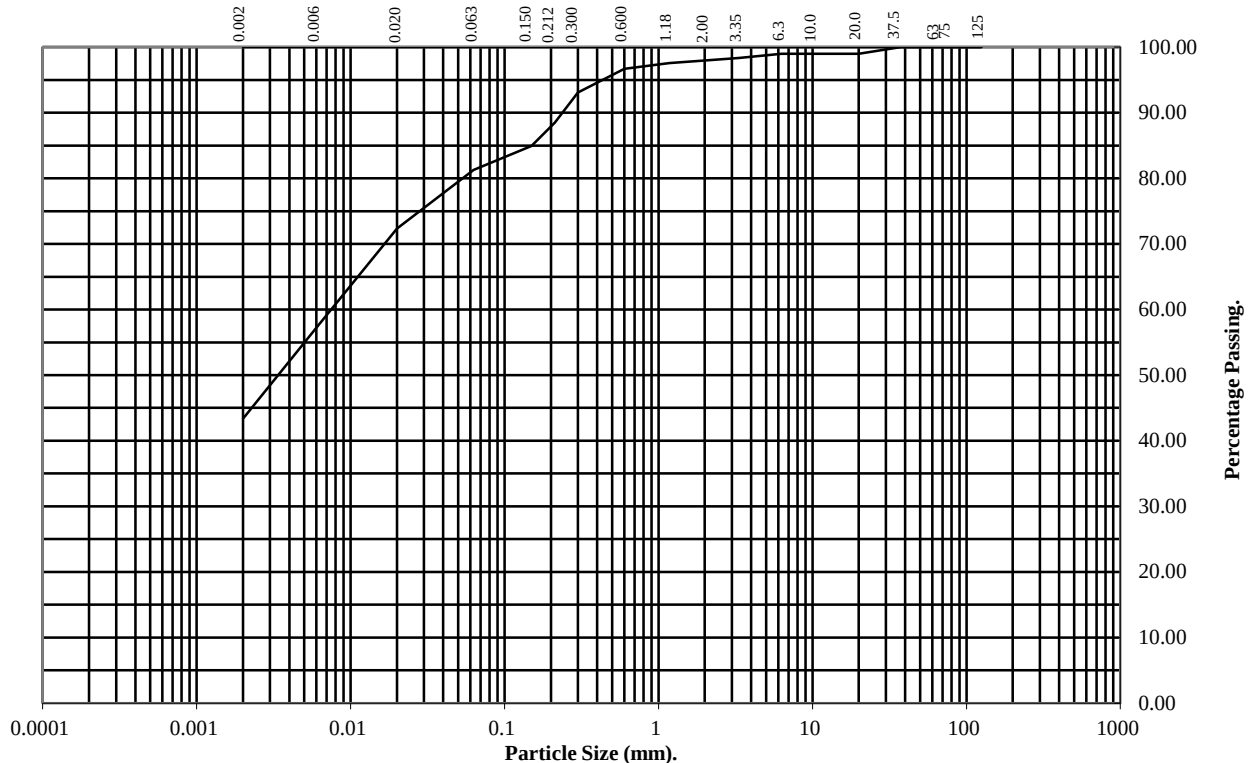
Hole Number: TP110

Top Depth (m): 1.50

Sample Number: 13

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	99
10	99
6.3	99
3.35	98
2	98
1.18	98
0.6	97
0.3	93
0.212	89
0.15	85
0.063	81

Particle Diameter	Percentage Passing
0.02	72
0.006	57
0.002	43

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	17
Silt	38
Clay	43

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

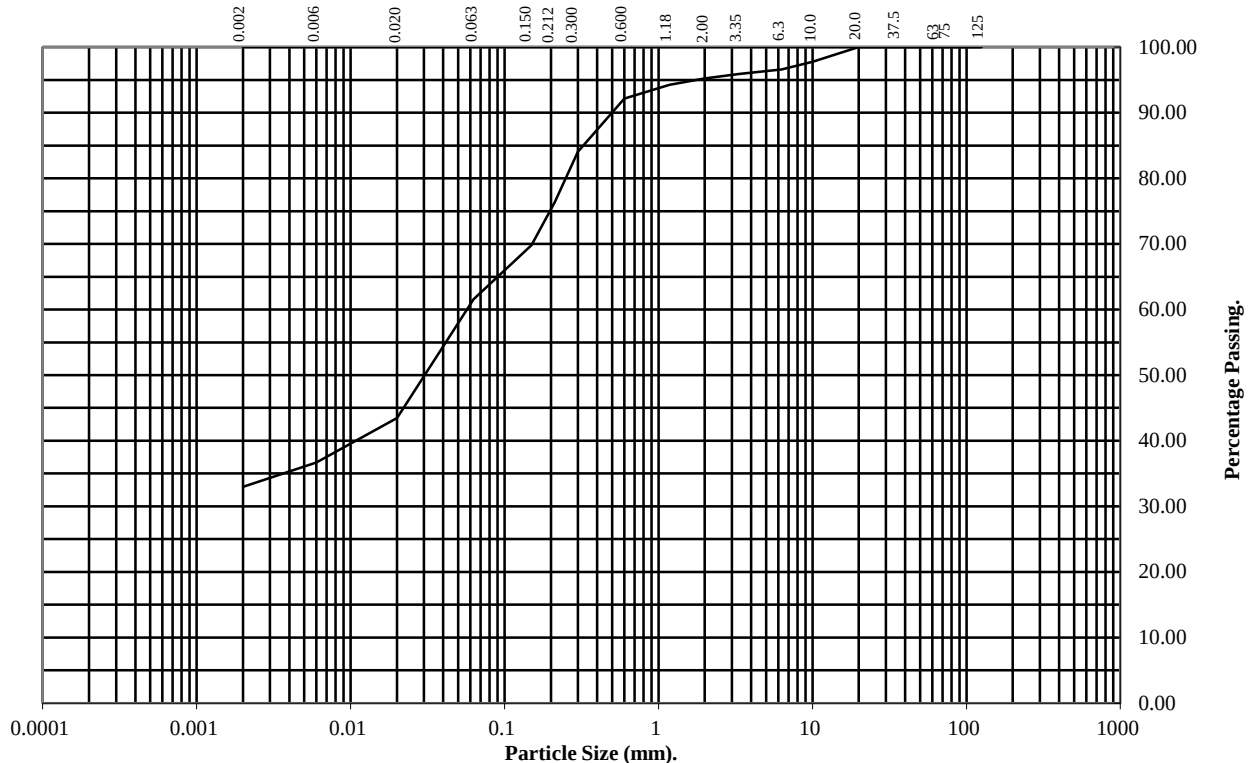
Hole Number: TP112

Top Depth (m): 0.80

Sample Number: 14

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	98
6.3	97
3.35	96
2	95
1.18	94
0.6	92
0.3	84
0.212	76
0.15	70
0.063	62

Particle Diameter	Percentage Passing
0.02	43
0.006	37
0.002	33

Soil Fraction	Total Percentage
Cobbles	0
Gravel	5
Sand	33
Silt	29
Clay	33

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

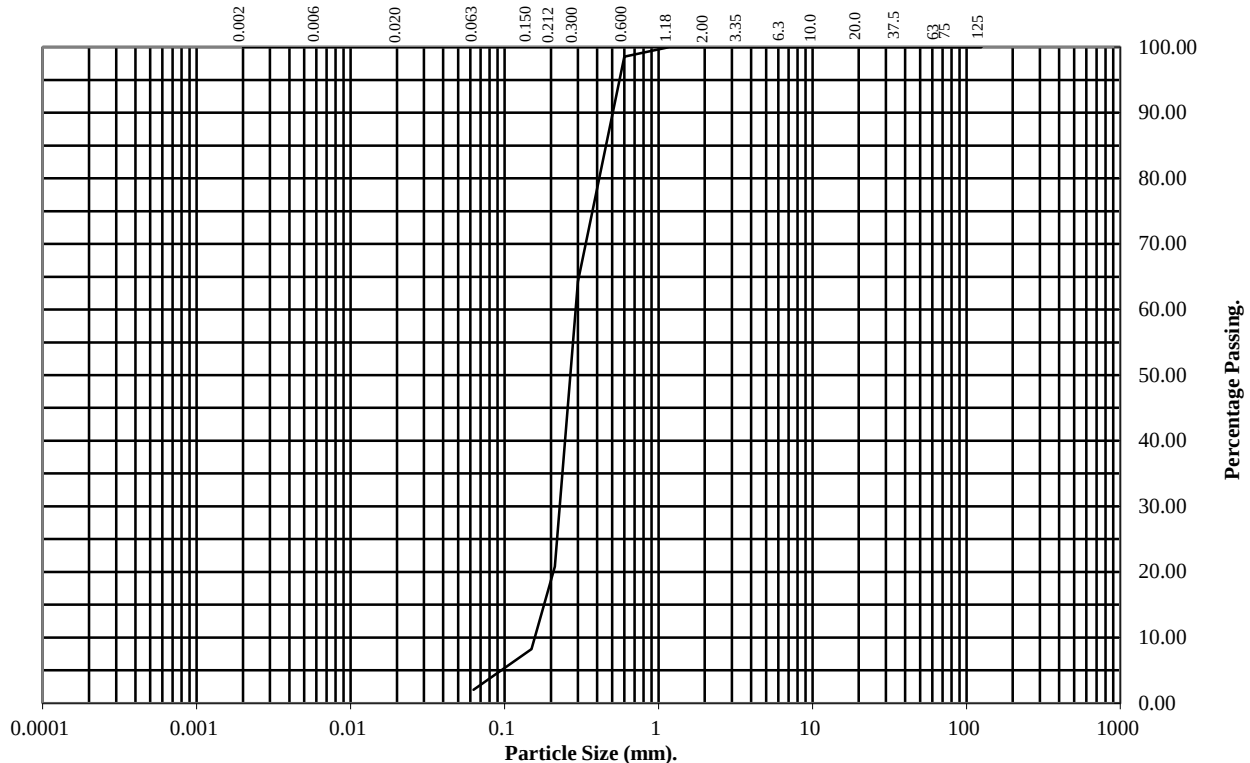
Hole Number: TP114

Top Depth (m): 1.10

Sample Number: 16

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	64
0.212	21
0.15	8
0.063	2

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	98
Silt/Clay	2

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

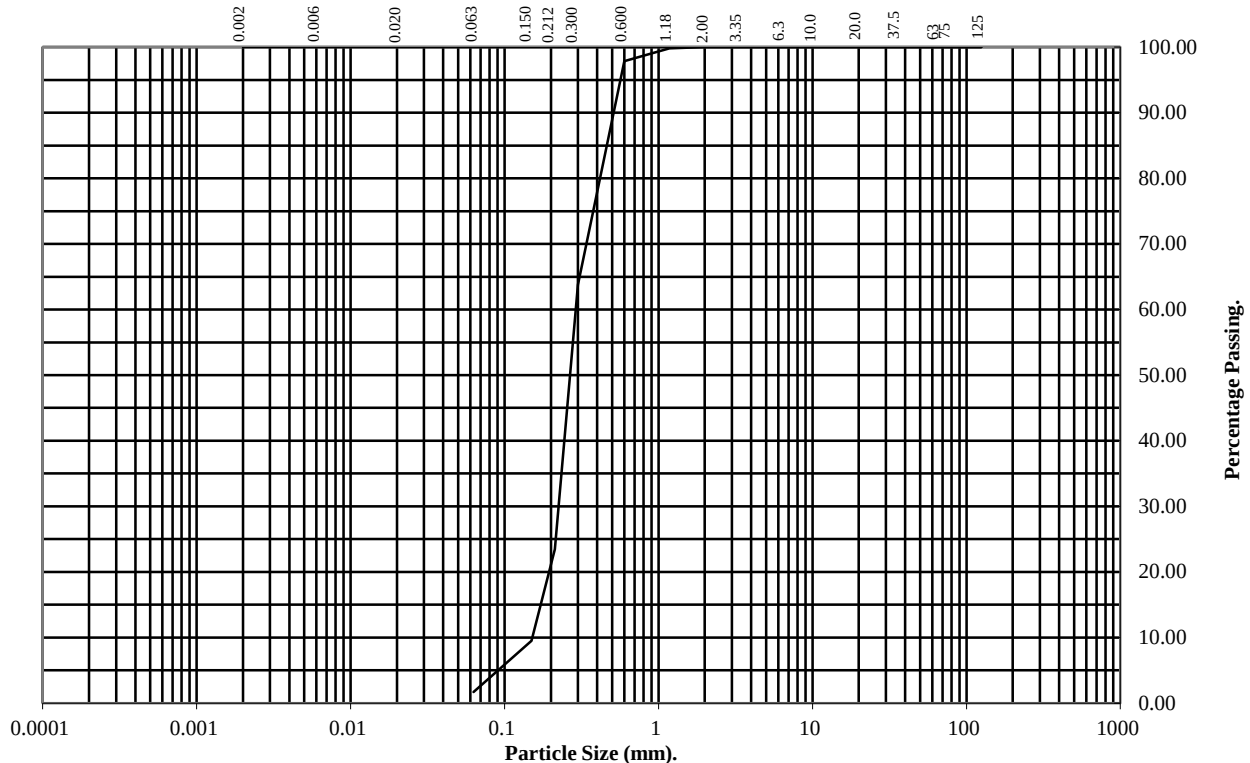
Hole Number: TP116

Top Depth (m): 0.75

Sample Number: 18

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	98
0.3	64
0.212	23
0.15	10
0.063	2

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	98
Silt/Clay	2

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

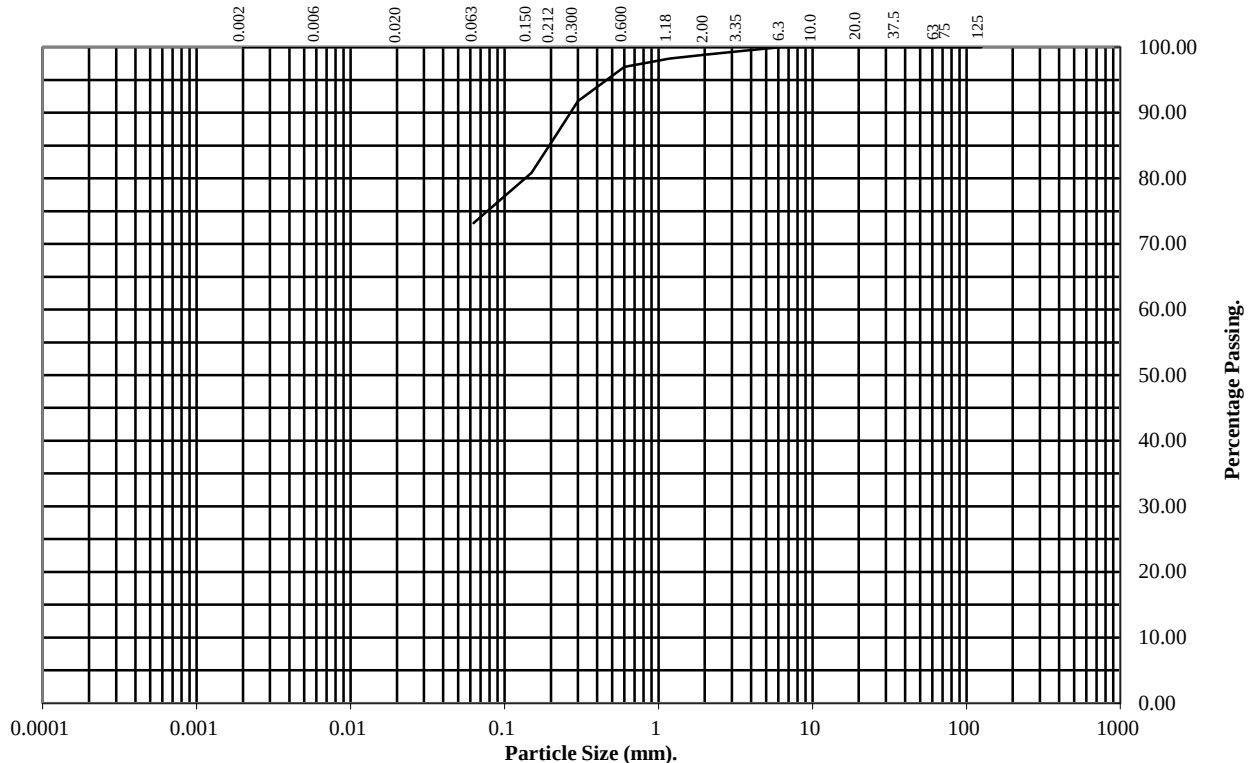
Hole Number: TP118

Top Depth (m): 1.15

Sample Number: 20

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	99
1.18	98
0.6	97
0.3	92
0.212	86
0.15	81
0.063	73

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	26
Silt/Clay	73

Remarks:

See Summary of Soil Descriptions



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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

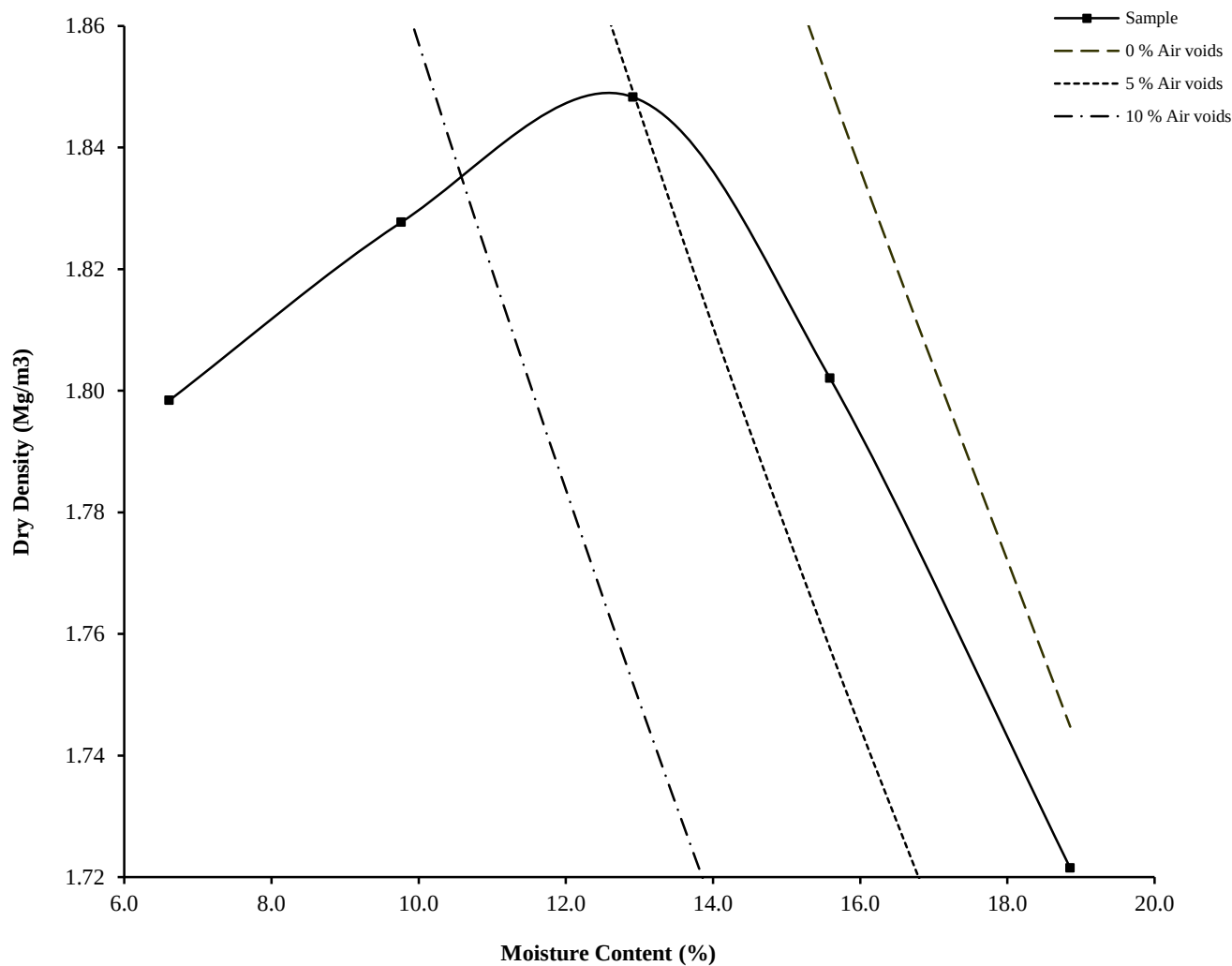
Hole Number: TP102

Top Depth (m) : 0.70

Sample Number: 2

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	16	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.60	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.85		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	13			
Remarks				
See summary of soil descriptions.				



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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

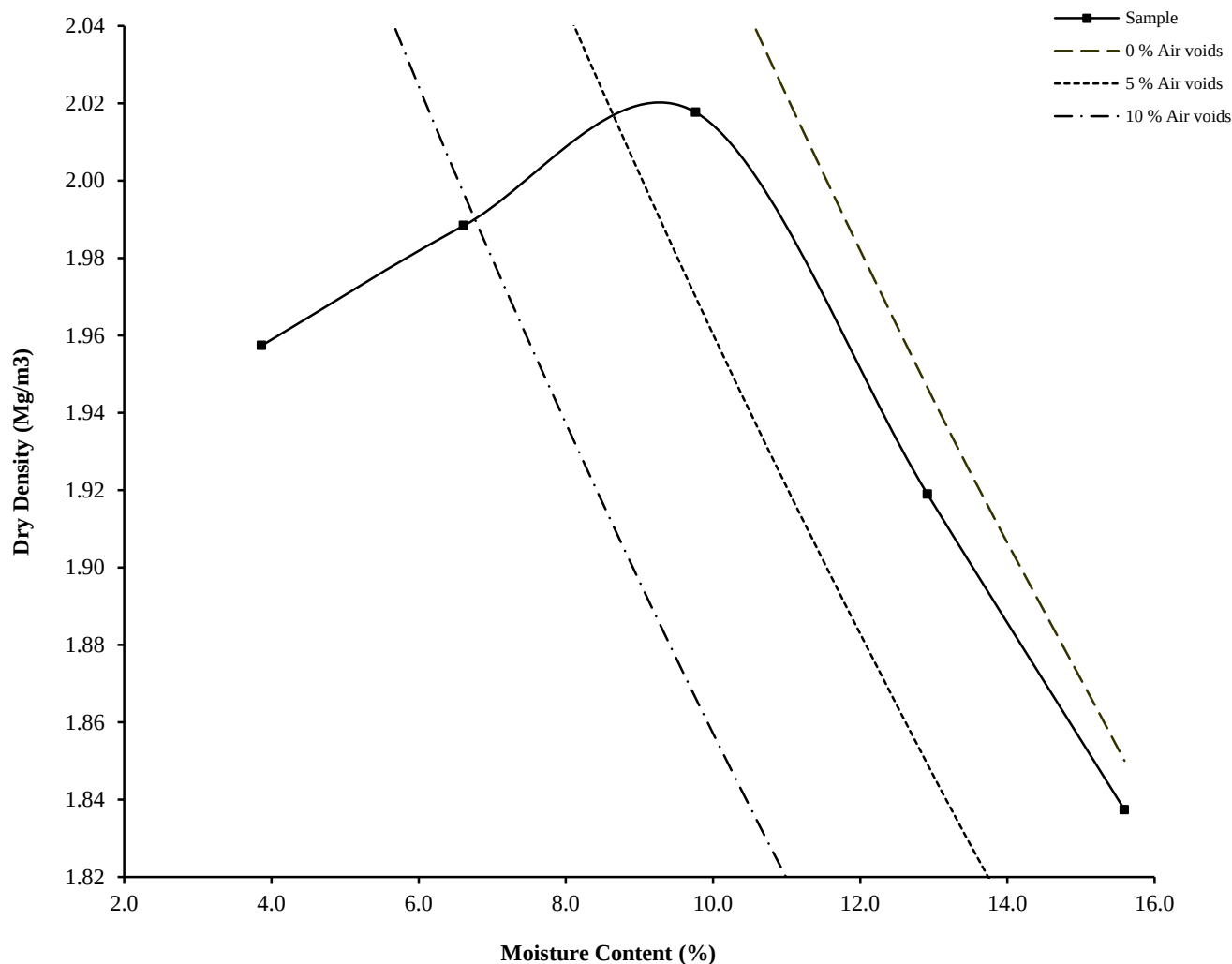
Hole Number: TP102

Top Depth (m) : 0.70

Sample Number: 2

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	16	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.60	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	2.02		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	9			
Remarks				
See summary of soil descriptions.				



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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

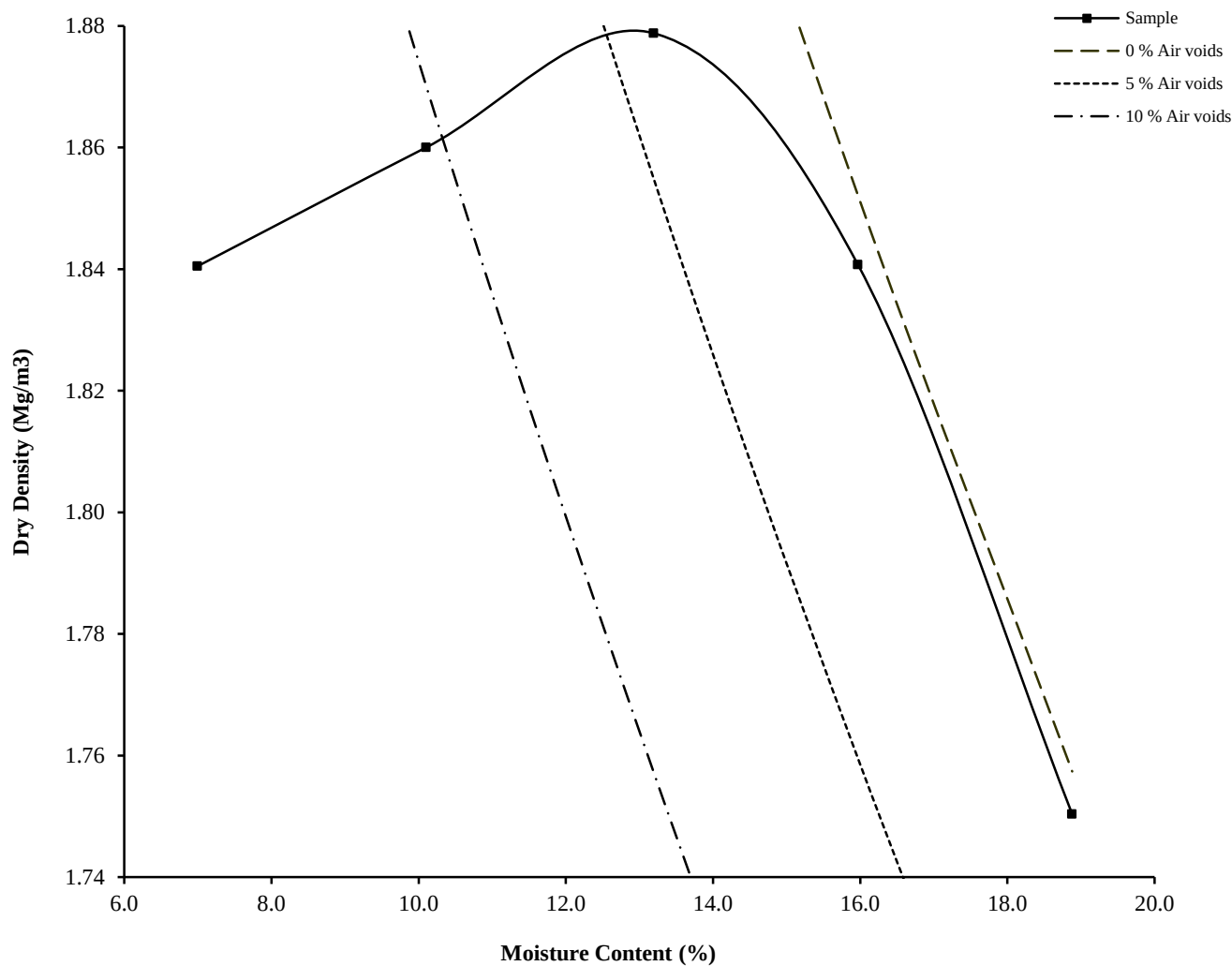
Hole Number: TP104

Top Depth (m) : 1.20

Sample Number: 6

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	19	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.63	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m3):	1.88		Material Retained on 20.0 mm Test Sieve (%):	2
Optimum Moisture Content (%):	13			
Remarks				
See summary of soil descriptions.				



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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

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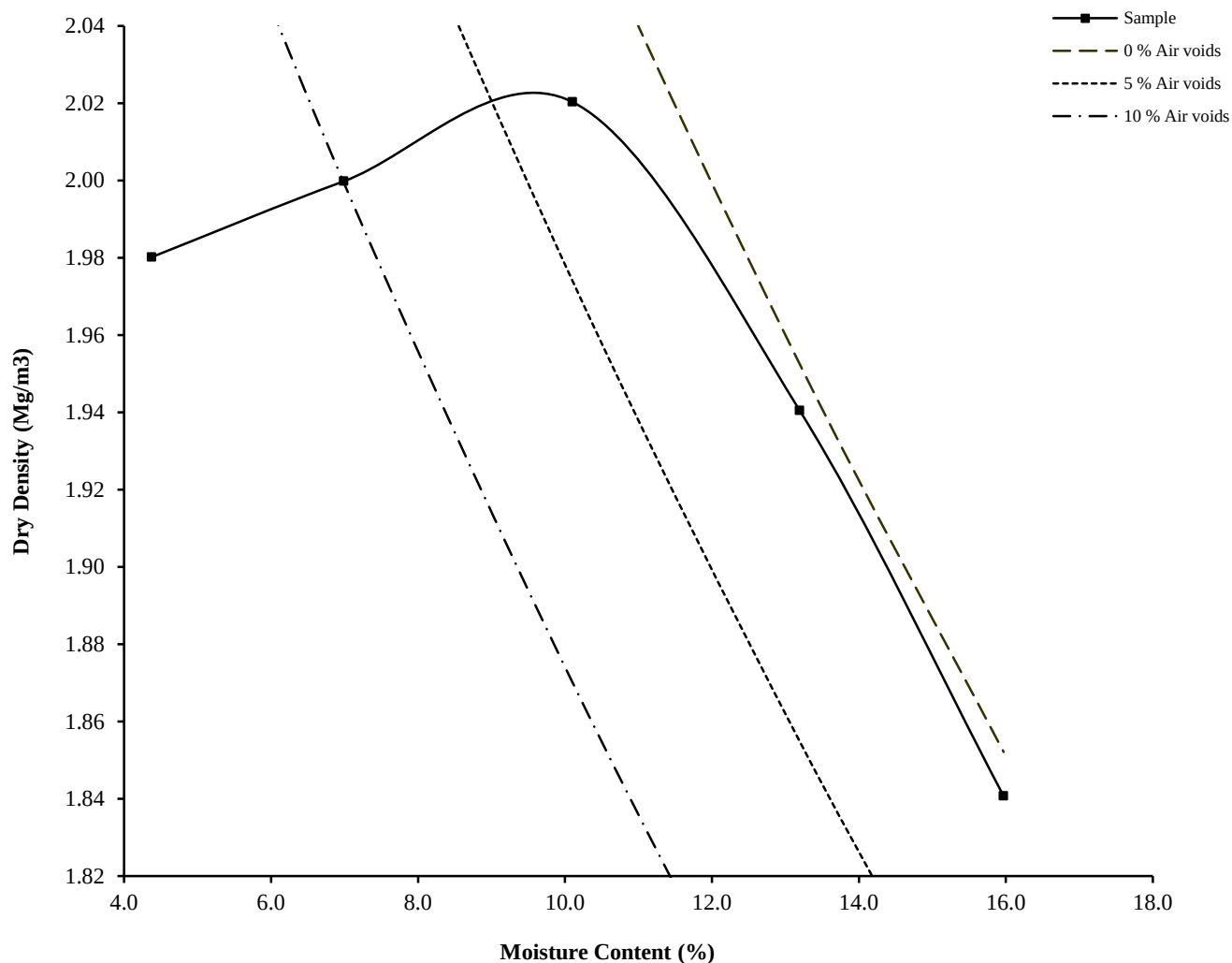
Hole Number: TP104

Top Depth (m) : 1.20

Sample Number: 6

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	19	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m3):	2.63	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m3):	2.02		Material Retained on 20.0 mm Test Sieve (%):	2
Optimum Moisture Content (%):	10			
Remarks				
See summary of soil descriptions.				



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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

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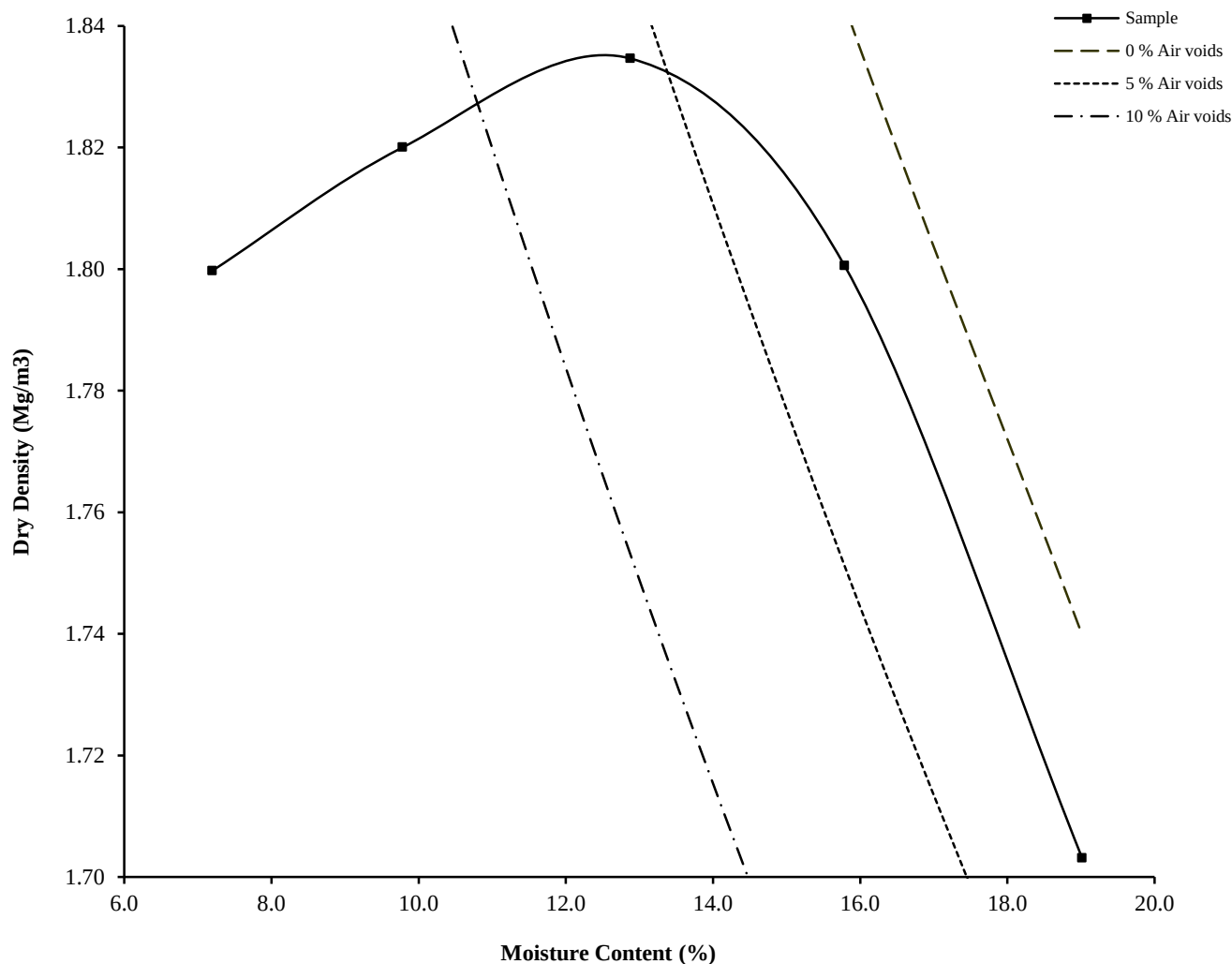
Hole Number: TP110

Top Depth (m) : 1.50

Sample Number: 13

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	19	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.60	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.83		Material Retained on 20.0 mm Test Sieve (%):	1
Optimum Moisture Content (%):	13			
Remarks				
See summary of soil descriptions.				



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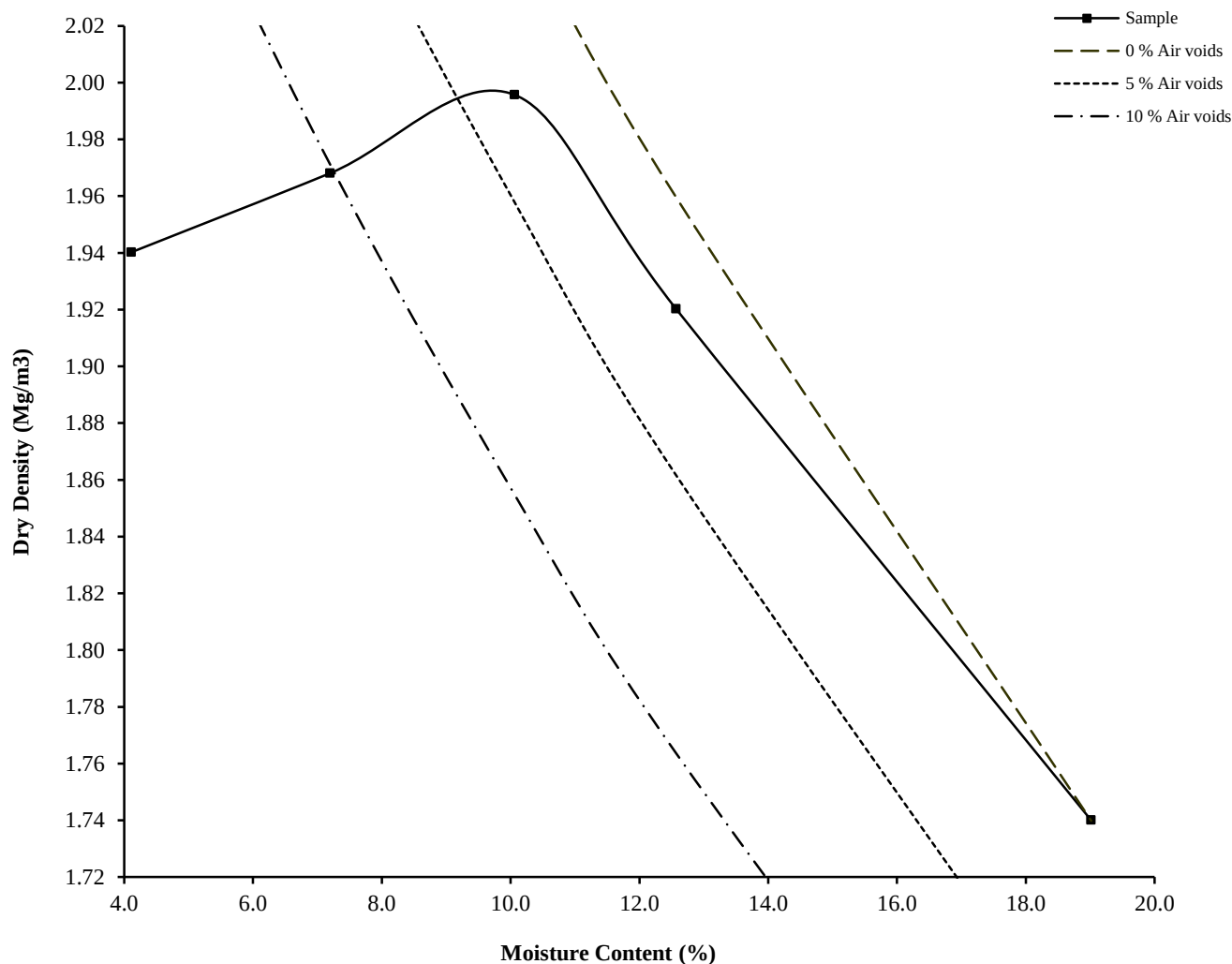
Hole Number: TP110

Top Depth (m) : 1.50

Sample Number: 13

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	19	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.60	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	2.00		Material Retained on 20.0 mm Test Sieve (%):	1
Optimum Moisture Content (%):	10			
Remarks				
See summary of soil descriptions.				



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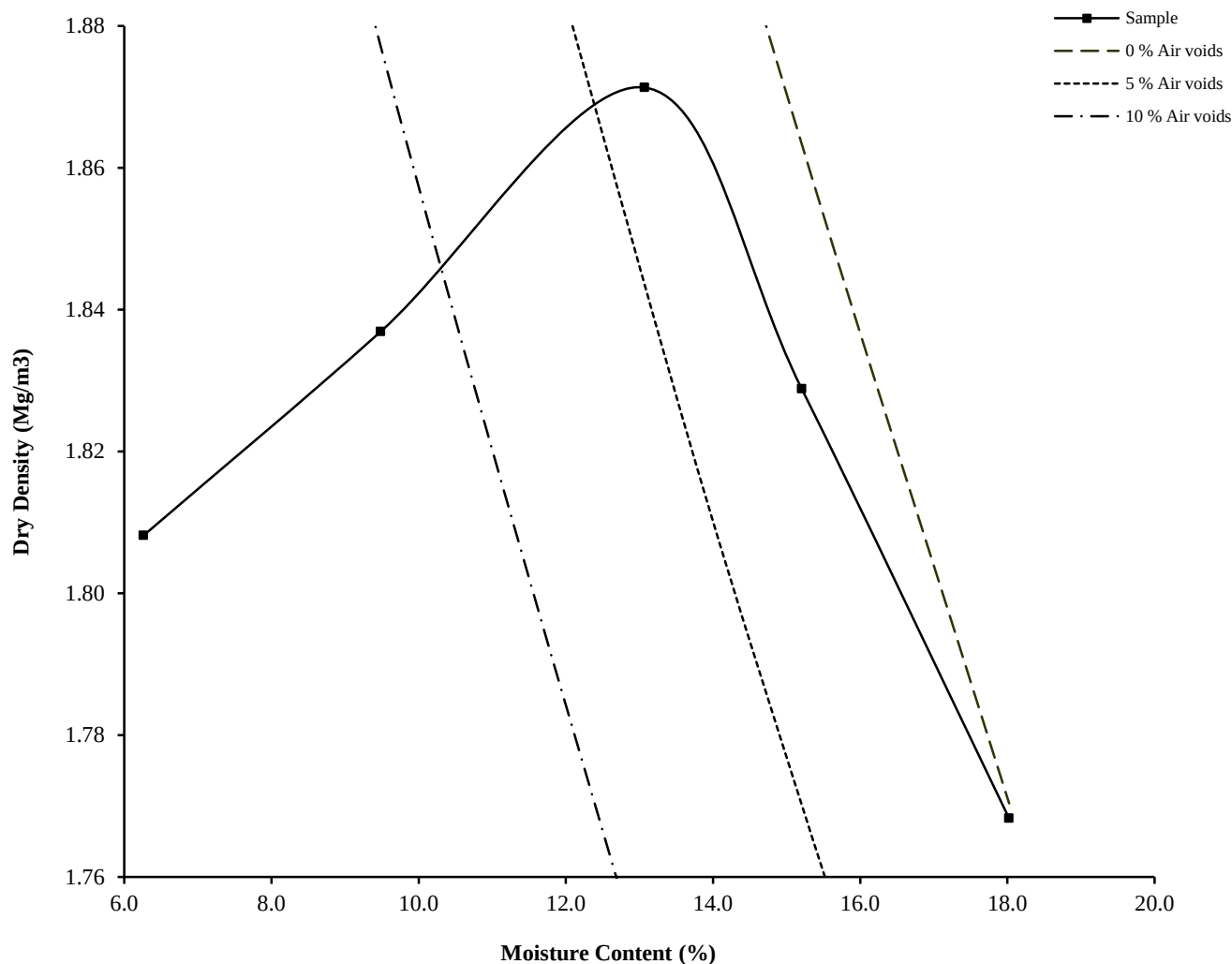
Hole Number: TP112

Top Depth (m) : 0.80

Sample Number: 14

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	15	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.60	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.87		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	13			
Remarks				
See summary of soil descriptions.				



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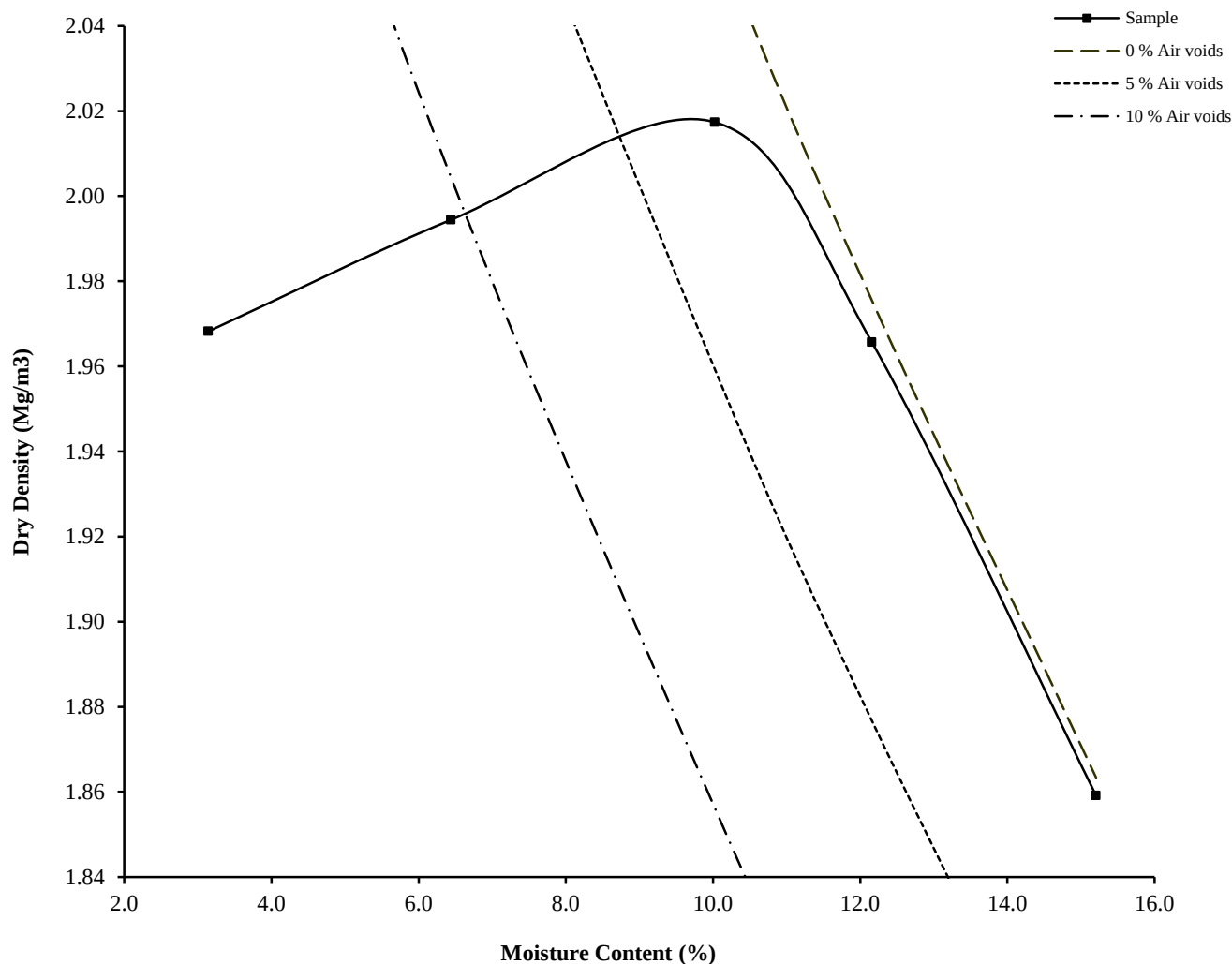
Hole Number: TP112

Top Depth (m) : 0.80

Sample Number: 14

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	15	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.60	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	2.02		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	10			
Remarks				
See summary of soil descriptions.				



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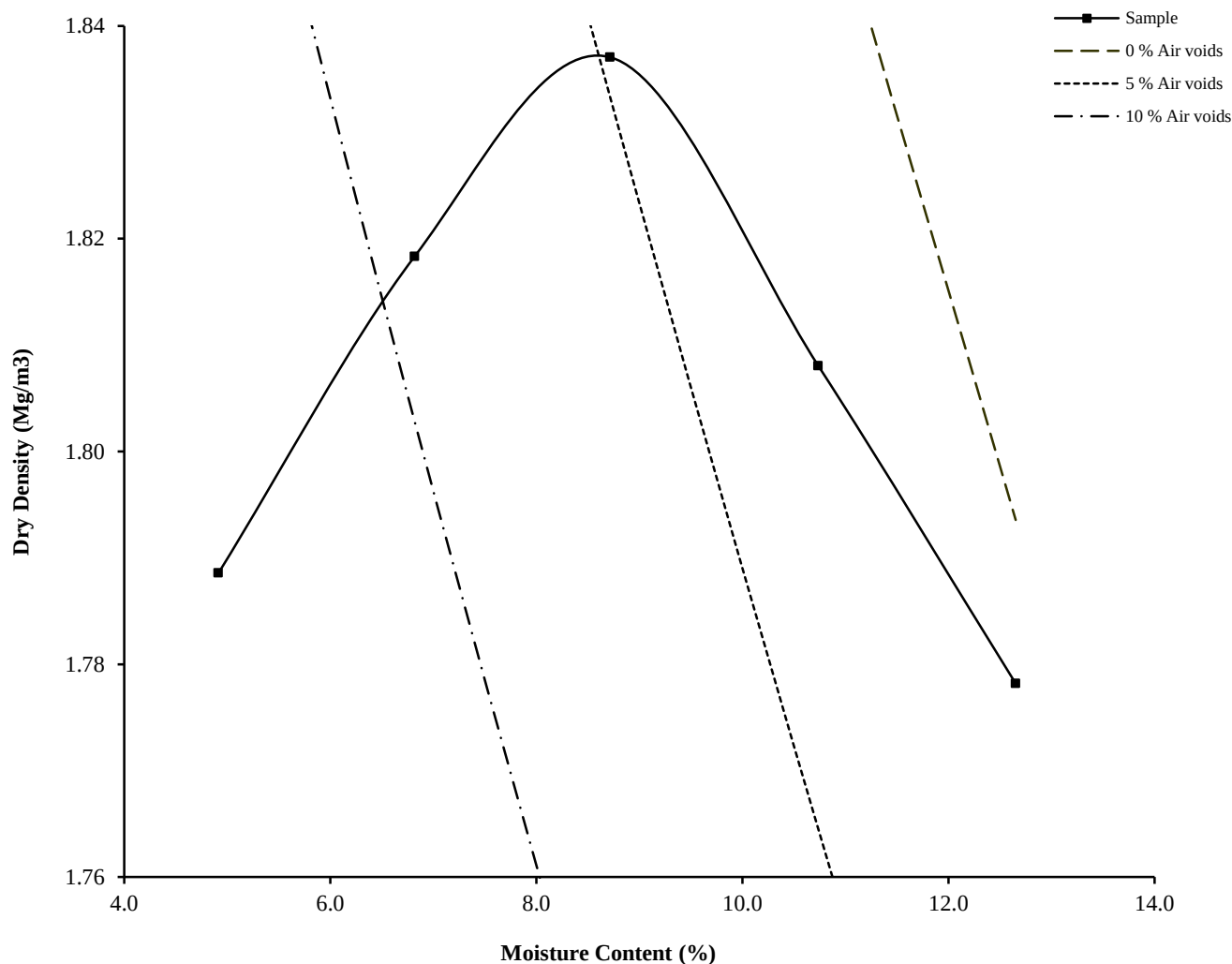
Hole Number: TP114

Top Depth (m) : 1.10

Sample Number: 16

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	11	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.32	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.84		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	9			
Remarks				
See summary of soil descriptions.				

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			5570

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

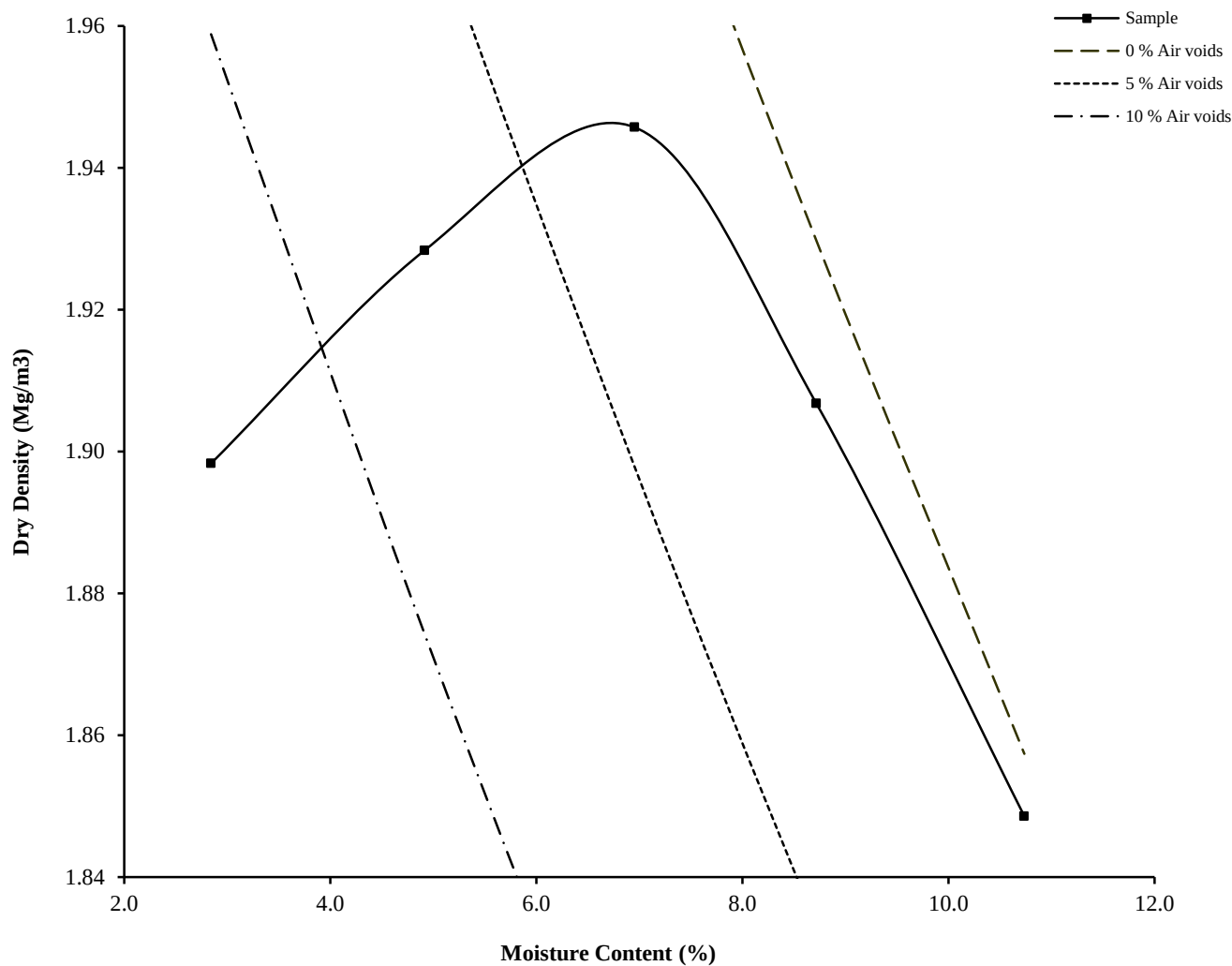
Hole Number: TP114

Top Depth (m) : 1.10

Sample Number: 16

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	11	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.32	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.95		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	7			
Remarks				
See summary of soil descriptions.				



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

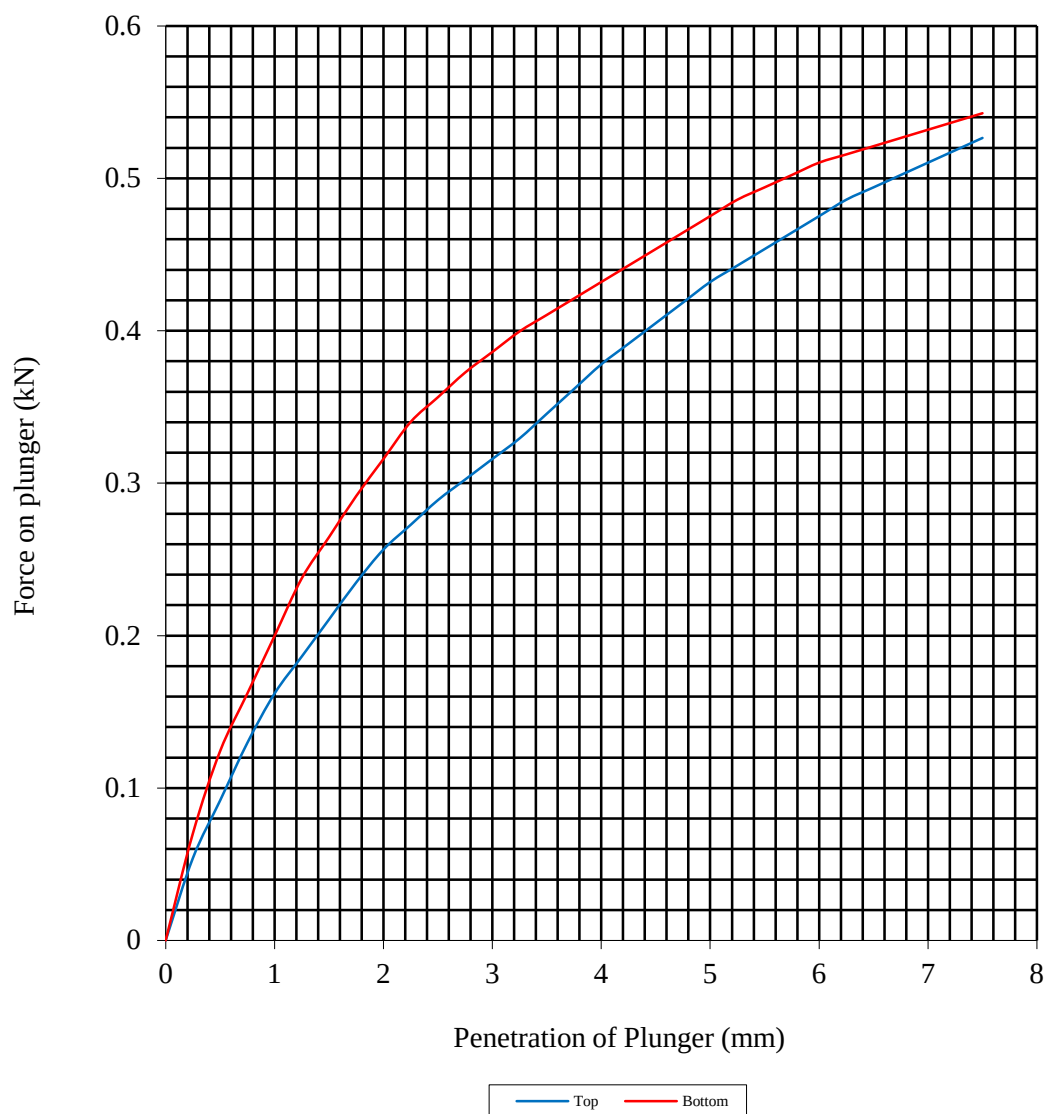
Hole Number: TP102

Top Depth (m): 0.70

Sample Number: 2

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	16	Surcharge Kg:	4.20	Sample Top	15	Sample Top	2.2
Bulk Density Mg/m3:	2.08	Soaking Time hrs	0	Sample Bottom	16	Sample Bottom	2.7
Dry Density Mg/m3:	1.80	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

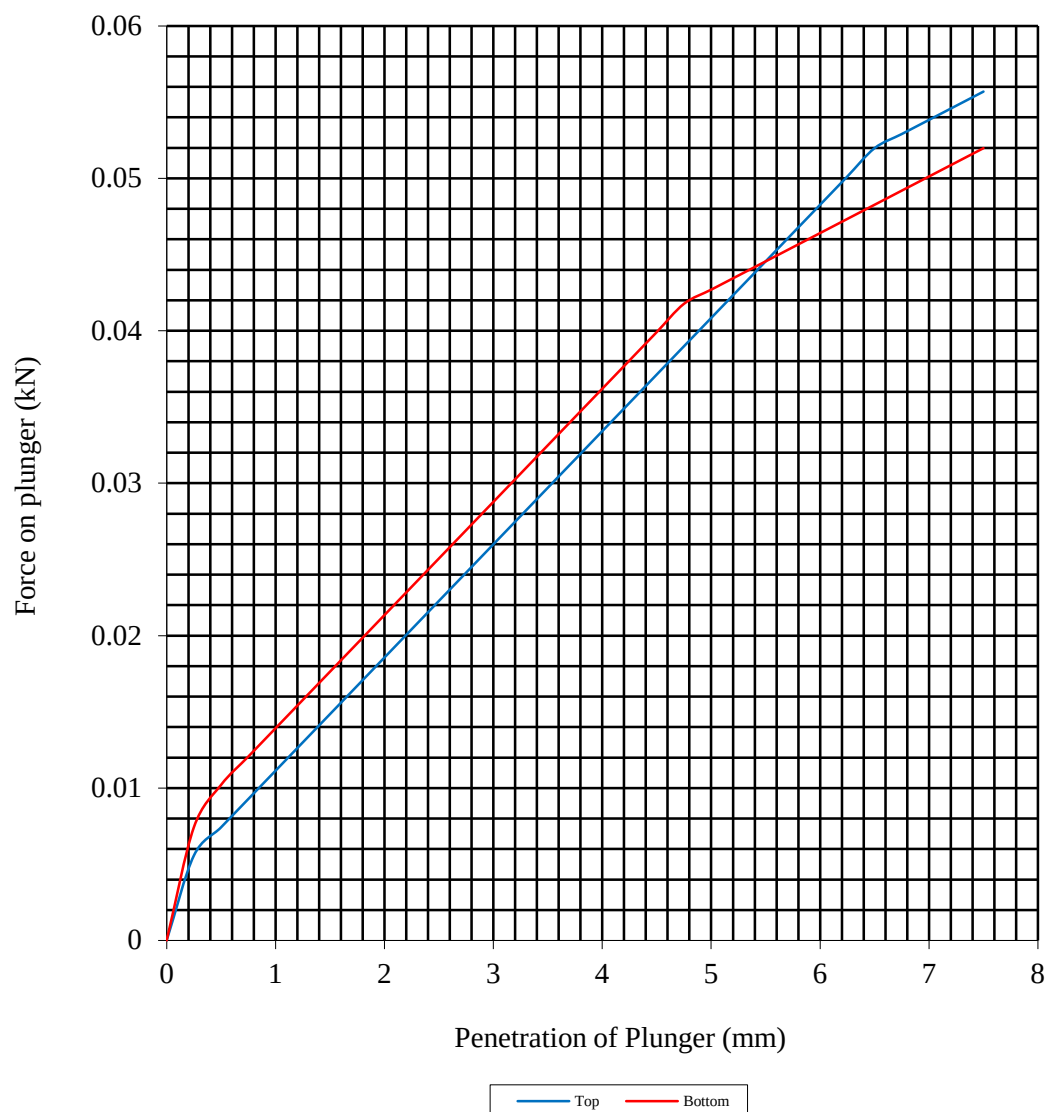
Hole Number: TP104

Top Depth (m): 1.20

Sample Number: 6

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	19	Surcharge Kg:	4.20	Sample Top	19	Sample Top	0.2
Bulk Density Mg/m3:	2.08	Soaking Time hrs	0	Sample Bottom	19	Sample Bottom	0.2
Dry Density Mg/m3:	1.75	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		2					
Compaction Conditions		2.5kg					



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CALIFORNIA BEARING RATIO TEST

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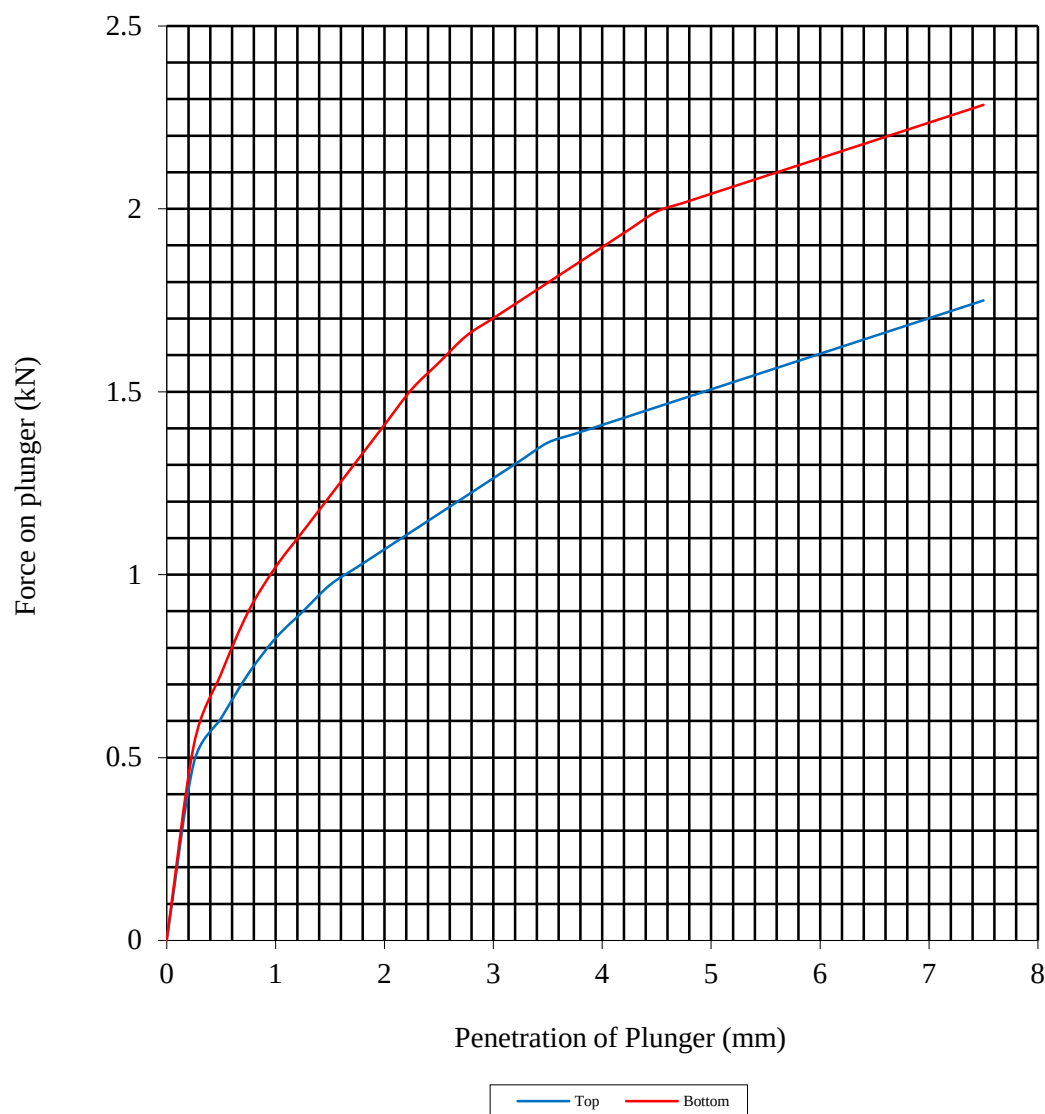
Hole Number: TP109

Top Depth (m): 0.70

Sample Number: 11

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	17	Surcharge Kg:	4.20	Sample Top	17	Sample Top	8.8
Bulk Density Mg/m3:	2.09	Soaking Time hrs	0	Sample Bottom	17	Sample Bottom	12.0
Dry Density Mg/m3:	1.79	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

Knowsley Lane, Knowsley

Contract No:
PSL19/2828
Client Ref:
5570

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

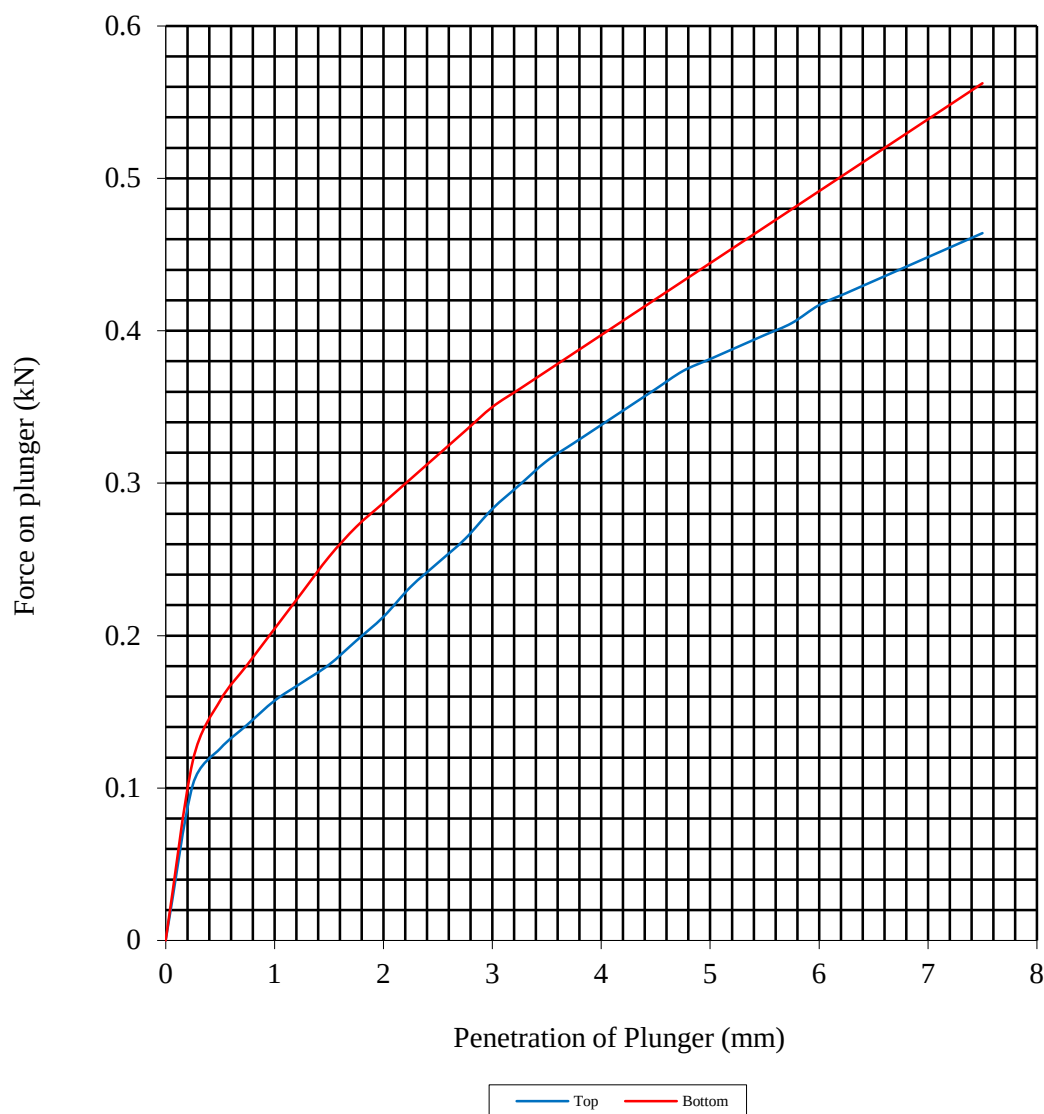
Hole Number: TP116

Top Depth (m): 0.75

Sample Number: 18

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	1.9
Bulk Density Mg/m3:	1.77	Soaking Time hrs	0	Sample Bottom	11	Sample Bottom	2.4
Dry Density Mg/m3:	1.59	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

Knowsley Lane, Knowsley

Contract No:
PSL19/2828
Client Ref:
5570

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

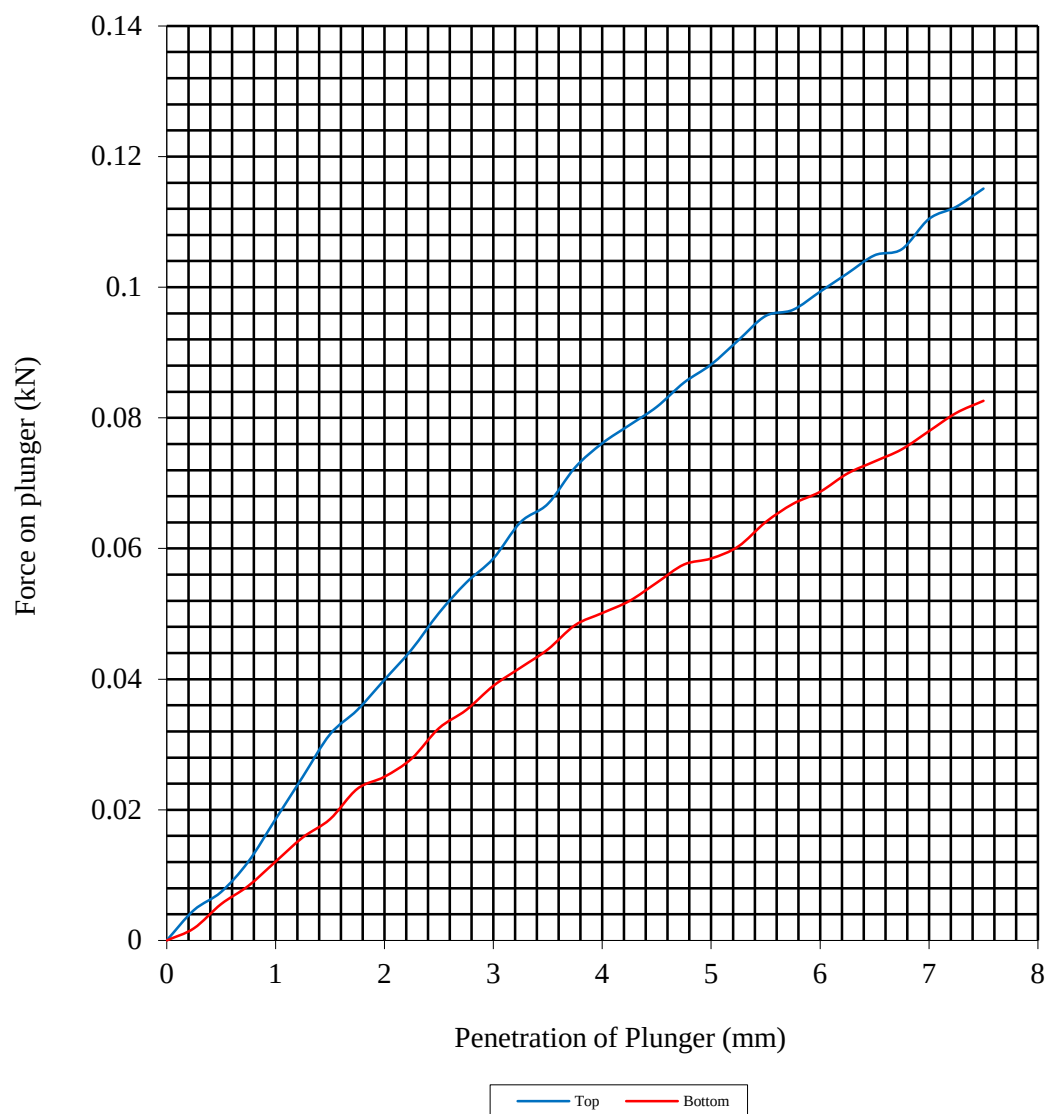
Hole Number: TP118

Top Depth (m): 1.15

Sample Number: 20

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	19	Surcharge Kg:	4.20	Sample Top	19	Sample Top	0.4
Bulk Density Mg/m ³ :	2.03	Soaking Time hrs	0	Sample Bottom	20	Sample Bottom	0.3
Dry Density Mg/m ³ :	1.70	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

Knowsley Lane, Knowsley

Contract No:
PSL19/2828
Client Ref:
5570



Certificate of Analysis

Certificate Number 19-09451

24-May-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-09451

Client Reference PSL19/2828

Order No (not supplied)

Contract Title Knowsley Lane, Knowsley

Description 7 Soil samples.

Date Received 21-May-19

Date Started 21-May-19

Date Completed 24-May-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 19-09451

Client Ref PSL19/2828

Contract Title Knowsley Lane, Knowsley

Lab No	1504350	1504351	1504352	1504353	1504354	1504355	1504356
Sample ID	TP102	TP104	TP110	TP112	TP114	TP117	TP118
Depth	0.70	0.80	0.70	0.80	1.10	1.40	1.15
Other ID	2	5	12	14	16	19	20
Sample Type	B	B	D	B	B	D	B
Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Inorganics										
pH	DETSC 2008#			6.2	6.6	5.9	6.2	6.8	7.4	6.1
Sulphate Aqueous Extract as SO ₄	DETSC 2076#	10	mg/l	44	76	22	35	12	23	50
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.02			0.02		0.02	

Information in Support of the Analytical Results

Our Ref 19-09451
 Client Ref PSL19/2828
 Contract Knowsley Lane, Knowsley

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1504350	TP102 0.70 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphate ICP (730 days), pH + Conductivity (7 days)	
1504351	TP104 0.80 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1504352	TP110 0.70 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1504353	TP112 0.80 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphate ICP (730 days), pH + Conductivity (7 days)	
1504354	TP114 1.10 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1504355	TP117 1.40 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), Total Sulphate ICP (730 days), pH + Conductivity (7 days)	
1504356	TP118 1.15 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
 Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
 The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
 Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



Appendix H Gas and Groundwater Monitoring Results

Site: Knowsley Lane, Knowsley
Job No: 5570
Visit No: 1

Visit No:

1

Date:

03/05/2019



Monitoring Location	Gas Concentration								Gas Emission Rate		GWL	Base of Standpipe	
	Peak		Steady		Highest	Highest	Lowest						
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lsl	%v/v	%	% lsl	%v/v	%	ppm	ppm	%	Peak	Steady		
BH101	0.0	0.0	2.9	0.0	0.0	2.9	0	0	18.1	0.1	0.1	1.95	3.00
BH102	0.0	0.0	1.6	0.0	0.0	1.6	0	0	19.1	0.2	0.2	1.52	3.00
BH103	0.0	0.0	0.4	0.0	0.0	0.2	0	0	20.1	0.1	0.1	1.30	5.00
BH104	0.0	0.0	0.1	0.0	0.0	0.1	0	0	20.2	-0.1	-0.1	6.70	7.00
BH105	0.0	0.0	0.9	0.0	0.0	0.5	0	0	20.2	0.1	0.1	0.90	2.00
BH106	0.0	0.0	0.7	0.0	0.0	0.6	0	3	19.7	0.1	0.1	3.29	4.00
BH107	0.0	0.0	2.3	0.0	0.0	2.3	0	2	18.9	0.1	0.1	3.28	4.50
Ambient Concentration (% volume):				CH ₄	0.0	%v/v	CO ₂		0.1	%v/v			
				O ₂	20.5	%v/v							
Barometric Pressure:		Start	1012		Monitoring Equipment:				GA5000				
		End	1014		Serial Number of Equipment:				G505491				
Barometric Pressure Trend:		Rising (Regionally rising)				Date of Last Calibration:				16.November.2018			
Weather:		Overcast				Operator:				D. Horne			
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:				Approved:							

Site: Knowsley Lane, Knowsley
Job No: 5570
Visit No: 2

Visit No:

2

Date:

08/05/2019



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lcl	%v/v	%	% lcl	%v/v	%	ppm	ppm	%	Peak	Steady		
BH101	0.0	0.0	4.1	0.0	0.0	4.1	0	0	17.2	0.0	0.0	1.78	3.00
BH102	0.0	0.0	3.5	0.0	0.0	3.5	0	0	18.0	0.1	0.1	1.46	3.00
BH103	0.0	0.0	0.3	0.0	0.0	0.1	0	0	20.8	0.0	0.0	1.33	5.00
BH104	0.0	0.0	0.3	0.0	0.0	0.3	5	97	11.0	10.5	10.5	6.80	7.00
BH105	0.0	0.0	0.2	0.0	0.0	0.1	2	0	20.8	0.2	0.2	0.80	2.00
BH106	0.0	0.0	3.3	0.0	0.0	0.5	0	2	17.7	0.0	0.0	3.30	4.00
BH107	0.0	0.0	2.2	0.0	0.0	2.2	0	1	19.5	0.1	0.0	3.40	4.50
Ambient Concentration (% volume):				CH ₄	0.0	%v/v	CO ₂			0.1	%v/v		
				O ₂	20.5	%v/v							
Barometric Pressure:		Start	989						Monitoring Equipment:		GA5000		
		End	990						Serial Number of Equipment:		G505491		
Barometric Pressure Trend:		Rising (Regionally falling)				Date of Last Calibration:				16.November.2018			
Weather:		Raining				Operator:				D. Horne			
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:				Approved:							

Site: Knowsley Lane, Knowsley
Job No: 5570
Visit No: 3

Knowsley Lane, Knowsley

5570

Caddicks Development Limited

15/05/2019



Monitoring Location	Gas Concentration										Gas Emission Rate	GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lcl	%v/v	%	% lcl	%v/v	%	ppm	ppm	%	Peak	Steady		
BH101	0.0	0.0	3.3	0.0	0.0	3.3	0	0	17.5	0.0	0.0	1.78	3.00
BH102	0.0	0.0	3.1	0.0	0.0	3.1	0	0	17.8	-0.1	-0.1	1.43	3.00
BH103	0.0	0.1	0.8	0.0	0.1	0.7	0	0	19.4	0.1	0.0	1.42	5.00
BH104	0.0	0.1	0.1	0.0	0.1	0.1	1	1	20.3	-2.1	-1.2	6.83	7.00
BH105	0.0	0.0	0.1	0.0	0.0	0.1	0	1	20.7	0.0	0.0	0.95	2.00
BH106	0.0	0.0	1.6	0.0	0.0	0.5	0	2	18.7	0.1	0.1	3.33	4.00
BH107	0.0	0.0	2.2	0.0	0.0	2.2	0	1	16.6	0.1	0.1	3.34	4.50
Ambient Concentration (% volume):				CH ₄	0.1	%v/v	CO ₂			0.1	%v/v		
				O ₂	20.5	%v/v							
Barometric Pressure:		Start	1024					Monitoring Equipment:				GA5000	
		End	1024					Serial Number of Equipment:				G505491	
Barometric Pressure Trend:		Steady (Regionally falling)						Date of Last Calibration:				16.November.2018	
Weather:		Sunny						Operator:				D. Horne	
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:					Approved:						

Site: Knowsley Lane, Knowsley
Job No: 5570
Visit No: 4

Visit No:

4

Date:

28/05/2019



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lcl	%v/v	%	% lcl	%v/v	%	ppm	ppm	%	Peak	Steady		
BH101	0.0	0.2	1.6	0.0	0.2	1.5	0	0	19.4	0.0	0.0	1.87	3.00
BH102	0.0	0.1	2.4	0.0	0.1	2.4	0	0	18.9	0.0	0.0	1.48	3.00
BH103	0.0	0.1	0.9	0.0	0.1	0.9	0	0	19.6	0.1	0.0	1.55	5.00
BH104	0.0	0.2	1.1	0.0	0.2	1.1	3	71	3.2	2.1	2.1	DRY	7.00
BH105	0.0	0.1	0.2	0.0	0.1	0.1	0	0	20.3	0.0	0.0	0.98	2.00
BH106	0.0	0.1	2.9	0.0	0.1	1.6	0	0	16.5	0.1	0.1	3.30	4.00
BH107	0.0	0.1	1.9	0.0	0.0	1.8	0	0	19.1	0.1	0.1	DRY	4.50
Ambient Concentration (% volume):				CH ₄	0.1	%v/v	CO ₂			0.2	%v/v		
				O ₂	20.3	%v/v							
Barometric Pressure:		Start	1007					Monitoring Equipment:				GA5000	
		End	1009					Serial Number of Equipment:				G505491	
Barometric Pressure Trend:		Rising (Regionally rising)				Date of Last Calibration:				16.November.2018			
Weather:		Overcast				Operator:				D. Horne			
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:					Approved:						

Site: Knowsley Lane, Knowsley
Job No: 5570
Visit No: 5

Knowsley Lane, Knowsley

5570

Caddicks Development Limited

13/06/2019



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lcl	%v/v	%	% lcl	%v/v	%	ppm	ppm	%	Peak	Steady		
BH101	0.00	0.0	3.6	0.0	0.0	3.0	0	0	17.90	0.0	0.0	1.80	3.00
BH102	0.00	0.0	3.1	0.0	0.0	3.1	0	0	18.10	0.0	0.0	1.31	3.00
BH103	0.00	0.0	0.3	0.0	0.0	0.2	0	0	20.70	0.0	0.0	0.90	5.00
BH104	0.00	0.0	0.3	0.0	0.0	0.3	0	1	16.40	3.9	3.9	DRY	7.00
BH105	0.00	0.0	0.5	0.0	0.0	0.3	0	0	20.90	0.0	0.0	0.66	2.00
BH106	0.00	0.0	1.7	0.0	0.0	0.9	0	0	18.80	0.0	0.0	2.43	4.00
BH107	0.00	0.0	0.5	0.0	0.0	0.3	0	2	20.9	0.1	0.1	0.81	4.50
Ambient Concentration (% volume):				CH ₄	0.0	%v/v	CO ₂			0.1	%v/v		
				O ₂	20.9	%v/v							
Barometric Pressure:		Start	999					Monitoring Equipment:				GA5000	
		End	1000					Serial Number of Equipment:				G505491	
Barometric Pressure Trend:		Rising (Regionally falling)				Date of Last Calibration:				16.November.2018			
Weather:		Raining & overcast				Operator:				D. Horne			
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:				Approved:							

Site: Knowsley Lane, Knowsley
Job No: 5570
Visit No: 6

Job No: 5570

Visit No:

Client: Caddicks Development Limited
Date: 18/06/2019



Monitoring Location	Gas Concentration									Gas Emission Rate	GWL	Base of Standpipe	
	Peak		Steady			Highest	Highest	Lowest					
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour			(m) bgl
	% lcl	%v/v	%	% lcl	%v/v	%	ppm	ppm	%	Peak	Steady		
BH101	0.0	0.0	2.8	0.0	0.0	2.6	0	0	18.40	0.0	0.0	1.55	3.00
BH102	.	.	.	.	.	.	.	.	.	.	.	.	3.00
BH103	0.0	0.0	0.4	0.0	0.0	0.1	0	0	20.00	0.0	0.0	1.17	5.00
BH104	0.0	0.0	0.1	0.0	0.0	0.1	0	0	20.00	-0.6	-0.6	DRY	7.00
BH105	0.0	0.0	0.1	0.0	0.0	0.1	0	0	19.90	0.0	0.0	0.76	2.00
BH106	0.0	0.0	1.9	0.0	0.0	0.8	0	1	17.30	0.1	0.1	3.20	4.00
BH107	0.0	0.0	0.1	0.0	0.0	0.1	0	2	19.8	0.1	0.1	0.97	4.50
Ambient Concentration (% volume):				CH ₄	0.0	%v/v	CO ₂			0.1	%v/v		
				O ₂	21.0	%v/v							
Barometric Pressure:		Start	1010					Monitoring Equipment:				GA5000	
		End	1111					Serial Number of Equipment:				G505491	
Barometric Pressure Trend:		Rising (Regionally steady)				Date of Last Calibration:				16.November.2018			
Weather:		Sunny				Operator:				D. Horne			
Key		Remarks											
NR - Not Recorded NA - Not Applicable		. = Unable to monitor BH102.											
		Checked:					Approved:						

SUMMARY OF GROUND GAS MONITORING

BH NO.	Peak CH4	Peak CH4	Steady CH4	Steady CH4	Peak CO2	Peak CO2	Steady CO2	Steady CO2	H ₂ S	CO	O ₂	O ₂	max limiting	max limiting	Peak Flow	Steady Flow	SWL	SWL
	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	ppm	ppm	(% v/v)	(% v/v)	bh flow	bh flow	(l/hr)	(l/hr)	(m bgl)	(m bgl)
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MAX	MAX	MIN	MAX	rate for CH4	rate for CO2*	MAX	MAX	MIN	MAX
BH101	0	0.2	0	0.2	1.6	4.1	1.5	4.1	0	0	17.2	19.4	0.0002	0.0041	0.1	0.1	1.55	1.95
BH102	0	0.1	0	0.1	0.3	3.5	0.2	3.5	0	0	17.8	19.1	0.0002	0.007	0.2	0.2	1.31	1.52
BH103	0	0.1	0	0.1	0.3	0.9	0.1	0.9	0	1	19.4	20.8	0	0	0.1	0	0.90	1.55
BH104	0	0.2	0	0.2	0.1	1.1	0.1	1.1	5	97	3.2	20.3	0.021	0.1155	10.5	10.5	6.70	6.83
BH105	0	0.1	0	0.1	0.1	1.7	0.1	0.9	2	1	19.9	20.9	0.0002	0.0034	0.2	0.2	0.66	0.98
BH106	0	0.1	0	0.1	0.5	3.3	0.3	1.6	0	3	16.5	19.7	0.0001	0.0033	0.1	0.1	2.43	3.33
BH107	0	0.1	0	0	0.1	2.3	0.1	2.3	0	2	16.6	20.9	0	0.0023	0.1	0.1	0.81	3.40

* Based on peak CO2 and steady flows.

	VISIT 1	VISIT 2	VISIT 3	VISIT 4	VISIT 5	VISIT 6
MB Start	1012	989	1024	1007	999	1010
MB Finish	1014	990	1024	1009	1000	1111
Pressure Change	Rising (Regionally rising)	Rising (Regionally falling)	Steady (Regionally falling)	Rising (Regionally rising)	Rising (Regionally falling)	Rising (Regionally steady)



Appendix I Notes on Limitations



General

JPG (Leeds) Limited have prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from JPG (Leeds) Limited; a charge may be levied against such approval.

JPG (Leeds) Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) this document to any third party with whom an agreement has not been executed.

Phase I Desk Study Reports

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, JPG (Leeds) Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Geo-Environmental Investigations

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics and ground and groundwater conditions to allow a reasonable assessment of the environmental risks together with engineering and development implications. The objectives of the investigation have been limited to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and groundwater.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather-related effects.

The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance values relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.

5 John Charles Way
LEEDS
LS12 6QA

Tel: 0113 263 1155
admin@jpg.group
www.jpg.group

