BURO HAPPOLD

Fallowfield Campus Redevelopment Project

Ground Conditions Phase 1 Desk Study Report

UoMF-BH-XX-XX-RP-GE-0001

053454

23 August 2023

Revision P02

Copyright © 1976 - 2023 Buro Happold. All rights reserved

Revision	Description	Issued by	Date	Checked
P01	Ground Conditions Phase 1 Desk Study - Draft	LR	30/06/23	PH
P02	Ground Conditions Phase 1 Desk Study – Final	LR	23/08/23	PH

https://burohappold.sharepoint.com/sites/053454/05_Teams Files/Ground Engineering/Reports/Desk Study/Fallowfield Ground Conditions Ph1 Desk Study Report_Final.docx

Report Disclaimer

This Report was prepared by Buro Happold Limited ("BH") for the sole benefit, use and information of the University of Manchester for Information. BH assumes no liability or responsibility for any reliance placed on this Report by any third party for any actions taken by any third party in reliance of the information contained herein. BH's responsibility regarding the contents of the Report shall be limited to the purpose for which the Report was produced and shall be subject to the express contract terms with the University of Manchester. The Report shall not be construed as investment or financial advice. The findings of this Report are based on the available information as set out in this Report.

author	**Louise Richards**
date	**23/08/23**
approved	**Pip Hunsworth**
signature	Digitally signed by Pip Hunsworth Location: Leeds Reason: I have reviewed this document Date: 2023.08.23 18:10:53+01'00'
date	**23/08/23**

Copyright © 1976 - 2023 Buro Happold. All rights reserved

Contents

Executive Summary 7

1 Introduction 9

2 Current land use and proposed development 13

3 Environmental Setting 16

4 Site Setting 22

5 Preliminary Geoenvironmental Risk Assessment 25

6 Conclusions and Recommendations 29

7 References 31

Appendix A Geotechnics GI

Appendix B Groundsure Report

Appendix C UXO Risk Map and PDSA

Copyright © 1976 - 2023 Buro Happold. All rights reserved

Executive Summary

Objectives

The purpose of this Desk Study is to establish the environmental, geological, hydrological and hydrogeological conditions present at the University of Manchester Fallowfield Campus that may result in potential contamination risks / ground related risks for existing and/or potential future uses. The overall aims of this report are (i) to inform the Client's understanding of potential ground-related risks associated with the proposed redevelopment and (ii) to provide evidence necessary to support the planning application.

Site Setting

The site covers 9.46 ha, and is located at Fallowfield Campus, 293 Wilmslow Road, Fallowfield, Manchester, M14 6HD, National Grid Reference (NGR) SJ 85733 94127. The existing site is currently student accommodation and university-related land use. Oak House and Woolton Hall are all still in use as student accommodation. Owens Park covering the northern half of the site is now closed as it does not meet current quality standards for use as student accommodation. The buildings on site are generally 4 storeys in height, with the exception of Owens Park tower in the north of the site which is 18 storeys.

Geological Setting

It is anticipated that the site is underlain by a sequence of Made Ground, underlain by Glacial Till, underlain by the Chester Formation.

History

The map records for the site indicate that is has been developed since pre-1890's and has had various uses. The site is presently occupied by the University of Manchester Fallowfield Campus, which was first recorded as Owens Park in 1972.

Geoenvironmental Considerations

A number of potential sources of contamination in near surface ground have been identified relating to the previous / historic uses (Made Ground). Low/moderate risk were assessed to people (demolition and construction workers, future site users and off site users) associated with this potential contamination. The potential risks associated with the possible presence of Unexploded Ordnance (UXO) were assessed as "Moderate". Mitigation options are available to reduce all of these risks to acceptable levels.

It is recommended that prior to the commencement of development, data is obtained from a site-specific ground investigation which is presented in a factual report suitable for submission to the Local Planning Authority to address part of the standard planning condition associated with site investigation. Following on from this, an assessment of the data will need to be undertaken along with any subsequent recommendations on the need for any further investigation. Depending on the results of the ground investigation more detailed risk assessment and / or requirements for remediation may be required.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

1 Introduction

1.1 General

This report presents the results of a Geoenvironmental Desk Study for the Fallowfield Campus Redevelopment Project prepared by Buro Happold on behalf of the Client, the University of Manchester (UoM). The purpose of this Study is to establish the environmental, geological, hydrological and hydrogeological conditions present at the site that may result in potential contamination risks for the proposed future use.

The site covers approximately 9.49 hectares (ha), and is located at Fallowfield Campus, 293 Wilmslow Road, Fallowfield, Manchester, M14 6HD, National Grid Reference (NGR) SJ 85733 94127.

The existing site is currently student accommodation and university-related land use. Oak House and Woolton Hall are all still in use as student accommodation. Owens Park covering the northern half of the site is now closed as it does not meet current quality standards for use as student accommodation.

The buildings are generally 4 storeys in height, with the exception of Owens Park tower in the north of the site which is 18 storeys. All of these buildings will be demolished to make way for the proposed development, including the Limes building which will be demolished and relocated elsewhere (under a future planning application). There are a number of high value and mature trees on the site and it is proposed to retain as many of these as possible.

The site location is shown below in Figure 1—1. An aerial photograph is available in Figure 1—2.

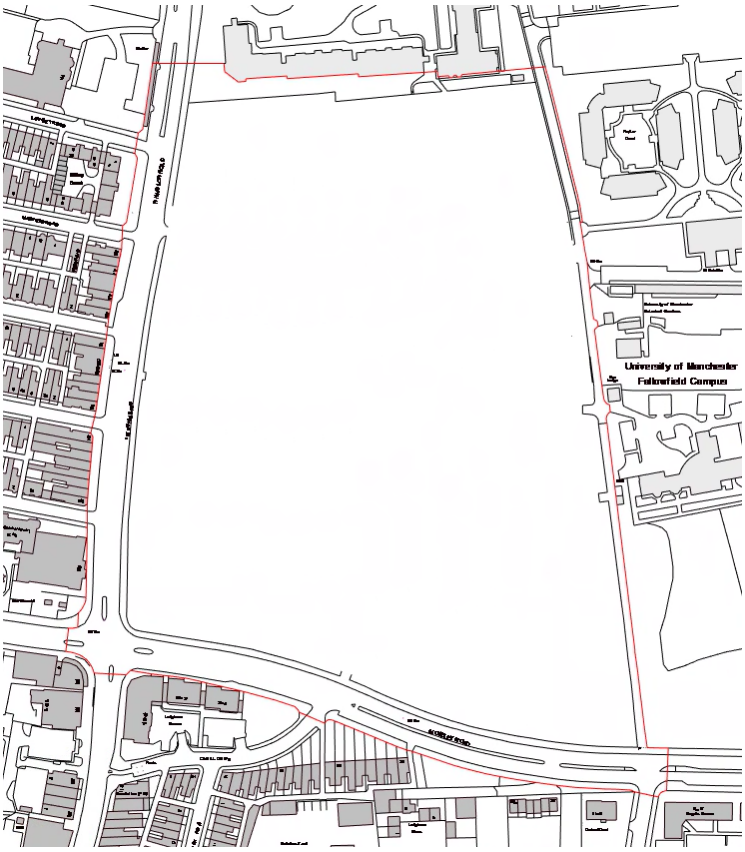


Figure 1—1 Site Location Plan extract

Copyright © 1976 - 2023 Buro Happold. All rights reserved



Figure 1—2 Recent aerial photograph of the site showing site boundary.

Please note, the redline boundary shown on Figure 1—2 was the boundary at the time of obtaining the Groundsure report. The current redline boundary is shown in Figure 1—1 and this is the boundary that has been used within this assessment.

1.2 Study Aims and Objectives

The overall aim of this study is to carry out a geoenvironmental assessment of the site in order to inform the Client's understanding of potential ground-related risks associated with the phased erection of purpose built student accommodation (Sui Generis) up to 3,300 beds, to include all associated ancillary uses, demolition and other necessary works.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

This report provides information relevant to redevelopment in accordance with the requirements of the National Planning Policy Framework (NPPF) [1]. The work was carried out in general accordance with the Model Procedures [2], the relevant British Standard [3], the Environment Agency (EA) Guiding Principles [4] and other current good practice guidance.

The particular objectives are:

- To determine the historical and current use of the site and its surroundings;
- To determine the nature of the ground conditions and the environmental sensitivity of the site;
- To assess the potential location, nature and extent of any ground and groundwater contamination;
- To assess the potential risks to people and the environment (natural and built) associated with ground contamination (solid, liquid or gas) both in the site's existing condition and for the proposed future use;
- To construct an initial Conceptual Site Model and carry out a preliminary contaminated land risk assessment, in general accordance with the EA/Department for Environment, Food and Rural Affairs (DEFRA) Model Procedures [2];
- To prepare a report based upon all of the above suitable to inform the Client about potential risks related to ground conditions and also suitable to support a planning application in accordance with NPPF [1] and to provide baseline information suitable for informing the Environmental Impact Assessment Scoping process; and
- To evaluate the potential need for and scope of any subsequent site investigations and/or remedial action or design.

1.3 Information Sources

The principal sources of information for this desk study report include:

- Historical and current topographic maps,
- British Geological Survey (BGS) geological maps [5],
- Historic Ground Investigation reports [6] [7] [8] [9] [10]; (Appendix A),
- Groundsure report (Appendix B – exploratory holes only) [11],
- Zetica UXO Risk Map and Pre-Desk Study Assessment (PDSA) (Appendix C)
- Public register information,
- and
- Information available from the EA website and other online sources.

This report is therefore based upon information obtained from third party sources. The third party data has been accepted at face value and has not been independently verified. Buro Happold can therefore give no warranty, representation or assurance as to the accuracy or completeness of such information. The current redline boundary is shown in Figure 1—1.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

1.4 Competence

This work reported here was carried out by engineers from Buro Happold. Buro Happold is a consulting engineering company that manages its work under various Quality Management Systems that are certified to ISO 9001. The work itself was carried out by the staff with relevant qualifications, training and experience. The technical elements of this report have been reviewed by a Chartered Geologist.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

2 Current land use and proposed development

2.1 Site Location

The site covers 9.46 hectares (ha), and is located at Fallowfield Campus, 293 Wilmslow Road, Fallowfield, Manchester, M14 6HD, National Grid Reference (NGR) SJ 85733 94127. The existing site is currently student accommodation and university-related land use. Oak House and Woolton Hall are all still in use as student accommodation. Owens Park covering the northern half of the site is now closed as it does not meet current quality standards for use as student accommodation. The buildings are generally four stories in height, with the exception of Owens Park tower in the north of the site which is 18 storeys. All of these buildings will be demolished to make way for the proposed development, including the Limes building which will be demolished and relocated elsewhere (under a future planning application). There are a number of high value and mature trees on the site and it is proposed to retain as many of these as possible.

2.2 Proposed development

The outline planning application (with access only) is for the for the phased demolition of existing buildings and phased development of up to 3,300 Purpose Built Student Accommodation bedrooms (Sui Generis use class) with associated facilities including waste storage, laundry and cycle storage; up to 4,500 sq m of floorspace to be used for ancillary purposes associated with the student residential use of the site within Use Class F1a, Class E(a), E(b), E(c), E(d), E(g), Sui Generis (drinking establishment and hot food takeaway); ancillary supporting staff accommodation (up to 55 bedrooms) (Sui Generis use class), and up to 1,200 sq m, of ancillary residential dwellings (Use Class C3), plus associated car parking, hard and soft landscaping, open space, utilities, footpaths and roads. The technical master plan and parameter plans for the proposed development are presented in Figure 2—1.

The height of the proposed buildings are set out from a datum point of +44.800m from a coordinate position of N:394293 E:385780 and range between 63.8 m AOD and 90.8 m AOD (including roof plant), a series of car parking spaces and up to 825 No. bicycle spaces (25%) are proposed.

2.3 Current site conditions

2.3.1 Layout and topography

The site is an irregular rectangular in shape with a total area of approximately 8 ha. The site is on a very slight north-south downhill gradient ranging from 44m AOD along Old Hall Lane (to the north) to 39m AOD along Moseley Road (to the south).

2.4 Surrounding land use

The surrounding uses include residential houses to the west and south and student residential buildings to the south (Ladybarn House) and east (e.g. Richmond Park and Unsworth Park). Further UoM buildings are located to the north of the site (e.g. Sheavyn House and Ashburne Hall).

The surrounding area within and around the site provides significant green space including playing fields, rows of mature trees and parkland.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

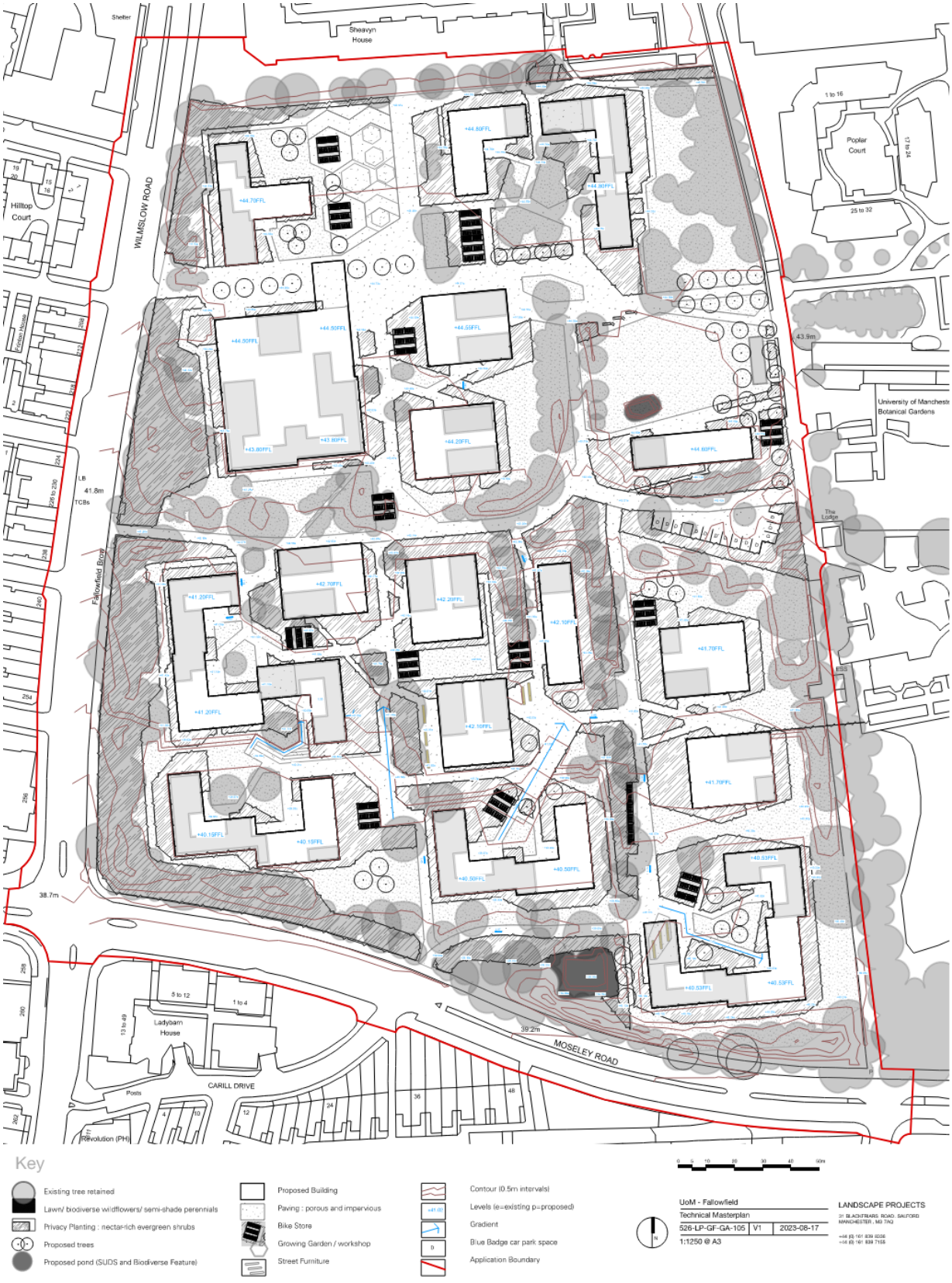


Figure 2—1 Technical Masterplan for the proposed development (extract)

Copyright © 1976 - 2023 Buro Happold. All rights reserved

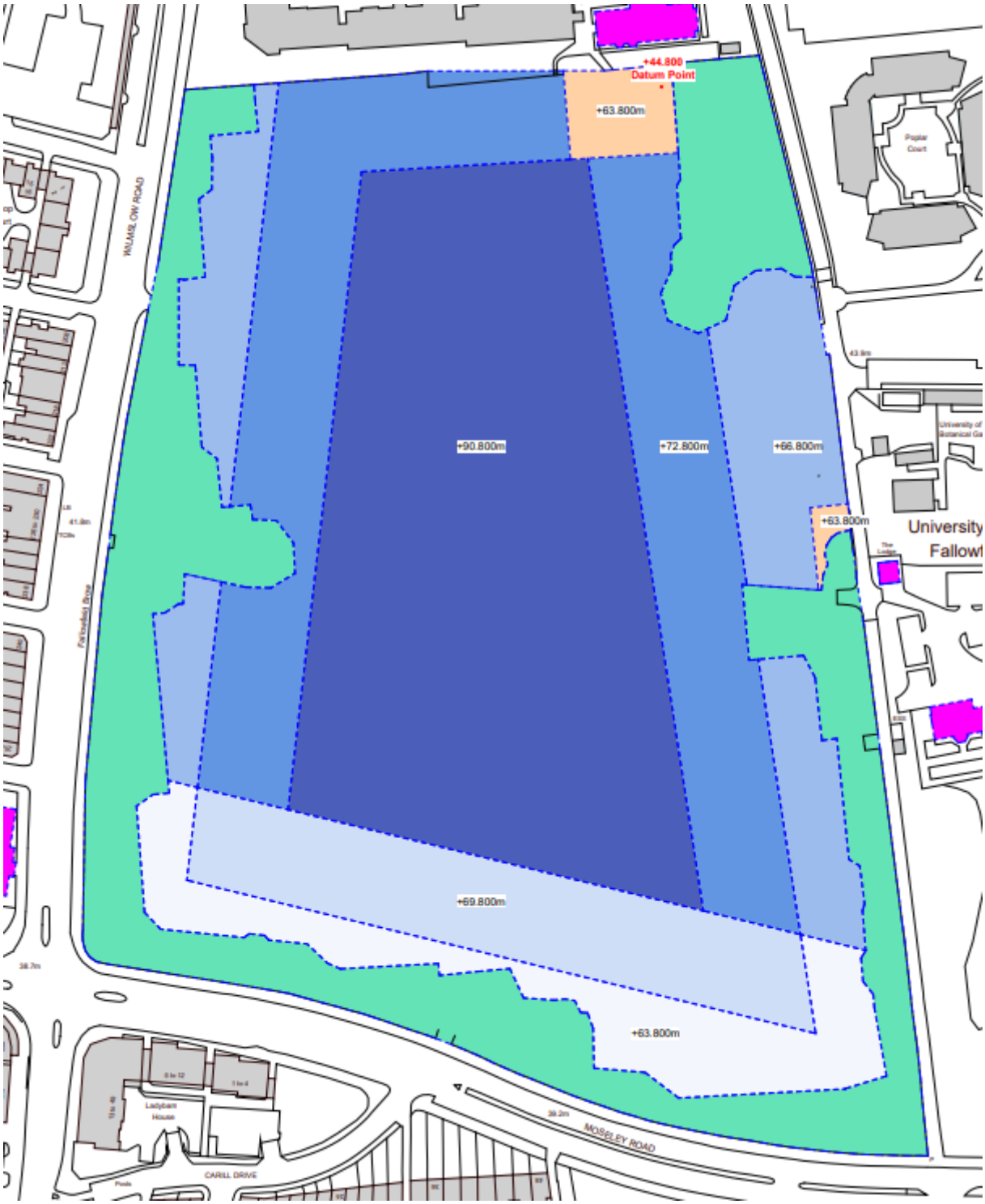


Figure 2—2 Parameter Plan (extract)

Copyright © 1976 - 2023 Buro Happold. All rights reserved

3 Environmental Setting

3.1 Published Geology

The anticipated site geology has been determined with reference to the relevant 1:10,000 scale / 1:50,000 scale BGS Map [5] [12] and Groundsure Report [11].

3.1.1 Superficial Geology

The BGS 1:10,000 scale geological map [12] records the site to be underlain by Boulder Clay.

The BGS 1:50,000 scale geological map [5] and Groundsure report [11] indicate that the site is underlain by Quaternary Glacial Till (TILLD-DMTN) across the majority of its area, with the exception of the southeast corner where there are no superficial deposits recorded. The total thickness of the superficial deposits is not recorded.

A thickness of Made Ground is anticipated due to the development history of the site.

3.1.2 Solid Geology

The BGS 1:10,000 / 1:50,000 scale geological maps [5] [12] and the Groundsure Report [11] indicate that the superficial deposits are underlain by the Triassic Chester Formation (formerly known as Bunter Pebble Beds / Chester Pebble Beds Formation). The Chester Formation comprises *"fine-to-coarse grained sandstone, commonly pebbly, with conglomerates and sporadic siltstones"*. The regional dip for the Chester Formation is recorded to be 8° to the southwest. An unnamed fault is recorded ~400m east of the site and is downthrown to the northwest by an unknown magnitude.

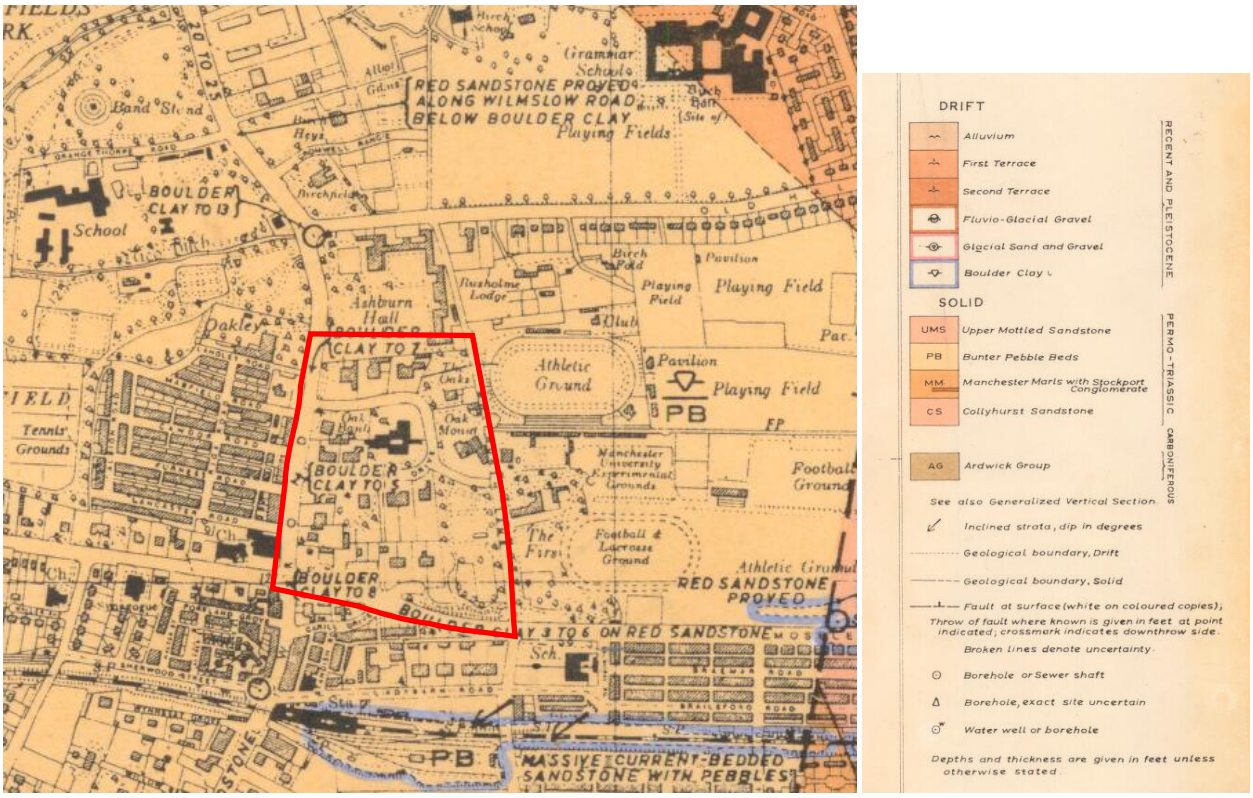


Figure 3—1 1:10,000 scale BGS map (extract)

Copyright © 1976 - 2023 Buro Happold. All rights reserved

3.2 Unpublished Geology

The anticipated ground conditions on site have been determined with reference to the Geotechnics Limited ground investigations on behalf of Coffey in 2015 [6] [7]. It should be noted that the ground conditions on-site may vary from the available records and are subject to review upon site specific information.

3.2.1 Geotechnics Factual Reports [6] [7]

In 2015, Coffey Geotechnics Limited commissioned Geotechnics Limited to complete two phases of site investigation (2a and 2b) at the UoM Owen Park Campus (of which the site is part of). The 2015 works relevant to the site comprised a total of:

- 36 No. boreholes (cable percussive to a maximum depth of 8.2m bgl and rotary to a maximum depth of 15.5m bgl);
- 14 No. window samples (maximum depth 3.9m bgl) ;
- 12 No. machine dug trial pits (maximum depth 4.5m bgl);
- In-situ SPT tests;
- In-situ Dynamic Cone Penetration (DCP) tests in trial pits;
- In-situ permeability tests (falling head tests);
- Installation of groundwater and ground gas monitoring wells and associated post-fieldwork monitoring visits; and
- Post-fieldwork geotechnical and geoenvironmental laboratory testing

An extract of the exploratory hole location plan is provided in Figure 3—2 **C**. The relevant exploratory holes are listed in Table 3—1.

Table 3—1 Geotechnics exploratory boreholes relevant to the site (2015).

Phase 2A				
BH01/1B	BH01/2	BH04/2	WS01/1B	WS01/2
BH02/1B	BH02/2	BH05/2	WS02/1B	
BH03/1B	BH03/2		WS03/1B	
Phase 2B				
BH04/1B	BH06/2	BH15/2	WS04/1B	TP01/1B
BH05/1B	BH07/2	BH16/2	WS05/1B	TP02/1B
BH05A/1B	**BH08/2**	**BH17/2**	WS06/1B	TP03/1B
BH06/1B	BH09/2	BH18/2	WS02/2	TP04/1B
BH07/1B	**BH10/2**	BH19/2	WS03/2	TP05/1B
BH08/1B	BH11/2	BH20/2	WS04/2	TP06/1B
BH09/1B	BH12/2	BH21/2	WS05/2	TP01/2
BH10/1B	**BH13/2**	BH22/2	WS06/2	TP02/2
BH11/1B	BH14/2		WS07/2	TP03/2
BH12/1B			WS08/2	TP04/2
BH13/1B				TP05/2
				TP06/2

*Boreholes in **blue** were continued with rotary follow-on.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

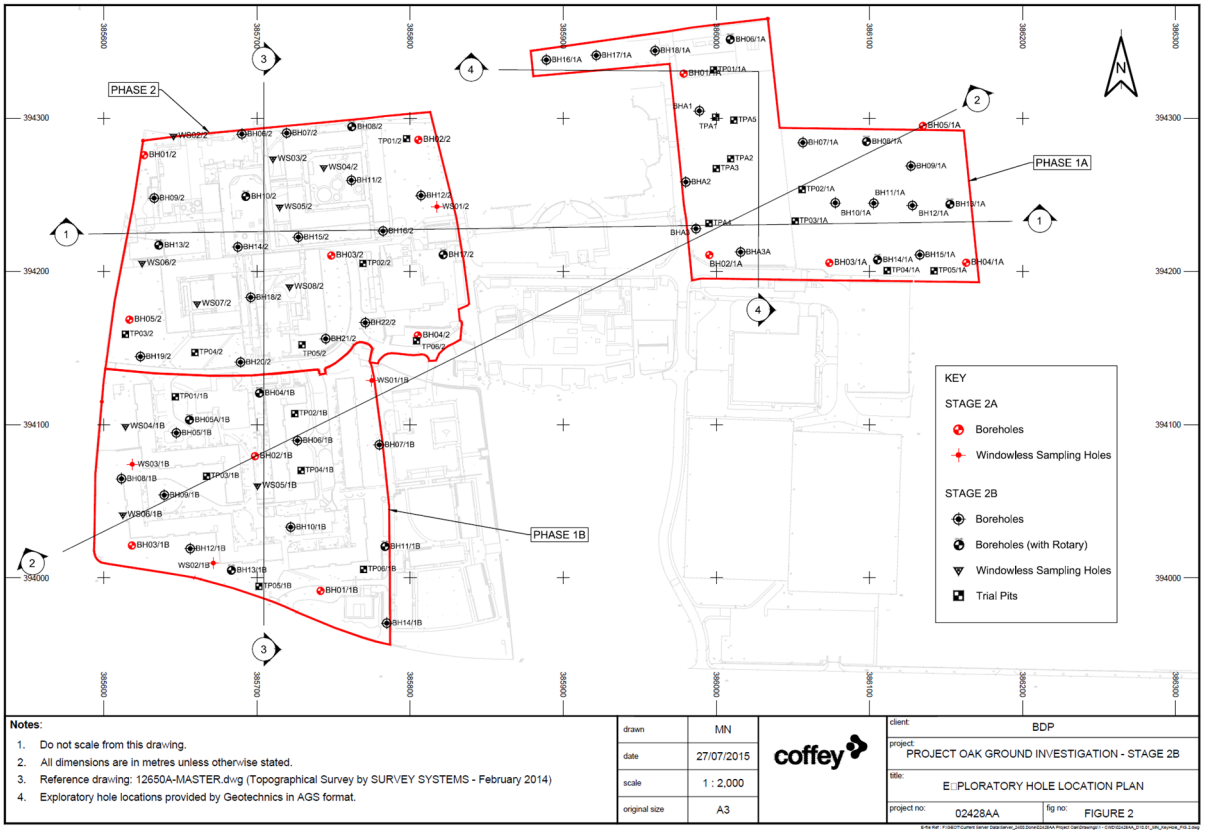


Figure 3—2 Coffey Exploratory Hole Location Plan (all phases)

Table 3—2 Summary of Ground Conditions

Depth to Top (m)	Thickness (m)	Description
0.00	0.20-2.60	Topsoil or Concrete/Macadam Over Sandy GRAVEL of brick, clinker and sandstone with low sandstone cobble content. Fragments of timber. And Gravelly sandy CLAY. Gravel of sandstone and limestone. [MADE GROUND] Note: Concrete obstruction at 0.80 m bgl in BH06/2
0.20-2.00	Absent – 3.10	Soft becoming firm then very stiff slightly sandy slightly gravelly CLAY. Gravel of subangular to rounded siltstone, sandstone and coal. And Very dense slightly clayey SAND [GLACIAL TILL]
1.40-4.10	Not proven	Very Dense clayey SAND with thinly laminated clay and extremely weak mudstone And Extremely weak red SANDSTONE And Extremely weak MUDSTONE [CHESTER FORMATION]

Based on the available site-specific data, the ground conditions comprise varying depths of Made Ground which is underlain by superficial deposits (clay and sand), underlain by completely weathered sandstone bedrock, in turn underlain by extremely weak sandstone and/or mudstone bedrock (Chester Formation).

Copyright © 1976 - 2023 Buro Happold. All rights reserved

3.2.2 Coffey Interpretive Reports [9] [10]

The Coffey reports confirmed the ground model as per Table 3—2. In addition:

- Groundwater is considered to be localised and perched within Made Ground across the site.
- Slightly elevated levels of heavy metals (lead & nickel), Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH's) above the residential without plant uptake chemical threshold were recorded within the Made Ground. The elevated results of TPH/PAH are primarily related to samples which contain tarmac fragments.
- The reports also advise that all results from the natural samples tested were below the residential threshold criteria.
- Slightly elevated PAH results were recorded within the groundwater samples which exceeded UK Drinking Water Standards.
- A ground gas classification of CS-1 was adopted for phases 1B and 2 which is considered to be relevant for the site.

3.3 Coal Mining

The Groundsure report [11] states that the site is not located in a coal mining reporting area as defined by the Coal Authority. The Coal Authority [13] interactive map was also consulted which recorded that the site is not in a Coal Mining Reporting area. No further assessment for coal mining is therefore considered to be required.

3.4 Hydrogeology & Hydrology

The hydraulic gradient for the site is likely to be influenced by general site topography and any local watercourses near to the site. As such, any shallow groundwater in the site area is likely to flow either south/southwest towards Fallowfield Brook located ~62m south of the site, or towards Cringle Brook located ~470m south of the site.

The hydrogeology of the site is likely to be characterised by a Principal Aquifer within the Chester Formation, overlain by unproductive strata of the Glacial Till.

The Glacial Till deposits are classified as a Secondary Undifferentiated Aquifer, defined as "*Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both Secondary A and B aquifer in different locations due to the variable characteristics of the rock type*".

The Chester Formation is classified as a Principal Aquifer, defined 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 1 No. historic groundwater abstraction recorded within 2km of the site as detailed in Table 3—3.

Table 3—3 Historical Groundwater Abstraction

Distance	Details	Date
1,407m south-east of site	Laundry Use OSC Group UK LTD Annual Volume (m3): 91,000	Start: 2004 Expiry: 2014

Copyright © 1976 - 2023 Buro Happold. All rights reserved

There are no active surface water abstractions recorded within 2km of the site.

There are 2 No. surface water bodies recorded with 250m of the site, namely:

- 62m south of the site, "*Fallowfield Brook*" which is classified as an "*inland river not influenced by normal tidal action*"; and
- 162m north of the site, "*Platt Brook*" which is classified as an "*inland river not influenced by normal tidal action*".

3.5 Flood Risk

The site is located within Flood Zone 1. The site is located in Flood Zone 1 and is therefore located outside of the 0.1% Annual Exceedance Probability (AEP) event, excluding Climate Change (CC) allowance.

The highest surface water flood risk due to areas likely to pond water during extreme rainfall events is located in the southeast of the site.

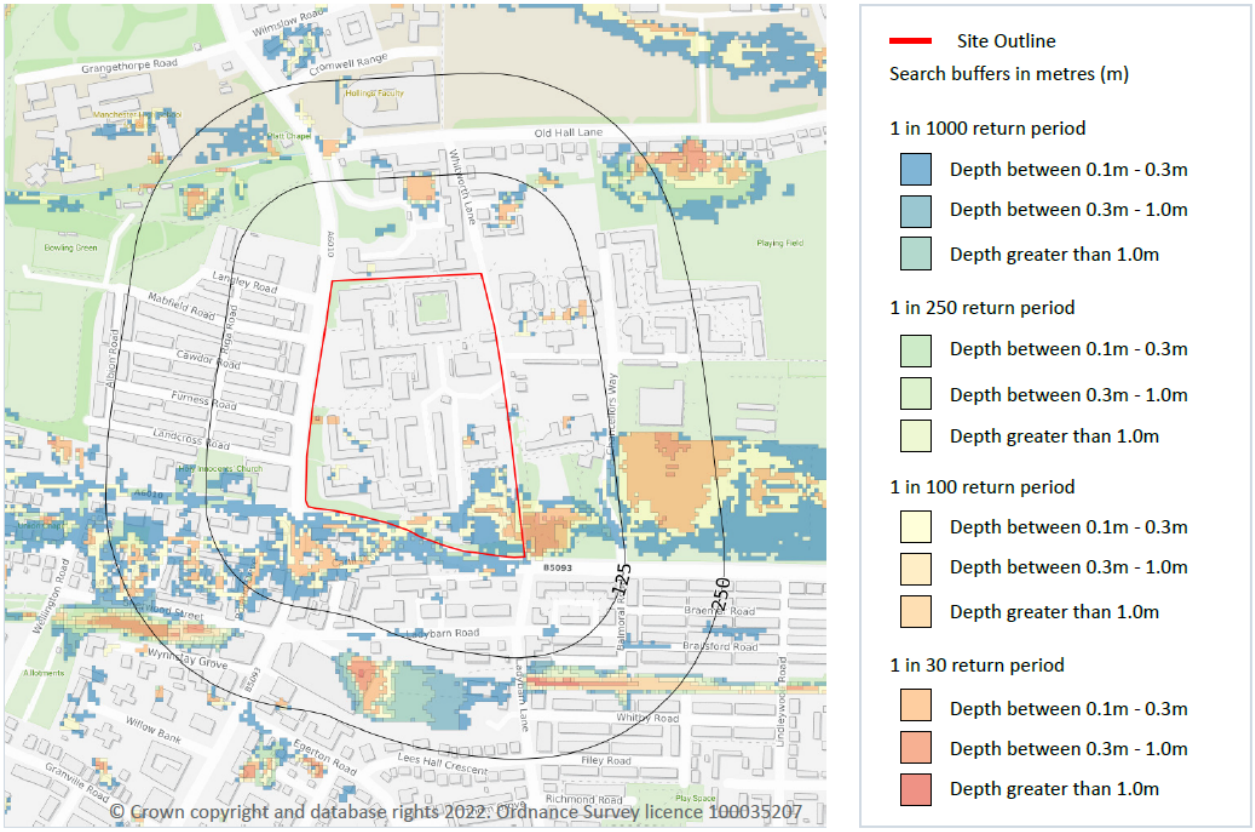


Figure 3—3 Surface Water Flood Map (extract– note old redline boundary from Groundsure)

Copyright © 1976 - 2023 Buro Happold. All rights reserved

3.6 Natural hazards

Regulatory data relating to ground stability for the site is summarised in Table 3-4 below.

Table 3-4 Potential natural hazards based on BGS Groundsure data

Potential Hazard	Hazard Rating
Shrink swell	Very Low. *Negligible in the south-east corner of the site, considered to be due to the anticipated lack of superficial deposits in this portion of the site.
Landslide	Very Low
Soluble Rocks	Negligible
Compressible Ground	Negligible
Collapsible Deposits	Very Low
Running Sand	Low to Very Low

3.7 Radon

The Indicative Atlas of Radon for England and Wales [14] and the Groundsure report [11] indicate that the site is not a Radon Affected Area, as less than 1% of properties are above the Action Level. Therefore, no radon protective measures are necessary.

3.8 Unexploded ordnance (UXO)

The Zetica Risk Map and PDSA (included as Appendix C) classifies the site as “moderate” risk. A detailed UXO desk study is recommended to be commissioned and obtained by the Client prior to any intrusive investigation and construction works.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

4 Site Setting

4.1 Site History

The site history and that for the immediate surrounding area has been assessed using historical maps from 1851 to 2010. This history is summarised in Table 4-1 below. The maps are presented in Appendix B.

Table 4-1 Summary of site history and history of the surrounding area

Historical Land Use		
OS Map Edition	**Site**	**Surrounding Area (within 100m)**
1849-1859 (1:10,000)	The site is recorded to be open fields	Fallowfield Brook is recorded to the south of the site, flowing from east to west.
1890 (1:10,560)		Residential buildings, a church and some schools are recorded in the surrounding area. Manchester Central Station railway line is recorded 100m south of the site.
1893 (1:2,500)	A number of unnamed buildings are recorded across the site, serviced by roads (Oak Drive and Carill Drive). A tramway is recorded from north to south in the western portion of the site.	
1905 (1:10,560)		Manchester Athletic Ground, Owen's College Athletic Ground and a nursery are recorded to the east of the site. Expansion of the residential buildings to the west of the site.
1932 (1:10,560)		Grangethorpe Hospital recorded ~100 m northwest of the site.
1934 (1:2,500)		Nursery no longer recorded - site was redeveloped and recorded as Manchester University Experimental Grounds
1955 (1:10,560)		School recorded where Grangethorpe Hospital was located previously.
1957-1958 (1:2,500)	The tramway is no longer recorded.	
1972-1976 (1:10,000)	The site has been redeveloped and is now recorded as Owen Park.	
1980-1983 (1:10,000)	Expansion of the buildings in Owen Park	
2001 (1:10,000)		Railway line to the south, and stadium to the northeast are no longer recorded (present in 1985-1989 maps).

4.2 Regulatory Data

Regulatory data relating to potentially contaminative uses is summarised in **Table 4-2** below. This information was obtained from the Groundsure report [11].

Copyright © 1976 - 2023 Buro Happold. All rights reserved

Table 4-2 Summary of Regulatory Data

Item	Location [on/off site]	Information	Potential to Impact
Environmental Permits, Incidents and Registers			
Licensed pollutant release (Part A(2)/B)	41m W	Dry Cleaning	Low
	350m S	Waste oil burner	Low
	388m S	Waste oil burner	Low
Pollution Incidents (EA/NRM)	465m N	Water impact: Cat. 2 (significant)	
		Land Impact: Cat. 4 (No impact)	Low
		Air Impact: Cat. 4 (No impact)	
None of the following were recorded within 500m of the site: Radioactive substance authorisations, Licensed discharges to controlled waters, Pollutant release to surface waters, Pollutant release to public sewer, List 1 dangerous substances, pollution inventory substances, pollution inventory waste transfers, pollution inventory radioactive waste			
Landfill and Other Waste Sites			
Waste exemptions	On site - Owens Park	Treating and storing waste exemption	Moderate
	91m W	Disposing of waste exemption	Low
	103m S	Treating waste exemption	Low
	116m E	Use of waste in construction	Low
	288m SW	Storing of waste exemption	Low
	289m SW	Disposing of waste exemption	Low
The following industrial activities were recorded within 500m: Active or recent landfill, historic landfill (BGS), historic landfill (LA/mapping records), historic landfill (EA/NRW records), historical waste sites, licensed waste sites			
Current and Past Industrial Land Use			
Electrical Sub Station	On site	Electrical Features	Moderate
Unspecified Heap	On site (1905-1938)	-	Low/Moderate
The following activities were recorded within 100m of the site: Nursery later known as Manchester University Experimental Grounds (1916-present), Builders Yard (pre-1956- present), Electrical Sub Station.			
Points of Interest (Environmentally Sensitive Sites, visual, cultural, agricultural, habitat designations)			
None of the following were recorded within 2000 m of the site: Site of Special Scientific Interest, conserved wetland sites (Ramsar), Special Areas of Conservation (SAC), Special Protected Areas (SPA), National Nature Reserves, Local nature reserves, Designated ancient woodland, Biosphere reserves, forest parks, marine conservation zones, green belt, nitrate sensitive areas, nitrate vulnerable zones.			

Copyright © 1976 - 2023 Buro Happold. All rights reserved

5 Preliminary Geoenvironmental Risk Assessment

5.1 General Approach

In the UK, the assessment of risk from contamination is based on consideration of the conceptual site model and follows the "source-pathway-receptor" approach. If one of these three elements (source, pathway or receptor) is absent, it is considered that there is no risk of harm. If, however, there is considered to be a linkage between any given source and any given receptor, a risk-based approach is used to assess the significance or impact of the linkage. Risks are defined as the probability of an event occurring combined with the severity of the consequence of that event. Particularly, to assess the risks to site end users posed by any given source, the sensitivity of each receptor is considered. For example, the concentration of contamination acceptable at a site to be developed as a residential property with a garden used to grow vegetables and accessible to young children is set lower than that for a commercial site where soil is exposed only in minor areas of landscaping and the only long-term users of the site are adults. Similarly, a site overlying a Principal Aquifer supplying potable water will be considered more stringently than a site overlying an impermeable geology with only minor seepages of groundwater.

5.2 Climate Change

It is accepted that the climate is changing and that this will affect future weather patterns. The EA [15] requires factoring climate change into risk assessments and remedial solutions. The British Standard, '*Adaptation to Climate Change – Principles, Requirements and Guidelines*' [16] states that '*climate change impacts shall be assessed comprehensively…including…contamination*' and should focus '*upon understanding the implications of future climate change trends and climate events over the full lifespan of a decision*'. The NPPF [17] requires new development to contribute to '*mitigating and adapting to climate change*' and to '*minimise vulnerability and increase resilience*' to the range of impacts arising from climate change.

The changes to weather patterns in the UK may include: an increase in warmer weather; an increase in the frequency and intensity of rainfall events; and an increase in the duration or frequency of dry spells in the summer. Such events are also likely to become more extreme. There is the potential for these scenarios to impact upon potential contaminant migration pathways in particular with respect to both hazardous ground gas and contaminated groundwater via permeable strata, during both demolition/construction and operation of the proposed development. As ground conditions at the proposed development may be vulnerable to extreme weather events due to climate change during the demolition, construction and operation phases, these potential impacts have been considered in the risk assessment.

5.3 Conceptual site model

The potential risks posed to human health and the environment by ground contamination at this site have been evaluated by a generic quantitative risk assessment which incorporates the 'source-pathway-receptor' identification and assessment methodology in accordance with LCRM [18]. The risk assessment process therefore involves the identification of each source based on the information in this report, including any available existing ground investigation results together with the identification of relevant exposure pathway(s) and receptors. The potential risks to the receptors have been assessed by considering the potential effect of the source on the receptor as well as the likelihood of a pathway linking the two, i.e. a contaminant linkage as discussed above.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

5.4 Sources

The potential contamination sources at the site have been identified from a review of regulatory data, historical maps and previous site investigations and are summarised in Table 5-1. The 'Contaminants of Concern' in this risk assessment are based primarily on information from this review of historical information and by reference to relevant Industry Profile reports and Research & Development 66 [19].

Table 5-1 Summary of potential sources of contamination

Potential Source	Location	Likely Age	Potential Contaminants of Concern
The site area current uses: Made Ground	On-site	1893 to present	Asbestos, heavy metals, organic and inorganic compounds, PAHs, TPHs, fuels/oils and ground gases.
Fuel and oil spills from car parking	On-site	1970's to present	Petroleum hydrocarbon, fuel, oils.
Surrounding area previous uses: nursery, builders yard, electrical sub-station	Off-site	1916 to 1950 Electrical substation - unknown to present	Asbestos, heavy metals, organic and inorganic compounds, acids /alkalis, PCBs, PAHs, TPHs, fuels and oils, organic solvents, and ground gases.

5.5 Pathways and receptors

The proposed development consists of the phased erection of purpose-built student accommodation (Sui Generis) up to 3,300 beds, to include all associated ancillary uses, demolition and other necessary works (see Section 2.2). The presence of contamination (in soils, liquids or gases) has the potential to impact upon human and environmental receptors both in the short term (during demolition and construction) and in the long term (during use and occupation). Those receptors and the pathways that could link them to the sources identified are summarised in Table 5-2Table 5-1.

Table 5-2 Summary table of receptors and potential pathways

Receptor		Pathway
Human Health	Investigation and demolition/construction workers	Direct/ dermal contact. Ingestion/ inhalation of soils. Inhalation of gas / vapour.
	Future site users / visitors (residents, guests, workers)	Direct/dermal contact. Inhalation of contaminated dusts, gas & vapour.
	Off-site occupiers / visitors of neighbouring land	Inhalation of contaminated dusts.
Controlled Waters	Fallowfield Brook / Platt Brook	Migration via permeable strata and preferential pathways (e.g. piling)
	Chester Formation: Principal Aquifer	Migration via permeable strata and preferential pathways (e.g. piling)
Building/Services	Buried concrete foundations. Potable water supply pipework	Direct contact / aggressive attack

Copyright © 1976 - 2023 Buro Happold. All rights reserved

5.6 Assessment of risk

The assessment of the level of risk for each of the potential contaminant linkages identified above is summarised in Table 5-3. The table lists the potential sources identified above. For each source, an assessment is made, receptor by receptor, as to the magnitude of the potential consequence (reflecting the potential severity of the hazard associated with that source and the sensitivity of the receptor).

Consideration has also been given to the level of uncertainty associated with each of these potential sources. For example, some of the information is based on historical records. Where site specific information has been used the uncertainty is reduced, however it is also noted that no investigation can examine 100% of the ground and therefore some degree of uncertainty will remain. Because of this uncertainty, the identification of the sources is based upon a conservative assessment of the potential location, nature and extent of the source. The probability or likelihood of the hazard being realised is then assessed by consideration of the directness / integrity of the exposure pathway that could link the receptor to the source. The assigned level of risk is determined by the terms of consequence and probability in accordance with C552 [20]. The final column describes all the factors considered in the assessment and presents the justification for the assessed level of risk.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

Table 5-3 Preliminary Risk Assessment

Source		Receptor/ Pathway	Risk assessment (following CIRIA C552)			Comment on hazard realisation
Origin	**Contaminants of concern**		**Consequence**	**Probability**	**Risk**	
On-site: Made Ground	Asbestos, heavy metals, organic and inorganic compounds, acids /alkalis, PCBs, PAHs, TPHs, fuels and oils, organic solvents, resins/adhesives, catalysts, sizing agents, binders and ground gases.	**Description of the Source: The site was first recorded to be developed in the 1890s and has undergone a series of redevelopments.**				
		Future site users / visitors (employees, guests and maintenance) Direct / dermal contact. Inhalation of soils / dusts. Ingestion of contaminated water supplies. Migration and accumulation of hazardous gases.	Severe	Unlikely	**Moderate / Low**	Proposed future use is for residential and commercial use with soft and hard landscaping. Potential for dust generation, direct contact and ingestion. Exposure time is relatively limited. Mitigation of potential risks can be achieved by appropriate investigation / design and implementation of remediation / mitigation measures including encapsulation.
		Investigation, demolition and construction workers Direct / dermal contact. Ingestion / inhalation of contaminated soils, gases and vapours.	Medium	Unlikely	**Low**	Potential for exposure during investigations, demolition and earthworks. Period of exposure dependent on construction timescales. Standard Health and Safety precautions likely to be used by workers. Mitigation of potential risks can be achieved by appropriate investigation and adoption of standard good construction practice.
		Off site occupiers / visitors of neighbouring land Inhalation of contaminated dusts.	Medium	Unlikely	**Low**	Large scale development, potential to impact surrounding visitors by dust generation. Increased potential during any earthworks. Mitigation of potential risks can be achieved by appropriate investigation and adoption of standard good construction practice.
		Degradation of Water quality **[Superficial Secondary Undifferentiated aquifer – Glacial Till]**	Medium	Unlikely	**Low**	Potential for increased infiltration and promotion of leaching during development earthworks. Mitigation of potential risks could be achieved by appropriate investigation, risk assessment and design.
		Degradation of Water quality **[Bedrock Principal aquifer – Chester Formation]**	Severe	Unlikely	**Moderate / Low**	Potential for increased infiltration and promotion of leaching during development earthworks. Mitigation of potential risks could be achieved by appropriate investigation, risk assessment and design.
		Buildings/services - permeation of water supply pipework, degradation of concrete Direct contact/, aggressive attack/ below ground structures	Medium	Unlikely	**Low**	Potential for direct contact on site. Mitigation of potential risks can be achieved by appropriate investigation / design and implementation of appropriate design.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

6 Conclusions and Recommendations

6.1 Summary of geoenvironmental risks

6.1.1 Assessed risks

An Initial Conceptual Site Model has been determined and a Preliminary Risk Assessment with respect to ground contamination has been carried out for the site based on available data. The main sources of potential contamination have been identified and the potential risks have been qualitatively assessed. The assessment is based upon the site in its current condition, but it also includes consideration of the potential risks associated with any below ground works (e.g. site investigation or future foundation works) and the potential future use. A summary of the potentially significant risks (i.e. greater than Low) is presented below.

Table 6-1 Summary of potential risks

Receptor	Source	Potential Risk
Investigation and demolition/construction workers	Made Ground/ Demolition debris	Moderate/Low
Degradation of water quality (bedrock Principal Aquifer)	Made Ground/ Demolition debris	Moderate/Low

The Phase 1 Environmental Risk Assessment has defined the risks in relation to the redevelopment of the site on human health and the environment, including controlled waters.

The Coffey / Geotechnics investigation provided clarification of the ground model carried out in 2015 with respect to areas of Made Ground and has further established baseline conditions with respect to ground contamination, groundwater contamination and potential for ground gas from on-site and off-site sources.

Based on the results of the Geotechnics ground investigation, there is a low to moderate risk to human health during demolition and construction in respect of the slightly elevated levels of heavy metals (lead & nickel), Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH's) above the residential without plant uptake chemical threshold within the Made Ground. The elevated results of TPH/PAH are primarily related to samples which contain tarmac fragments. The reports also advise that all results from the natural samples tested were below the residential threshold criteria.

Slightly elevated PAH results were recorded within the groundwater samples which exceeded UK Drinking Water Standards. These thresholds are considered onerous for the site and in relation to the proposed development, therefore the risk to controlled water is low.

Information from the ground investigation undertaken at the site to date has not identified any significant ground constraints that might render the site unsuitable for the proposed development. The presence of Made Ground presents minor potential impacts on the demolition and construction phase but an overall improvement for the operational phase of the proposed development due to clean cover (hardstanding and soft landscaping build ups).

The risks during demolition and construction can, however, be adequately managed (through industry recognised standards and best practice measures), and so the redevelopment of the site is unlikely to generate any significant ground conditions (including groundwater) related environmental effects. The risks can be adequately managed so as not to cause unacceptable harm to human health, the built environment, ecology or controlled waters.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

6.1.2 Recommendations

There are risks associated with the limited site-specific information, site history, and land use in the surrounding area. Therefore, it is recommended that an intrusive site investigation is completed.

Prior to the GI being undertaken, it is recommended that a detailed UXO desk study is commissioned and obtained by the Client. This will provide a thorough assessment of UXO risk on site and advise on any mitigation measures that may need to be included during intrusive works.

The aims and objectives of the investigation should combine geotechnical and geoenvironmental objectives to gain an understanding of:

- The presence, extent, and nature of any Made Ground/ fill materials;
- The geotechnical and geoenvironmental properties of site won materials for re-use on-site, and/or waste classification;
- The ground gas regime; and
- The shallow and deep groundwater regime.

The investigation would identify the potential pathways and allow assessment of risk to sensitive receptors. This data will also inform any remediation/ mitigation requirements associated with the proposed development. To meet both the geotechnical and geoenvironmental aims and objectives above, the scope of the site investigation should include the following:

- Boreholes (of suitable frequency and depth) to determine the shallow and deep ground conditions. Boreholes should include monitoring installations to intercept ground gas and shallow groundwater;
- Window samples to determine the shallow conditions. Window samples should include monitoring installations to intercept ground gas and shallow groundwater;
- Trial pitting across the site with sampling of near surface soils;
- In-situ testing (SPTs, U100 samples);
- Geotechnical & chemical testing of representative soil and groundwater samples; and
- A ground gas and groundwater monitoring programme.

The factual data obtained from this investigation would be collated, assessed and presented in a report suitable for submission in support of a reserved matters planning application.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

7 References

[1] Ministry of Housing, Communities and Local Goverment, "National Planning Policy Framework," Ministry of Housing, Communities and Local Government, 2019.

[2] Environment Agency, "Model procedures for the management of land contamination - contaminated land report 11 (CLR11)," Environment Agency, 2004.

[3] British Standards Institute, "BS10175:2011 +A2:2017 Investigation of Potentially Contaminated Sites - Code of Practice," British Standards Institute, 2011.

[4] Environment Agency, "GPLC1 - Guiding principles for land contamination," Environment Agency, 2010.

[5] BGS, "Geological Survey of Great Britain (England and Wales). Manchester, Sheet 85, Bedrock & Superficial, 1:50,000.," 2011.

[6] Geotechnics, "Project Oak SI Scope Stage 2A. Factual Report, for Coffee Geotechnics," 2015.

[7] Geotechnics, "Project Oak SI Scope Stage 2B. Factual Report, for Coffee Geotechnics," 2015.

[8] RSK, "Project Oak, Fallowfield. Geo-environmental Desk Study," 2015.

[9] Coffey, "Geoenvironmental and Geotechnical Interpretive Report Stage 2A. Project Oak, Fallowfield, Manchester.," 2015.

[10] Coffey, "Geoenvironmental and Geotechnical Interpretive Report Stage 2B. Project Oak, Fallowfield, Manchester.," 2015.

[11] Groundsure, "Groundsure Enviro + Geo Insight. Fallowfield. GS-8830801.," Groundsure Location Intelligence, 2022.

[12] BGS, Geological Survey of Great Britain (England and Wales). Cheshire, Sheet SJ 89 SE, Bedrock & Superficial, 1:10 000, 1963.

[13] The Coal Authority, "Interactive Map for Planning," 2020. [Online]. Available: https://mapapps2.bgs.ac.uk/coalauthority/home.html. [Accessed 01 2023].

[14] B. G. S. Health Protection Agency, Indicative Atlas of Radon in England and Wales, 2007.

[15] Environment Agency, "GPLC2 - Guiding Principles for Land Contamination," 2010.

[16] British Standards Institute, "Adaptation to Climate Change - Principles, Requirements and Guidelines (BS EN ISO 14090:2019)," 2019.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

[17] Ministry of Housing, Communities and Local Government, "National Planning Policy Framework," Ministry of Housing, Communities and Local Government, 2021.

[18] Environment Agency, "Land Contamination Risk Management (LCRM)," 2021.

[19] NHBC, Environemant Agency and Chartered Institute of Environmental Health, Guidance for the safe development of housing on land affected by contamination. R&D 66:2008, 2008.

[20] CIRIA, "Contaminated Land Risk Assessment. A guide to good practice. C552," CIRIA, 2001.

[21] CIRIA, "Unexploded Ordnance (UXO). A Guide for the Construction Industry (C681)," CIRIA, 2009.

[22] BRE, "Special Digest 1 - Concrete in Aggressive Ground," BRE, 2005.

[23] CIRIA, "Assessing risks posed by hazardous ground gases to buildings," CIRIA, 2007.

[24] CL:AIRE, "CAR-SOIL Control of Asbestos Regulations 2012. Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials. Industry Guidance," 2016.

Copyright © 1976 - 2023 Buro Happold. All rights reserved

Appendix A Geotechnics GI

Copyright © 1976 - 2023 Buro Happold. All rights reserved



Key

- Borehole
- Dynamic Sample Borehole

Hole ID	Easting (mE)	Northing (mN)	Level (mOD)
BH01/1A	385978.60	394329.02	44.56
BH01/1B	385741.50	393991.55	38.72
BH01/2	385626.29	394275.84	47.57
BH02/1A	385995.35	394210.70	45.95
BH02/1B	385698.67	394079.43	44.91
BH02/2	385805.39	394285.82	44.38
BH03/1A	386073.72	394205.57	45.06
BH03/1B	385618.33	394021.16	47.11
BH03/2	385748.49	394210.36	46.76
BH04/1A	386163.09	394205.65	45.05
BH04/2	385805.00	394158.16	43.81
BH05/1A	386134.82	394294.92	44.69
BH05/2	385616.69	394168.52	43.44
WS01/1B	385774.94	394128.80	42.86
WS01/2	385817.50	394242.21	44.51
WS02/1B	385671.48	394009.67	41.38
WS03/1B	385618.54	394074.15	40.73

geotechnics

The Geotechnical Centre,
Unit 1, Borders Industrial Park,
River Lane, Saltney,
Chester
CH4 8RJ

Phone: 01244 671117
Fax: 01224 671122
Email mail@geotechnics.co.uk

www.geotechnics.co.uk

Engineer:
Coffey Geotechnics

Client:
Coffey Geotechnics

Project:
Project Oak SI Scope Stage 2A

Drawing Title:
Exploratory Hole Location Plan

Scale: 1:1000@A1

Date:
May 2015

Project No:
PN153327

File Name:
Geo-PN153327-001(1)

G:\Projects\Chester\2015\PN153327\Drawings\Geo-PN153327-001.dwg

APPENDIX 2

Cable Percussive Borehole Records

DATA SHEET - Symbols and Abbreviations used on Records

Sample Types

B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
LB	Large bulk disturbed sample
P	Piston sample (PF - failed P sample)
TW	Thin walled push in sample
U	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
UT	Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample)
V	Vial sample
W	Water sample
#	Sample Not Recovered

Insitu Testing / Properties

CBRP	CBR using TRL probe
CHP	Constant Head Permeability Test
COND	Electrical conductivity
HV	Strength from Hand Vane
ICBR	CBR Test
IDEN	Density Test
IRES	Resistivity Test
MEX	CBR using Mexecone Probe Test
PKR	Packer Permeability Test
PLT	Plate Load Test
PP	Strength from Pocket Penetrometer
Temp	Temperature
VHP	Variable Head Permeability Test
VN	Strength from Insitu Vane
w%	Water content

(All other strengths from undrained triaxial testing)

S	Standard Penetration Test (SPT)
C	SPT with cone
N	SPT Result
-/-	Blows/penetration (mm) after seating drive
-*/- (mm)	Total blows/penetration
( )	Extrapolated value

Groundwater

Water Strike

Depth Water Rose To

Instrumentation

Seal

Filter

Seal



Strata

Made Ground Granular

Made Ground Cohesive

Topsoil

Cobbles and Boulders

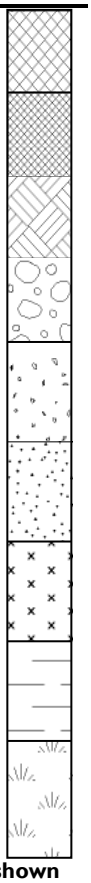
Gravel

Sand

Silt

Clay

Peat



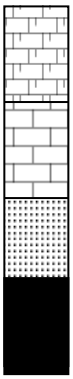
Note: Composite soil types shown by combined symbols

Chalk

Limestone

Sandstone

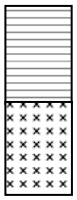
Coal



Strata, Continued

Mudstone

Siltstone

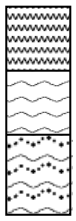


Metamorphic Rock

Fine Grained

Medium Grained

Coarse Grained

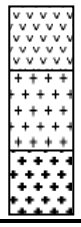


Igneous Rock

Fine Grained

Medium Grained

Coarse Grained



Backfill Materials

Arisings

Bentonite Seal

Concrete

Fine Gravel Filter

General Fill

Gravel Filter

Grout

Sand Filter

Tarmacadam



Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (m)	Maximum Minimum
NI	Non-intact core
NR	No core recovery
AZCL	Assumed zone of core loss

(where core recovery is unknown it is assumed to be at the base of the run)

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2A	Engineer	COFFEY GEOTECHNICS	Borehole	BH01/1A
				Project No	PN153327
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385978.6 E 394329.0 N	Ground Level	44.56 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.56
0.00- 0.30	B					MADE GROUND: Light brown sandy angular to subangular fine to coarse gravel of brick and sandstone with a low to medium cobble content of sandstone.			
0.20	ES								
0.30- 0.80	B					MADE GROUND: Black sandy angular to subangular fine to coarse gravel of clinker, brick fragments and sandstone with ash, timber and pockets of clay.	0.30		44.26
0.50	ES								
0.80- 1.10	B			28		MADE GROUND: Soft grey mottled orange and black slightly gravelly sandy clay. Gravel is subrounded fine to coarse of sandstone. Slight hydrocarbon odour.	0.80		43.76
1.00	ES								
1.10	D					Soft reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium including siltstone, sandstone and occasional coal.	1.10		43.46
1.20- 1.65	U23	(DRY)				Below 1.50m, firm.			
1.65- 1.80	D								
1.80- 2.20	B								
1.80	ES								
2.20- 2.65	B								
2.20- 2.65	D	1.70 (DRY)			S12				
3.00	D								
3.20- 3.65	U109	1.70 (DRY)	273	12		At 3.20m, very high strength Below 3.20m, very stiff.			
3.65- 3.80	D								
4.10	D					Very dense red clayey fine to medium SAND.	4.05		40.51
4.10	VHP								
4.20- 4.49	D	1.70 (DRY)			S50/ 142	Below 4.30m, clay absent.			
4.30- 4.80	B								
						Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).	4.80		39.76

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	CR/DH
5.15	0.15	Cable Percussion	CR/DH

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			13/04/15	08:00
5.15	1.50	DRY	13/04/15	15:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 4.10m depth.
A 50mm gas monitoring pipe was installed to 1.10m with a geowrapped slotted section from 0.30m to 1.10m with flush lockable protective cover; 25/06/2015 - No readings possible as skip on top of position. and a 50mm gas monitoring pipe was installed to 5.10m with a geowrapped slotted section from 4.05m to 5.10m with flush lockable protective cover; 25/06/2015 - No readings possible as skip on top of position.. Backfill details from base of

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH01/1A**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385978.6** E **394329.0** N
Ground Level **44.56** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.10- 5.15	D	1.70 (DRY)			S50/21	End of Borehole	5.15		39.41

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks **hole: gravel filter up to 4.05m, bentonite seal up to 1.10m, gravel filter up to 0.30m, bentonite seal up to 0.20m, concrete up to ground level. Chiselling: 4.80-5.10m for 60 minutes.**

Logged by **PC**

Figure **2 of 2**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH01/1B** | Project No **PN153327**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385741.5 E, 393991.6 N** | Ground Level **38.72** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		38.72
0.00- 0.18	B					Grass over TOPSOIL: Dark brown clayey gravelly fine to medium sand with rootlets. Gravel is angular to subangular fine to coarse including siltstone and sandstone.	0.20		38.52
0.20- 0.70	B								
0.20	ES					MADE GROUND: Dark brown mottled black sandy angular to subangular fine to coarse gravel of clinker and sandstone with a low cobble content of sandstone and occasional pockets of clay.			
0.50	ES						0.70		38.02
0.70- 1.00	ES					MADE GROUND: Soft orangish brown slightly gravelly sandy clay. Gravel is subangular fine to medium of sandstone and limestone. At 0.90m, plastic pipe c300mm in diameter noted in side of pit with limestone gravel pipe bedding.	1.00		37.72
1.10	D					Loose light reddish brown slightly gravelly clayey fine to medium SAND. Gravel is subangular fine to medium of sandstone and limestone.			
1.30- 1.75	#	(DRY)			S8				
1.40	D								
1.60	ES						1.60		37.12
1.70	D					Firm to stiff reddish brown slightly gravelly sandy CLAY. Gravel is subrounded to rounded fine to coarse including sandstone. Below 1.70m, stiff, mottled grey with occasional black speckling, slightly sandy, with occasional coal. At 1.70m, high strength			
1.70- 2.15	U89	1.50 (DRY)	88	17					
							2.10		36.62
2.15- 2.30	D					Very dense red slightly clayey fine to coarse SAND. Below 2.20m, clay absent.			
2.30- 2.70	B								
2.30	VHP								
2.60- 2.73		1.50 (DRY)			S50/48				
							2.70		36.02
2.76	D					Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).			
2.80- 2.86	#	1.50 (DRY)			S50/29		2.86		35.86
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	CR/DH
2.86	0.15	Cable Percussion	CR/DH

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			10/04/15	08:00
2.86	1.50	DRY	10/04/15	14:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 2.30m depth.
A 50mm gas monitoring pipe was installed to 2.80m with a geowrapped slotted section from 2.00m to 2.80m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 2.00m, bentonite seal up to 0.50m, concrete up to ground level.
Chiselling: 2.70-2.80m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH01/2** | Project No **PN153327**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385626.3 E 394275.8 N** | Ground Level **44.44** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.44
0.00- 0.20	B					Grass over MADE GROUND: Dark brown clayey gravelly fine to coarse sand with rootlets. Gravel is angular to subangular fine to coarse including glass, brick fragments, siltstone and sandstone.			
0.20	ES						0.25		44.19
0.25- 0.50	B					MADE GROUND: Dark brown mottled orange slightly clayey gravelly fine to coarse sand with pockets of firm orangish brown clay. Gravel is angular to subangular fine to coarse including brick fragments, siltstone and sandstone.			
0.50	ES								
0.60- 1.00	B						0.60		43.84
						PROBABLE MADE GROUND: Very soft to soft grey mottled orangish brown slightly gravelly sandy clay. Gravel is subrounded to rounded fine to coarse including sandstone.			
1.00- 1.20	B						1.00		43.44
1.00	ES					Soft orangish brown mottled grey slightly gravelly CLAY with lenses of sand and rootlets. Gravel is subangular to subrounded fine including sandstone.			
1.20- 1.65	D	1.20 (DAMP)			S13		1.20 ▽		43.24
						Firm to stiff reddish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium including sandstone, siltstone and occasional coal.			
						Below 1.70m, occasional grey mottling.			
1.70- 2.00	B								
2.00	U37	1.80 (DRY)		16					
2.50- 3.00	B					Below 2.50m, very stiff.			
3.00- 3.36	D	1.80 (DRY)			S50/ 205		3.00		41.44
3.00	VHP					Very dense reddish brown slightly clayey fine to coarse SAND. Below 3.20m, clay absent.			
3.40- 3.90	B								
3.90- 4.00	#	1.80 (DRY)			C50/45		3.90		40.54
						Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).			
							4.35		40.09
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	JF/MR
4.35	0.15	Cable Percussion	JF/MR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			08/04/15	08:00
4.35	1.80	DRY	08/04/15	15:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20					Seepage.

Remarks

AGS

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 3.00m depth.
Backfill details from base of hole: arisings up to ground level.
Chiselling: 3.90-4.35m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH02/1A** / **PN153327**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385995.3 E, 394210.7 N** | Ground Level **45.95** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		45.95
0.15- 0.65	B			20		Grass over TOPSOIL: Dark brown slightly gravelly clayey fine to coarse sand with rootlets. Gravel is angular to subangular fine to coarse including siltstone and sandstone.	0.15		45.80
0.20	ES								
0.50	ES					MADE GROUND: Dark greyish brown very clayey very sandy angular to subangular fine to coarse gravel including slag, brick, siltstone, sandstone and occasional coal with a low cobble content of sandstone. Some rootlets.			
0.80- 1.00	B					MADE GROUND: Light greyish brown clayey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse including brick fragments, siltstone and sandstone.	0.80		45.15
1.00	ES						1.00 ▽		44.95
1.10	D								
1.20- 1.65	D	(DRY)			S6	MADE GROUND: Loose black slightly clayey sandy angular to subangular fine to coarse gravel of clinker and brick fragments with ash. Slight hydrocarbon odour.			
1.50	D						1.50		44.45
1.60	ES					MADE GROUND: Very soft dark grey clay with occasional coal fragments, ash and lenses of sand. Slight hydrocarbon odour.			
2.00	D						2.00		43.95
2.20- 2.65	U33	2.15 (DRY)		18		Soft to firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse including siltstone, sandstone and occasional coal. Below 2.30m, stiff to very stiff, reddish brown mottled grey and slightly sandy.			
2.30	VHP								
2.65- 2.80	D								
2.80- 3.70	B								
3.20- 3.65	D	2.15 (DRY)			S24				
3.65- 4.00	B								
4.00							4.00		41.95
4.10	D					Very dense reddish brown slightly clayey fine to coarse SAND. Below 4.20m, clay absent.			
4.20- 4.64	D	2.15 (DRY)			S50/ 292				
							4.60		41.35
4.70- 5.10	B					Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	CR/DH
6.08	0.15	Cable Percussion	CR/DH

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			13/04/15	15:00
2.20	1.50	DRY	13/04/15	17:00
2.20	1.50	DRY	14/04/15	08:00
6.08	1.50	DRY	14/04/15	17:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.00					Between 1.00m and 1.50m, damp.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 2.30m depth.
A 50mm gas monitoring pipe was installed to 2.00m with a geowrapped slotted section from 0.50m to 2.00m with flush lockable protective cover and a 50mm gas monitoring pipe was installed to 5.90m with a geowrapped slotted section from 4.00m to 5.90m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 4.00m, bentonite seal up to 2.00m, gravel filter up to 0.50m, bentonite seal up to 0.30m, concrete up to

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH02/1A**
Project No **PN153327**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385995.3** E **394210.7** N
Ground Level **45.95** m OD
Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.20- 5.33	D	2.15 (DRY)			S50/55				
5.90- 6.08	D	2.15 (DRY)			S50/36	At 5.90m, interbedded reddish brown sandstone and red mudstone.			
						End of Borehole	6.08		39.87

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks **0.10m, arisings up to ground level.**
Chiselling: 5.50-5.90m for 60 minutes.

Logged by **PC**
Figure **2 of 2**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH02/1B**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385698.7** E **394079.4** N
Ground Level **44.91** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Properties Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
							G.L.		44.91
						MADE GROUND: Black tarmacadam.	0.10		44.81
						MADE GROUND: Grey concrete.	0.20		44.71
0.20- 0.50	B					MADE GROUND: Light greyish brown gravelly fine to coarse sand with a medium cobble content of subangular sandstone. Gravel is angular to subangular fine to coarse including sandstone and occasional brick fragments.			
0.20	ES								
0.50- 1.00	B								
0.50	ES								
						MADE GROUND: Soft light greyish brown slightly sandy slightly gravelly clay with fragments of timber. Gravel is subangular fine to coarse including brick fragments and sandstone.	0.60		44.31
1.00	ES					Firm reddish brown mottled grey and occasionally black slightly sandy slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to medium including siltstone, sandstone and occasional coal.	1.00		43.91
1.20	U32	1.20 (DRY)		19					
1.50- 2.20	B								
2.20- 2.59	D	1.80 (DRY)			S50/ 235	Very dense reddish brown clayey fine to coarse SAND. Below 2.40m, clay absent.	2.20		42.71
2.20	VHP								
2.70- 3.20	B								
3.20- 3.28	#	1.80 (DRY)			C50/25	Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).	3.20		41.71
						End of Borehole	3.40		41.51

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	JF/MR
3.40	0.15	Cable Percussion	JF/MR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			10/04/15	11:00
3.40	1.50	DRY	10/04/15	16:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 2.20m depth.
Backfill details from base of hole: arisings up to 0.50m, concrete up to 0.20m, tarmacadam up to ground level.
Chiselling: 3.20-3.40m for 60 minutes.

Logged by **PC**
Figure **1 of 1**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH02/2** | Project No **PN153327**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385805.4 E 394285.8 N** | Ground Level **44.38** m OD

Scale 1:25

Sampling: Depth	Sample Type	Depth Cased & (to Water)	Properties: Strength kPa	w %	SPT N	Strata: Description	Depth	Legend	Level m OD
							G.L.		44.38
0.00- 0.30	B					Grass over TOPSOIL: Dark brown slightly gravelly clayey fine to coarse sand with rootlets. Gravel is subangular fine to medium including sandstone.			
0.30- 0.60	B						0.30		44.08
0.30	ES					MADE GROUND: Soft dark brown slightly gravelly sandy clay with a medium cobble content of brick and sandstone. Gravel is angular to subangular fine to coarse including brick fragments, sandstone and siltstone. Some rootlets.			
0.60- 1.00	B						0.60		43.78
0.60	ES					Soft orangish brown mottled grey slightly sandy slightly gravelly CLAY with lenses of sand. Gravel is subangular and fine including sandstone and siltstone.			
1.00	ES						1.00		43.38
1.20	U20	1.20 (DRY)				Stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium including siltstone, sandstone and occasional coal.			
1.70- 2.00	B								
2.00- 2.45	D	1.80 (DRY)			S23				
2.50- 3.00	B								
3.00- 3.43	D	1.80 (DRY)			S50/ 275				
3.30	VHP						3.30		41.08
3.50- 3.90	B					Very dense reddish brown slightly clayey fine to coarse SAND. Below 3.50m, clay absent			
3.90- 3.98	#	1.80 (DRY)			C50/30		3.90		40.48
						Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).	4.20		40.18
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	JF/MR
4.20	0.15	Cable Percussion	JF/MR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	08:00
4.20	1.80	DRY	09/04/15	13:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 3.30m depth.
A 50mm groundwater monitoring pipe was installed to 4.20m with a geowrapped slotted section from 3.30m to 4.20m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 3.30m, bentonite seal up to 0.10m, concrete up to ground level.
Chiselling: 3.90-4.20m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH03/1A** / **PN153327**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386073.7 E, 394205.6 N** | Ground Level **45.06** m OD

Scale 1:25

Sampling: Depth	Sample Type	Depth Cased & (to Water)	Properties: Strength kPa	w %	SPT N	Strata: Description	Depth	Legend	Level m OD
							G.L.		45.06
0.05	D					Grass over TOPSOIL: Light brown clayey fine to medium sand with rootlets and pockets of soft clay.	0.05		45.01
0.10- 0.35	B								
0.20	ES					MADE GROUND: Dark greyish brown clayey fine to medium sand with rootlets and pockets of clay.			
0.40	D						0.40		44.66
0.50	ES					Soft to firm orangish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine of sandstone. Below 0.50m, low cobble content of sandstone.			
0.55- 0.95	B								
1.00	D					Below 1.00m, reddish brown with black speckling.			
1.00	ES								
1.20- 1.65	U69	(DRY)							
						Below 1.60m, stiff to very stiff. Gravel is subangular to subrounded fine to medium including siltstone, sandstone and occasional coal.			
1.70	D								
2.00- 2.45	B					Below 2.00m, friable with lenses of red fine to coarse sand up to 10mm thick.			
2.00	D								
2.00- 2.45	D	1.50			S38				
2.00	ES	(DRY)							
						Very dense reddish brown clayey fine to coarse SAND.	2.40		42.66
						Below 2.90m, clay absent.			
3.00- 3.45	B						3.00		42.06
3.00	D								
3.00- 3.26	D	1.50 (DRY)			S50/ 125	Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).			
3.00	VHP								
3.50- 3.70	B								
3.70- 3.82	#	1.50 (DRY)			C50/40	End of Borehole	3.70		41.36

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	NF/SM
3.70	0.15	Cable Percussion	NF/SM

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			22/04/15	08:00
3.70	1.50	DRY	22/04/15	15:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 3.00m depth.
Backfill details from base of hole: arisings up to ground level.
Chiselling: 3.50-3.70m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH03/1B**
Project No **PN153327**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385618.3 E 394021.2 N**
Ground Level **39.82** m OD
Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		39.82
0.00- 0.13	B					Grass over TOPSOIL: Dark brown slightly gravelly clayey fine to coarse sand with rootlets. Gravel is subangular fine to coarse including sandstone.	0.15		39.67
0.13- 0.60	B					MADE GROUND: Dark brown slightly clayey gravelly fine to medium sand. Gravel is angular to subangular fine to coarse including sandstone, brick fragments and occasional siltstone.			
0.20	ES								
0.50	ES								
0.60- 0.80	B			15		MADE GROUND: Light greyish brown clayey very sandy angular to subangular fine to coarse gravel of brick, concrete, sandstone and siltstone with a low cobble content of sandstone and brick.	0.60		39.22
0.80- 1.30	B						0.80		39.02
1.00	ES					MADE GROUND: Loose black sandy angular to subangular fine to coarse gravel of clinker, sandstone, siltstone and occasional brick fragments with ash.			
1.10	D								
1.30- 1.75	D	1.20 (DRY)			S9				
1.68	W								
1.80- 2.00	B					MADE GROUND: Light reddish brown sandy to very sandy angular fine to coarse gravel of sandstone and brick with pockets of clay.	1.80		38.02
2.00	ES						2.00		37.82
2.10	D					Stiff reddish brown locally mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium including siltstone, sandstone and occasional coal. At 2.20m, very high strength			
2.20- 2.65	U41	2.15 (DRY)	169	13					
2.65- 2.80	D								
2.80- 3.30	B					Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).	2.75		37.07
2.80	VHP								
3.30- 3.49	D	2.15 (DRY)			S50/80				
3.80- 3.88	D	2.15 (DRY)			S50/42				
						End of Borehole	3.88		35.94

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	CR/DH
3.88	0.15	Cable Percussion	CR/DH

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			10/04/15	13:00
3.88	2.15	DRY	10/04/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.70	1.50	1.68	20	2.00	Seepage.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 2.80m depth.
A 50mm gas monitoring pipe was installed to 3.80m with a geowrapped slotted section from 2.80m to 3.80m with flush lockable protective cover and a 50mm gas monitoring pipe was installed to 2.00m with a geowrapped slotted section from 0.50m to 2.00m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 2.80m, bentonite seal up to 2.00m, gravel filter up to 0.50m, bentonite seal up to 0.30m, concrete up to

Symbols and abbreviations are explained on the accompanying key sheet.
All dimensions are in metres.
Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**
Figure **1 of 2**
01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH03/1B**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385618.3** E **394021.2** N
Ground Level **39.82** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks **0.10m, arisings up to ground level.**
Chiselling: 3.65-3.80m for 30 minutes.

Logged by **PC**

Figure **2 of 2**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH03/2**
Project No **PN153327**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385748.5** E **394210.4** N
Ground Level **44.29** m OD
Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.29
0.00- 0.25	B					Grass over TOPSOIL: Dark brown slightly gravelly clayey fine to coarse sand with rootlets. Gravel is subangular fine to coarse including sandstone.			
0.20	ES						0.25		44.04
0.25- 0.40	B					MADE GROUND: Dark brown slightly gravelly clayey fine to coarse sand with rootlets and pockets of clay. Gravel is angular to subangular fine to coarse including glass, brick fragments and sandstone.			
0.40- 0.80	B						0.40		43.89
0.50	ES								
1.00	ES					Soft to firm reddish brown mottled light yellow and grey with occasional black speckles slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular to rounded fine to medium including siltstone and sandstone. Below 0.80m, occasional coal.			
1.10	D								
1.20- 1.65	U39	1.15 (DRY)	183	16		Below 1.20m, stiff, light yellow mottling and rootlets absent. At 1.20m, very high strength			
1.65- 1.80	D								
1.80- 2.30	B								
1.80	VHP						1.85		42.44
2.00	D					Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).			
2.30- 2.42	D	1.50 (DRY)			S50/43				
2.55- 2.64	D	1.50 (DRY)			S50/49				
						End of Borehole	2.64		41.65

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	CR/DH	G.L.			09/04/15	08:00						None encountered.
2.64	0.15	Cable Percussion	CR/DH	2.64	1.50	DRY	09/04/15	13:00						

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 1.80m depth.
Backfill details from base of hole: arisings up to ground level.
Chiselling: 2.30-2.55m for 60 minutes.

Logged by **PC**
Figure **1 of 1**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2A	Engineer	COFFEY GEOTECHNICS	Borehole	BH04/1A
				Project No	PN153327
Client	COFFEY GEOTECHNICS	National Grid Coordinates	386163.1 E 394205.6 N	Ground Level	45.05 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		45.05
0.05	D					Grass over TOPSOIL: Dark brown slightly gravelly clayey fine to medium sand with pockets of soft clay. Gravel is subangular fine of sandstone.	0.05		45.00
0.10- 0.30	B								
0.20	ES								
						MADE GROUND: Dark greyish brown clayey fine to medium sand with rootlets and pockets of soft clay.	0.30		44.75
0.35	D								
0.40	D						0.40		44.65
0.50	ES					MADE GROUND: Soft dark brown sandy slightly gravelly clay. Gravel is subangular fine of siltstone, sandstone and quartz.			
0.55- 0.95	B								
						Soft to firm orangish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine of sandstone. Below 0.90m, reddish brown mottled grey. Gravel is subangular to subrounded fine to coarse of siltstone and coal.			
1.00	D								
1.00	ES								
1.20- 1.65	U52	(DRY)							
1.70	D					Below 1.80m, stiff.			
1.80	D								
2.00- 2.45	B			19					
2.00	D								
2.00- 2.45	D	1.50 (DRY)			S25				
3.00- 3.45	B					At 3.00m, lens of sand up to 100mm thick.			
3.00	D								
3.00- 3.36	D	1.50 (DRY)			S50/ 210				
						Very dense red slightly clayey fine to coarse SAND.	3.30		41.75
3.50	VHP								
							3.70		41.35
3.70	D					Very stiff friable reddish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium including siltstone, sandstone and coal.			
4.00- 4.45	B			15		Below 4.00m, sandy.			
4.00- 4.45	D	1.50 (DRY)			S46				
4.80	D						4.80		40.25
						Dense red locally yellowish brown slightly gravelly clayey fine to medium SAND. Gravel is subangular fine to medium of mudstone.			
5.00- 5.45	B								

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	NF/SM
7.93	0.15	Cable Percussion	NF/SM

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			22/04/15	15:00
1.70	1.50	DRY	22/04/15	17:00
1.70	1.50	DRY	23/04/15	08:00
7.93	1.50	DRY	23/04/15	15:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 3.50m depth.
Backfill details from base of hole: arisings up to ground level.
Chiselling: 7.70-7.80m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH04/1A**
Project No **PN153327**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386163.1** E **394205.6** N
Ground Level **45.05** m OD
Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.00- 5.45	D	1.50 (DRY)			S44	Between 5.00m and 6.10m, bands of stiff friable thinly laminated reddish brown clay.			
5.85- 6.35	B								
6.50- 6.95	B								
6.50- 6.91	D	1.50 (DRY)			S50/ 255				
						Very stiff reddish brown sandy CLAY.	6.60		38.45
7.10	D					Very dense light grey clayey fine to coarse SAND.	7.10		37.95
7.50- 7.70	B					Below 7.50m, bands of stiff thinly laminated reddish brown clay and extremely weak mudstone.			
7.50	D								
7.70- 7.80	D								
7.80- 7.93	#	1.50 (DRY)			C50/50				
						End of Borehole	7.93		37.12

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2A	Engineer	COFFEY GEOTECHNICS	Borehole	BH04/2
				Project No	PN153327
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385805.0 E 394158.1 N	Ground Level	43.81 m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
							G.L.		43.81
0.00- 0.20	B					Grass over TOPSOIL: Dark brown clayey gravelly fine to coarse sand with rootlets and pockets of soft clay. Gravel is angular to subangular fine to coarse including sandstone.	0.25		43.56
0.20	ES								
0.25- 0.50	B					Firm reddish brown with orange and grey mottling slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium including siltstone, sandstone and occasional coal.			
0.50- 1.00	B								
0.50	ES								
1.00- 1.20	B					Between 1.00m and 1.20m, sandy.			
1.00	ES								
1.20- 1.45	B								
1.20	U28	1.20 (DRY)							
1.45- 2.30	B					Very dense reddish brown clayey fine to coarse SAND.	1.45		42.36
2.30- 2.49	D	1.80 (DRY)			S50/65	Below 2.30m, clay absent.			
2.50	VHP								
						Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).	2.70		41.11
						End of Borehole	2.90		40.91

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	JF/MR
2.90	0.15	Cable Percussion	JF/MR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	14:00
2.50	1.80	DRY	09/04/15	18:00
2.50	1.80	DRY	10/04/15	08:00
2.90	1.80	DRY	10/04/15	11:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 2.50m depth.
A 50mm gas monitoring pipe was installed to 2.90m with a geowrapped slotted section from 1.45m to 2.90m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 1.45m, bentonite seal up to 0.20m, concrete up to 0.10m, arisings up to ground level.
Chiselling: 2.70-2.90m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 1

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH05/1A** **PN153327**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386134.8 E 394294.9 N** | Ground Level **44.69** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.69
0.05	D					Grass over TOPSOIL: Dark brown slightly clayey slightly gravelly fine to medium sand with rootlets. Gravel is subangular fine to coarse including sandstone.	0.05		44.64
0.10- 0.40	B								
0.20	ES								
						MADE GROUND: Dark brown slightly gravelly clayey fine to medium sand with rootlets. Gravel is subangular fine of sandstone.	0.45		44.24
0.45	D								
0.50	ES								
0.55- 0.95	B					MADE GROUND: Very soft dark brown slightly gravelly sandy clay with ash. Gravel is subangular to subrounded fine to coarse including sandstone, clinker and brick fragments.			
1.00	D								
1.00	ES								
1.10	W								
1.20- 1.65	B					Below 1.20m, slightly sandy gravelly.			
1.20- 1.65		(0.80)			C2				
						Very soft to soft orangish brown slightly sandy peaty SILT with fragments of wood. Organic odour.	1.60		43.09
2.00- 2.45	B			59		Below 2.00m, dark greyish brown mottled orange.			
2.00	D								
2.00- 2.45	D	1.50			S4				
2.00	ES	(1.40)							
3.00	D					Below 3.00m, peat absent.			
3.00- 3.45	U100	3.00 (2.70)							
						Firm to stiff orangish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium including siltstone and sandstone. Below 3.50m, reddish brown. Gravel includes subangular fine coal.	3.30		41.39
3.50	D								
4.00- 4.45	B			16		Below 4.00m, lenses of red fine to coarse sand.			
4.00	D								
4.00- 4.41	D	3.00 (DRY)			S50/ 255				
4.60	D						4.60		40.09
						Dense to very dense reddish brown slightly gravelly very clayey fine to medium SAND. Gravel is subangular fine of sandstone.			
5.00- 5.45	B					Below 5.00m, clayey.			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	NF/SM
8.22	0.15	Cable Percussion	NF/SM

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			23/04/15	11:00
3.30	3.00	DAMP	23/04/15	17:00
3.30	3.00	DRY	24/04/15	08:00
8.22	3.00	DRY	24/04/15	15:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.10		0.80	20		Medium inflow.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 5.00m depth.
A 50mm gas monitoring pipe was installed to 3.00m with a geowrapped slotted section from 0.40m to 3.00m with flush lockable protective cover and a 50mm gas monitoring pipe was installed to 5.50m with a geowrapped slotted section from 4.60m to 5.50m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 5.50m, gravel filter up to 4.60m, bentonite seal up to 3.00m, gravel filter up to 0.40m, bentonite seal up

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

01/07/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH05/1A**
Project No **PN153327**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386134.8** E **394294.9** N
Ground Level **44.69** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.00	D								
5.00- 5.45	D	3.00 (DRY)			S50				
5.00	VHP								
5.50	D								
						Stiff reddish brown sandy CLAY (possible weathered mudstone).	5.50		39.19
6.00- 6.45	UF100	3.00 (DRY)							
6.20- 6.65	B						6.20		38.49
6.20- 6.49	D	3.00 (DRY)			S50/ 135	Extremely weak reddish brown MUDSTONE.			
7.00	D								
7.50- 7.95	B			26					
7.50- 7.82	D	3.00 (DRY)			S50/ 170				
8.00- 8.22		3.00 (DRY)			C50/ 125				
						End of Borehole	8.22		36.47

Boring

Depth	Hole Dia	Technique	Crew

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks **to 0.20m, concrete up to ground level. Chiselling: 7.80-8.00m for 60 minutes.**

Logged by **PC**

Figure **2 of 2**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2A	Engineer	COFFEY GEOTECHNICS	Borehole / Project No	BH05/2 / PN153327
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385616.7 E, 394168.5 N	Ground Level	43.44 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		43.44
0.00- 0.20	B					Vegetation over TOPSOIL: Dark brown slightly gravelly clayey fine to medium sand with rootlets. Gravel is subangular fine including sandstone.	0.20		43.24
0.20- 0.50	B								
0.30	ES					Firm reddish brown mottled grey and light yellow slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded fine to medium including sandstone, siltstone and occasional coal.			
0.50- 0.90	B								
0.60	ES								
						Below 0.90m, stiff, occasional black speckling, light yellow mottling absent.			
1.00	ES								
1.10	D								
1.20- 1.65	U29	1.20 (DRY)							
1.65- 1.80	D								
1.80- 2.00	B								
							2.00		41.44
2.10	D					Extremely weak reddish brown fine to medium grained SANDSTONE (recovered as sand).			
2.10	VHP								
2.20- 2.39	D	1.50			S50/89				
2.30- 2.80	B	(DRY)							
3.00	D								
3.10- 3.15	#	1.50 (DRY)			S50/11				
						End of Borehole	3.15		40.29

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	CR/DH
3.15	0.15	Cable Percussion	CR/DH

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	08:00
3.15	1.50	DRY	09/04/15	13:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars.
A permeability test was undertaken at 2.10m depth.
A 50mm gas monitoring pipe was installed to 3.10m with a geowrapped slotted section from 2.00m to 3.10m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 2.00m, bentonite seal up to 0.50m, concrete up to ground level.
Chiselling: 2.80-3.10m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 1

01/07/2015

geotechnics

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth	Level	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
	m bgl	m OD			0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH01/1A	2.20	42.36	S	-	1	2	2	3	3	4	12	*
BH01/1A	4.20	40.36	S	-	8	11	20	30/67	/0	/0	50/142	>
BH01/1A	5.10	39.46	S	-	25/32	/0	50/21	/0	/0	/0	50/21	>

Driller	C. Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH01/1B	1.30	37.42	S	-	2	2	2	1	3	2	8	*
BH01/1B	2.60	36.12	S	-	19	6/11	50/48	/0	/0	/0	50/48	>
BH01/1B	2.80	35.92	S	-	25/31	/0	50/29	/0	/0	/0	50/29	>

Driller	C. Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' (10 20 30 40 50)
BH01/2	1.20	43.24	S	-	1	2	2	3	3	5	13	*
BH01/2	3.00	41.44	S	-	3	9	13	20	17/55	/0	50/205	>
BH01/2	3.90	40.54	C	-	25/55	/0	50/45	/0	/0	/0	50/45	>

Driller	M Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH02/1A	1.20	44.75	S	-	4	3	2	1	2	1	6	*
BH02/1A	3.20	42.75	S	-	3	3	5	5	6	8	24	*
BH02/1A	4.20	41.75	S	-	5	6	7	10	12	21/67	50/292	>
BH02/1A	5.20	40.75	S	-	25/72	/0	50/55	/0	/0	/0	50/55	>
BH02/1A	5.90	40.05	S	-	10	15/64	50/36	/0	/0	/0	50/36	>

Driller	C. Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH02/1B	2.20	42.71	S	-	5	10	10	16	20	4/10	50/235	>
BH02/1B	3.20	41.71	C	-	25/50	/0	50/25	/0	/0	/0	50/25	>

Driller	M Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH02/2	2.00	42.38	S	-	1	3	4	5	6	8	23	*
BH02/2	3.00	41.38	S	-	1	1	5	9	19	17/50	50/275	>
BH02/2	3.90	40.48	C	-	25/45	/0	50/30	/0	/0	/0	50/30	>

Driller	M Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH03/1A	2.00	43.06	S	-	3	4	7	9	10	12	38	*
BH03/1A	3.00	42.06	S	-	9	16/60	25	25/50	/0	/0	50/125	>
BH03/1A	3.70	41.36	C	-	25	/0	50/40	/0	/0	/0	50/40	>

Driller	Neil Forrester
Hammer No.	SPT4
Energy Ratio, Er (%)	75.00
Calibration Date	29/01/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH03/1B	1.30	38.52	S	-	5	11	2	2	3	2	9	*
BH03/1B	3.30	36.52	S	-	16	9/33	47	3/5	/0	/0	50/80	>
BH03/1B	3.80	36.02	S	-	25/37	/0	50/42	/0	/0	/0	50/42	>

Driller	C. Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth	Level	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
	m bgl	m OD			0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH03/2	2.30	41.99	S	-	25	/0	50/43	/0	/0	/0	50/43	>
BH03/2	2.55	41.74	S	-	25/43	/0	50/49	/0	/0	/0	50/49	>

Driller	C. Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' (10 20 30 40 50)
BH04/1A	2.00	43.05	S	-	2	2	5	6	6	8	25	*
BH04/1A	3.00	42.05	S	-	5	8	11	19	20/60	/0	50/210	>
BH04/1A	4.00	41.05	S	-	4	8	10	11	12	13	46	*
BH04/1A	5.00	40.05	S	-	5	6	7	10	12	15	44	*
BH04/1A	6.50	38.55	S	-	5	9	12	15	15	8/30	50/255	>
BH04/1A	7.80	37.25	C	-	21	4/5	50/50	/0	/0	/0	50/50	>

Driller	Neil Forrester
Hammer No.	SPT4
Energy Ratio, Er (%)	75.00
Calibration Date	29/01/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH04/2	2.30	41.51	S	-	13	12/50	50/65	/0	/0	/0	50/65	>

Driller	M Roberts
Hammer No.	AR58
Energy Ratio, Er (%)	75.00
Calibration Date	23/08/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH05/1A	1.20	43.49	C	-	1	-	1	-	1	-	2	*
BH05/1A	2.00	42.69	S	-	1	1	1	1	1	1	4	*
BH05/1A	4.00	40.69	S	-	5	7	10	17	15	8/30	50/255	>
BH05/1A	5.00	39.69	S	-	8	15	16	16	10	8	50	*
BH05/1A	6.20	38.49	S	-	4	13	23	27/60			50/135	>
BH05/1A	7.50	37.19	S	-	7	11	17	23	10/20		50/170	>
BH05/1A	8.00	36.69	C	-	19	6/20	33	17/50			50/125	>

Driller	Neil Forrester
Hammer No.	SPT4
Energy Ratio, Er (%)	75.00
Calibration Date	29/01/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

APPENDIX 3

Dynamic Sampling Borehole Records

DATA SHEET - Symbols and Abbreviations used on Records

Sample Types

B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
LB	Large bulk disturbed sample
P	Piston sample (PF - failed P sample)
TW	Thin walled push in sample
U	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
UT	Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample)
V	Vial sample
W	Water sample
#	Sample Not Recovered

Insitu Testing / Properties

CBRP	CBR using TRL probe
CHP	Constant Head Permeability Test
COND	Electrical conductivity
HV	Strength from Hand Vane
ICBR	CBR Test
IDEN	Density Test
IRES	Resistivity Test
MEX	CBR using Mexecone Probe Test
PKR	Packer Permeability Test
PLT	Plate Load Test
PP	Strength from Pocket Penetrometer
Temp	Temperature
VHP	Variable Head Permeability Test
VN	Strength from Insitu Vane
w%	Water content

(All other strengths from undrained triaxial testing)

S	Standard Penetration Test (SPT)
C	SPT with cone
N	SPT Result
-/-	Blows/penetration (mm) after seating drive
-*/- (mm)	Total blows/penetration
( )	Extrapolated value

Groundwater

Water Strike

Depth Water Rose To

Instrumentation

Seal

Filter

Seal



Strata

Made Ground Granular

Made Ground Cohesive

Topsoil

Cobbles and Boulders

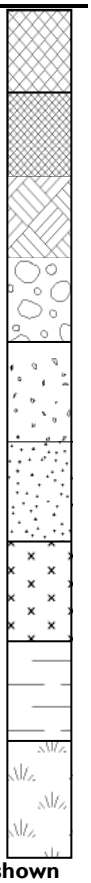
Gravel

Sand

Silt

Clay

Peat



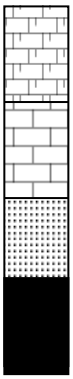
Note: Composite soil types shown by combined symbols

Chalk

Limestone

Sandstone

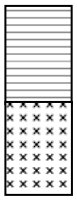
Coal



Strata, Continued

Mudstone

Siltstone

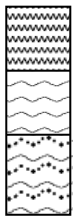


Metamorphic Rock

Fine Grained

Medium Grained

Coarse Grained

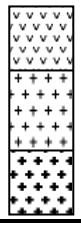


Igneous Rock

Fine Grained

Medium Grained

Coarse Grained



Backfill Materials

Arisings

Bentonite Seal

Concrete

Fine Gravel Filter

General Fill

Gravel Filter

Grout

Sand Filter

Tarmacadam



Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (m)	Maximum Minimum
NI	Non-intact core
NR	No core recovery
AZCL	Assumed zone of core loss

(where core recovery is unknown it is assumed to be at the base of the run)

BOREHOLE RECORD - Dynamic Sample

Project	PROJECT OAK SI SCOPE STAGE 2A	Engineer	COFFEY GEOTECHNICS	Borehole	WS01/1B
				Project No	PN153327
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385774.9 E 394128.8 N	Ground Level	42.86 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		42.86
0.20	ES					Grass over MADE GROUND: Soft to firm greyish brown slightly sandy slightly gravelly clay with some rootlets. Gravel is angular to subrounded fine to medium of various lithologies and brick fragments.			
0.50	ES								
1.00	ES						1.00		41.86
1.20- 1.65	D	1.20 (DRY)			S18	Firm becoming stiff orangish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of various lithologies.			
							1.80		41.06
2.00- 2.15	D	1.20 (DRY)			S50/75	Extremely weak to weak reddish brown fine to medium grained SANDSTONE with occasional subangular to subrounded fine gravel-sized clasts (Recovered as slightly silty slightly gravelly sand).			
2.15	VHP					End of Borehole	2.15		40.71

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	AJ/SL
2.15	0.09	Dynamic Sampler	AJ/SL

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	10:00
2.15	1.20	DRY	09/04/15	12:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

AGS

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 1kg plastic tub, 1 x 258ml amber glass jar and 1 x 60ml VOC vial.
The Dynamic Sample Borehole was terminated at 2.15m depth within sandstone bedrock.
A permeability test was undertaken at 2.15m depth.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by DSa
Checked by JK
Figure 1 of 1
01/07/2015

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS01/2**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385817.5** E **394242.2** N
Ground Level **44.51** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.51
0.20	ES					Grass over MADE GROUND: Soft greyish brown slightly sandy gravelly clay with some rootlets. Gravel is angular to subrounded medium to coarse of brick fragments.			
0.50	ES								
							0.80		43.71
1.00	ES					MADE GROUND: Soft to firm orangish brown slightly gravelly clay. Gravel is angular to subrounded fine to medium of various lithologies and brick fragments.	1.00		43.51
1.20- 1.65	D	1.20 (DRY)			S14	Firm orangish brown slightly sandy to sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of various lithologies.			
2.00- 2.45	D	2.00 (DRY)			S46	Below 2.00m, Very stiff.			
							2.40		42.11
						Extremely weak reddish brown fine to medium grained SANDSTONE with occasional subangular to subrounded fine gravel-sized clasts (Recovered as slightly silty slightly gravelly sand).	2.45		42.06
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	AJ/SL
2.45	0.09	Dynamic Sampler	AJ/SL

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	08:00
2.45	2.00	DRY	09/04/15	10:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 1kg plastic tub, 1 x 258ml amber glass jar and 1 x 60ml VOC vial.
The Dynamic Sample Borehole was terminated at 2.45m depth within sandstone bedrock.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **DSa**
Checked by **JK**
Figure **1 of 1**
01/07/2015

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS02/1B**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385671.5** E **394009.7** N
Ground Level **41.38** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						Grass over MADE GROUND: Dark brown slightly silty gravelly fine to medium sand with a low cobble content of bricks and some rootlets. Gravel is angular to subrounded fine to coarse of various lithologies, glass and brick fragments.	G.L.		41.38
0.20	ES								
0.50	ES								
						Soft to firm orangish brown sandy CLAY.	0.70		40.68
1.00	ES								
1.20- 1.65	D	1.20 (DRY)			S15				
						Stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine of various lithologies. Slight organic odour.	1.65		39.73
2.00- 2.45	D	1.20 (DRY)			S29				
						Extremely weak reddish brown fine to medium grained SANDSTONE (Recovered as slightly silty sand).	2.25		39.13
2.80	VHP								
						End of Borehole	2.80		38.58

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	AJ/SL	G.L.			09/04/15	12:00						None encountered.
2.80	0.09	Dynamic Sampler	AJ/SL	2.80	1.20	DRY	09/04/15	14:00						

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 1kg plastic tub, 1 x 258ml amber glass jar and 1 x 60ml VOC vial.
The Dynamic Sample Borehole was terminated at 2.80m depth within sandstone bedrock.
A permeability test was undertaken at 2.80m depth.
Backfill details from base of hole: arisings up to ground level.

Logged by **DSa**
Checked by **JK**
Figure **1 of 1**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS03/1B**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385618.5** E **394074.2** N
Ground Level **40.73** m OD

Scale 1:25

Sampling: Depth	Sample Type	Depth Cased & (to Water)	Properties: Strength kPa	w %	SPT N	Strata: Description	Depth	Legend	Level m OD
						Grass over TOPSOIL: Dark brown slightly silty fine to coarse sand with some rootlets.	G.L.		40.73
0.20	ES					MADE GROUND: Dark brown slightly silty gravelly fine to coarse sand with a low cobble content of bricks. Gravel is angular to subrounded fine to coarse of various lithologies and brick fragments.	0.15		40.58
0.50	ES								
						Between 0.80m and 1.00m, medium cobble content of bricks.			
1.00	ES								
1.20- 1.65	D	1.20 (DRY)			S15	MADE GROUND: Black silty gravelly fine to medium sand of ash with wood. Gravel is angular to subrounded fine to medium of various lithologies and brick fragments.	1.20		39.53
						Stiff brown slightly sandy to sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of various lithologies.	1.60		39.13
2.00- 2.45	D	1.20 (DRY)			S23				
3.00- 3.45	D	1.20 (DRY)			S41	At 3.00m, very thin band of sand.			
						Extremely weak reddish brown fine to medium grained SANDSTONE (Recovered as slightly silty sand).	3.35		37.38
3.85	VHP					End of Borehole	3.85		36.88

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	AJ/SL
3.85	0.09	Dynamic Sampler	AJ/SL

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	14:00
3.85	1.20	DRY	09/04/15	16:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 1kg plastic tub, 1 x 258ml amber glass jar and 1 x 60ml VOC vial.
The Dynamic Sample Borehole was terminated at 3.85m depth within sandstone bedrock.
A permeability test was undertaken 3.85m depth.
Backfill details from base of hole: arisings up to ground level.

Logged by **DSa**
Checked by **JK**
Figure **1 of 1**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS01/1B	1.20	41.66	S	-	2	3	4	4	4	6	18	*
WS01/1B	2.00	40.86	S	-	24		50				50/75	>

Driller	Alan Jones
Hammer No.	MG149
Energy Ratio, Er (%)	81.00
Calibration Date	02/04/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS01/2	1.20	43.31	S	-	2	2	3	3	4	4	14	*
WS01/2	2.00	42.51	S	-	3	6	10	9	10	17	46	*

Driller	Alan Jones
Hammer No.	MG149
Energy Ratio, Er (%)	81.00
Calibration Date	02/04/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS02/1B	1.20	40.18	S	-	3	3	3	4	4	4	15	*
WS02/1B	2.00	39.38	S	-	3	6	6	7	7	9	29	*

Driller	Alan Jones
Hammer No.	MG149
Energy Ratio, Er (%)	81.00
Calibration Date	02/04/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS03/1B	1.20	39.53	S	-	3	3	4	4	3	4	15	*
WS03/1B	2.00	38.73	S	-	3	4	4	5	6	8	23	*
WS03/1B	3.00	37.73	S	-	7	8	10	10	10	11	41	*

Driller	Alan Jones
Hammer No.	MG149
Energy Ratio, Er (%)	81.00
Calibration Date	02/04/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

APPENDIX 3

Dynamic Sampling Borehole Records

DATA SHEET - Symbols and Abbreviations used on Records

Sample Types

B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
LB	Large bulk disturbed sample
P	Piston sample (PF - failed P sample)
TW	Thin walled push in sample
U	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
UT	Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample)
V	Vial sample
W	Water sample
#	Sample Not Recovered

Insitu Testing / Properties

CBRP	CBR using TRL probe
CHP	Constant Head Permeability Test
COND	Electrical conductivity
HV	Strength from Hand Vane
ICBR	CBR Test
IDEN	Density Test
IRES	Resistivity Test
MEX	CBR using Mexecone Probe Test
PKR	Packer Permeability Test
PLT	Plate Load Test
PP	Strength from Pocket Penetrometer
Temp	Temperature
VHP	Variable Head Permeability Test
VN	Strength from Insitu Vane
w%	Water content

(All other strengths from undrained triaxial testing)

S	Standard Penetration Test (SPT)
C	SPT with cone
N	SPT Result
-/-	Blows/penetration (mm) after seating drive
-*/- (mm)	Total blows/penetration
( )	Extrapolated value

Groundwater

Water Strike

Depth Water Rose To

Instrumentation

Seal

Filter

Seal



Strata

Made Ground Granular

Made Ground Cohesive

Topsoil

Cobbles and Boulders

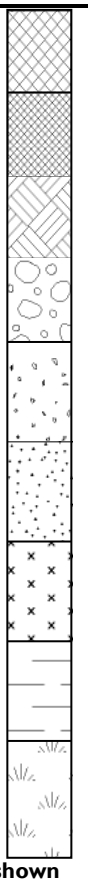
Gravel

Sand

Silt

Clay

Peat



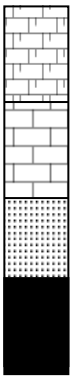
Note: Composite soil types shown by combined symbols

Chalk

Limestone

Sandstone

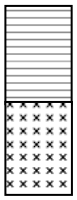
Coal



Strata, Continued

Mudstone

Siltstone

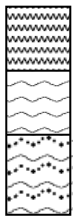


Metamorphic Rock

Fine Grained

Medium Grained

Coarse Grained

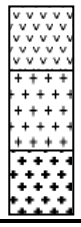


Igneous Rock

Fine Grained

Medium Grained

Coarse Grained



Backfill Materials

Arisings

Bentonite Seal

Concrete

Fine Gravel Filter

General Fill

Gravel Filter

Grout

Sand Filter

Tarmacadam



Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (m)	Maximum Minimum
NI	Non-intact core
NR	No core recovery
AZCL	Assumed zone of core loss

(where core recovery is unknown it is assumed to be at the base of the run)

BOREHOLE RECORD - Dynamic Sample

Project	PROJECT OAK SI SCOPE STAGE 2A	Engineer	COFFEY GEOTECHNICS	Borehole	WS01/1B
				Project No	PN153327
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385774.9 E 394128.8 N	Ground Level	42.86 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		42.86
0.20	ES					Grass over MADE GROUND: Soft to firm greyish brown slightly sandy slightly gravelly clay with some rootlets. Gravel is angular to subrounded fine to medium of various lithologies and brick fragments.			
0.50	ES								
1.00	ES						1.00		41.86
1.20- 1.65	D	1.20 (DRY)			S18	Firm becoming stiff orangish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of various lithologies.			
							1.80		41.06
2.00- 2.15	D	1.20 (DRY)			S50/75	Extremely weak to weak reddish brown fine to medium grained SANDSTONE with occasional subangular to subrounded fine gravel-sized clasts (Recovered as slightly silty slightly gravelly sand).			
2.15	VHP					End of Borehole	2.15		40.71

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	AJ/SL
2.15	0.09	Dynamic Sampler	AJ/SL

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	10:00
2.15	1.20	DRY	09/04/15	12:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

AGS

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 1kg plastic tub, 1 x 258ml amber glass jar and 1 x 60ml VOC vial.
The Dynamic Sample Borehole was terminated at 2.15m depth within sandstone bedrock.
A permeability test was undertaken at 2.15m depth.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by DSa
Checked by JK
Figure 1 of 1
01/07/2015

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS01/2**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385817.5** E **394242.2** N
Ground Level **44.51** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.51
0.20	ES					Grass over MADE GROUND: Soft greyish brown slightly sandy gravelly clay with some rootlets. Gravel is angular to subrounded medium to coarse of brick fragments.			
0.50	ES								
							0.80		43.71
1.00	ES					MADE GROUND: Soft to firm orangish brown slightly gravelly clay. Gravel is angular to subrounded fine to medium of various lithologies and brick fragments.	1.00		43.51
1.20- 1.65	D	1.20 (DRY)			S14	Firm orangish brown slightly sandy to sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of various lithologies.			
2.00- 2.45	D	2.00 (DRY)			S46	Below 2.00m, Very stiff.			
							2.40		42.11
						Extremely weak reddish brown fine to medium grained SANDSTONE with occasional subangular to subrounded fine gravel-sized clasts (Recovered as slightly silty slightly gravelly sand).	2.45		42.06
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	AJ/SL
2.45	0.09	Dynamic Sampler	AJ/SL

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	08:00
2.45	2.00	DRY	09/04/15	10:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 1kg plastic tub, 1 x 258ml amber glass jar and 1 x 60ml VOC vial.
The Dynamic Sample Borehole was terminated at 2.45m depth within sandstone bedrock.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **DSa**
Checked by **JK**
Figure **1 of 1**
01/07/2015

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS02/1B**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385671.5** E **394009.7** N
Ground Level **41.38** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						Grass over MADE GROUND: Dark brown slightly silty gravelly fine to medium sand with a low cobble content of bricks and some rootlets. Gravel is angular to subrounded fine to coarse of various lithologies, glass and brick fragments.	G.L.		41.38
0.20	ES								
0.50	ES								
						Soft to firm orangish brown sandy CLAY.	0.70		40.68
1.00	ES								
1.20- 1.65	D	1.20 (DRY)			S15				
						Stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine of various lithologies. Slight organic odour.	1.65		39.73
2.00- 2.45	D	1.20 (DRY)			S29				
						Extremely weak reddish brown fine to medium grained SANDSTONE (Recovered as slightly silty sand).	2.25		39.13
2.80	VHP								
						End of Borehole	2.80		38.58

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	AJ/SL	G.L.			09/04/15	12:00						None encountered.
2.80	0.09	Dynamic Sampler	AJ/SL	2.80	1.20	DRY	09/04/15	14:00						

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 1kg plastic tub, 1 x 258ml amber glass jar and 1 x 60ml VOC vial.
The Dynamic Sample Borehole was terminated at 2.80m depth within sandstone bedrock.
A permeability test was undertaken at 2.80m depth.
Backfill details from base of hole: arisings up to ground level.

Logged by **DSa**
Checked by **JK**
Figure **1 of 1**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2A**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS03/1B**
Project No **PN153327**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385618.5** E **394074.2** N
Ground Level **40.73** m OD

Scale 1:25

Sampling: Depth	Sample Type	Depth Cased & (to Water)	Properties: Strength kPa	w %	SPT N	Strata: Description	Depth	Legend	Level m OD
						Grass over TOPSOIL: Dark brown slightly silty fine to coarse sand with some rootlets.	G.L.		40.73
0.20	ES					MADE GROUND: Dark brown slightly silty gravelly fine to coarse sand with a low cobble content of bricks. Gravel is angular to subrounded fine to coarse of various lithologies and brick fragments.	0.15		40.58
0.50	ES								
						Between 0.80m and 1.00m, medium cobble content of bricks.			
1.00	ES								
1.20- 1.65	D	1.20 (DRY)			S15	MADE GROUND: Black silty gravelly fine to medium sand of ash with wood. Gravel is angular to subrounded fine to medium of various lithologies and brick fragments.	1.20		39.53
						Stiff brown slightly sandy to sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of various lithologies.	1.60		39.13
2.00- 2.45	D	1.20 (DRY)			S23				
3.00- 3.45	D	1.20 (DRY)			S41	At 3.00m, very thin band of sand.			
						Extremely weak reddish brown fine to medium grained SANDSTONE (Recovered as slightly silty sand).	3.35		37.38
3.85	VHP					End of Borehole	3.85		36.88

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	AJ/SL
3.85	0.09	Dynamic Sampler	AJ/SL

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/04/15	14:00
3.85	1.20	DRY	09/04/15	16:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 1kg plastic tub, 1 x 258ml amber glass jar and 1 x 60ml VOC vial.
The Dynamic Sample Borehole was terminated at 3.85m depth within sandstone bedrock.
A permeability test was undertaken 3.85m depth.
Backfill details from base of hole: arisings up to ground level.

Logged by **DSa**
Checked by **JK**
Figure **1 of 1**
01/07/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS01/1B	1.20	41.66	S	-	2	3	4	4	4	6	18	*
WS01/1B	2.00	40.86	S	-	24		50				50/75	>

Driller	Alan Jones
Hammer No.	MG149
Energy Ratio, Er (%)	81.00
Calibration Date	02/04/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS01/2	1.20	43.31	S	-	2	2	3	3	4	4	14	*
WS01/2	2.00	42.51	S	-	3	6	10	9	10	17	46	*

Driller	Alan Jones
Hammer No.	MG149
Energy Ratio, Er (%)	81.00
Calibration Date	02/04/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS02/1B	1.20	40.18	S	-	3	3	3	4	4	4	15	*
WS02/1B	2.00	39.38	S	-	3	6	6	7	7	9	29	*

Driller	Alan Jones
Hammer No.	MG149
Energy Ratio, Er (%)	81.00
Calibration Date	02/04/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2A **Project No** PN153327

Client COFFEY GEOTECHNICS

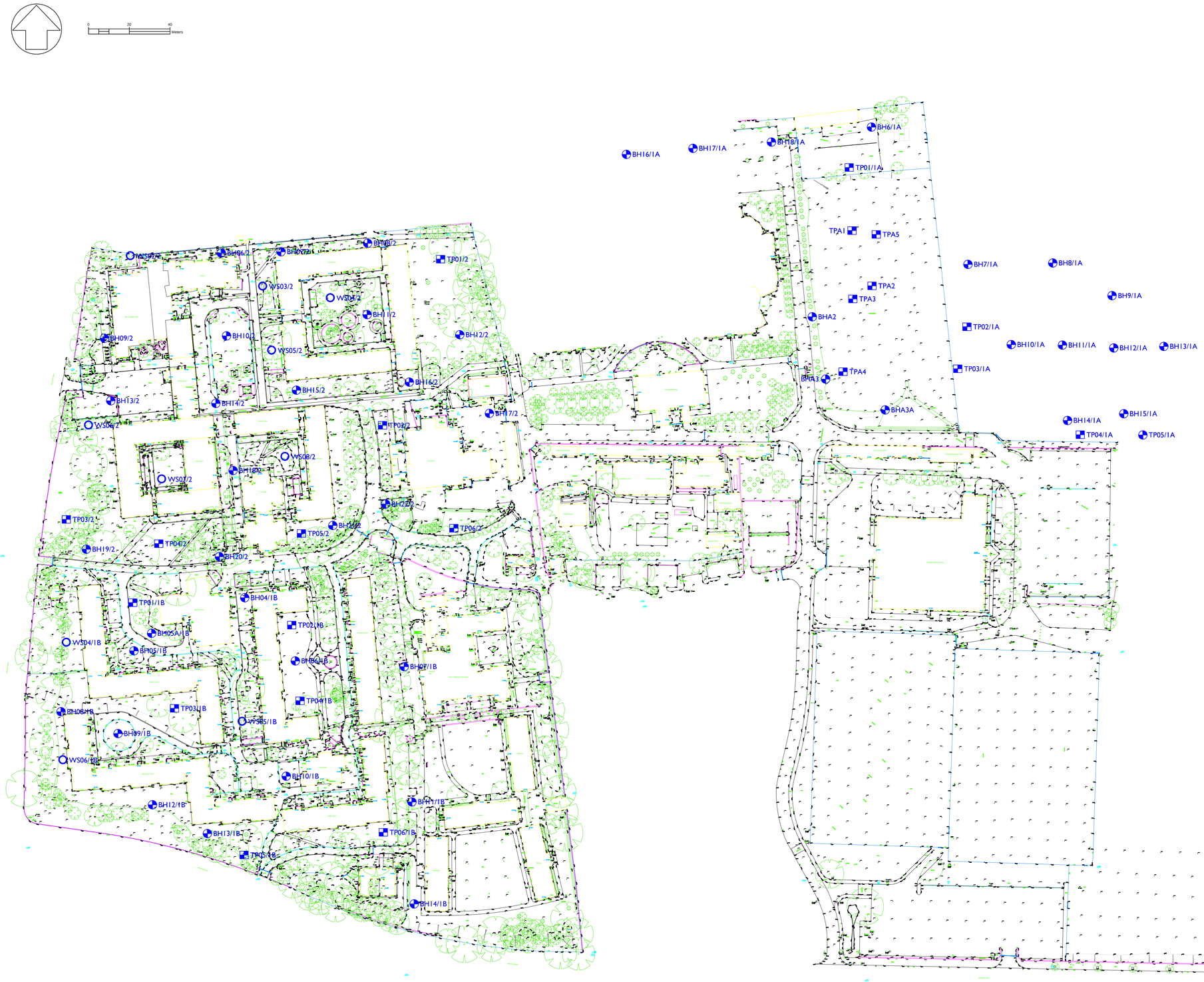
Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS03/1B	1.20	39.53	S	-	3	3	4	4	3	4	15	*
WS03/1B	2.00	38.73	S	-	3	4	4	5	6	8	23	*
WS03/1B	3.00	37.73	S	-	7	8	10	10	10	11	41	*

Driller	Alan Jones
Hammer No.	MG149
Energy Ratio, Er (%)	81.00
Calibration Date	02/04/2014

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used



Key

- Borehole
- Dynamic Sample Borehole

Hole ID	Eastng (mE)	Northing (mN)	Level (mOD)
BH04/1B	385701.60	394120.60	42.26
BH05/1B	385647.30	394094.60	40.98
BH05A/1B	385655.90	394103.10	41.40
BH06/1A	386009.00	394351.30	44.00
BH06/1B	385726.40	394089.60	41.87
BH06/2	385690.10	394289.60	44.49
BH07/1A	386056.40	394284.00	44.58
BH07/1B	385779.80	394086.80	41.59
BH07/2	385719.40	394290.20	44.49
BH08/1A	386098.00	394284.70	44.64
BH08/1B	385611.50	394064.70	40.06
BH08/2	385761.90	394294.40	44.49
BH09/1A	386127.00	394268.70	44.73
BH09/1B	385639.40	394054.00	40.22
BH09/2	385632.80	394247.80	44.30
BH10/1A	386077.60	394244.70	44.70
BH10/1B	385722.00	394033.10	39.98
BH10/2	385692.70	394248.90	44.58
BH11/1A	386102.70	394244.40	44.87
BH11/1B	385783.60	394020.50	40.22
BH11/2	385761.60	394259.40	44.74
BH12/1A	386127.90	394243.00	44.89
BH12/1B	385656.40	394019.10	39.82
BH12/2	385807.10	394249.50	44.52
BH13/1A	386152.50	394243.80	44.86
BH13/1B	385683.30	394005.00	39.62
BH13/2	385635.90	394217.10	43.85
BH14/1A	386105.20	394207.50	45.03
BH14/1B	385784.70	393970.50	40.14
BH14/2	385687.50	394215.90	44.42
BH15/1A	386132.80	394210.80	44.99
BH15/2	385727.00	394222.30	44.50
BH16/1A	385888.90	394338.00	44.38
BH16/2	385782.30	394226.30	44.48
BH17/1A	385921.50	394340.90	44.44
BH17/2	385821.60	394210.90	44.42
BH18/1A	385959.90	394344.00	44.45
BH18/2	385695.90	394183.00	43.41
BH19/2	385623.90	394144.40	42.43
BH20/2	385689.20	394140.70	42.92
BH21/2	385744.80	394156.00	43.85
BH22/2	385770.70	394166.50	43.64
BHA1	385988.80	394304.70	46.67
BHA2	385980.00	394258.30	45.71
BHA3	385986.60	394227.80	46.50
BHA3A	386015.80	394212.60	47.27
TP01/1A	385998.10	394331.50	44.55
TP01/1B	385646.70	394118.20	41.69
TP01/2	385797.70	394286.60	44.29
TP02/1A	386055.90	394253.40	44.85
TP02/1B	385724.70	394107.20	41.96
TP02/2	385769.20	394205.20	44.79
TP03/1A	386051.40	394232.80	44.93
TP03/1B	385667.10	394066.40	40.96
TP03/2	385614.10	394159.00	43.27
TP04/1A	386111.50	394200.50	45.04
TP04/1B	385728.80	394070.10	41.82
TP04/2	385659.50	394147.10	42.88
TP05/1A	386142.10	394200.40	44.98
TP05/1B	385701.30	393994.50	39.16
TP05/2	385729.40	394152.10	43.72
TP06/1B	385769.60	394005.60	39.78
TP06/2	385804.20	394154.70	43.85
TPA1	385999.50	394300.60	47.45
TPA2	386009.30	394273.50	48.49
TPA3	385999.90	394267.10	48.05
TPA4	385995.10	394231.40	47.60
TPA5	386011.40	394298.70	47.91
WS02/2	385645.50	394288.30	44.37
WS03/2	385710.40	394273.40	45.03
WS04/1B	385614.10	394098.80	41.58
WS04/2	385743.60	394267.70	44.71
WS05/1B	385700.30	394060.10	41.06
WS05/2	385714.80	394242.00	44.54
WS06/1B	385612.40	394041.20	39.91
WS06/2	385625.00	394205.30	43.97
WS07/2	385660.90	394178.90	43.38
WS08/2	385721.30	394189.90	43.88

geotechnics

The Geotechnical Centre,
Unit 1, Borders Industrial Park,
River Lane, Saltney,
Chester
CH4 8RJ

Phone: 01244 671117
Fax: 01244 671122
Email mail@geotechnics.co.uk

www.geotechnics.co.uk

Engineer:
Coffey Geotechnics

Client:
Coffey Geotechnics

Project:
Project Oak SI Scope Stage 2B

Drawing Title:
Exploratory Hole Location Plan

Scale: 1:1000@A1

Date:
August 2015

Project No:
PN153349

File Name:
Geo-PN153349-001(1)

\\phoebe\Data\projects\Chester\2015\PN153349\Drawings\Geo-PN153349-001.dwg

APPENDIX 2

Borehole Records

DATA SHEET - Symbols and Abbreviations used on Records

Sample Types

B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
LB	Large bulk disturbed sample
P	Piston sample (PF - failed P sample)
TW	Thin walled push in sample
U	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
UT	Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample)
V	Vial sample
W	Water sample
#	Sample Not Recovered

Insitu Testing / Properties

CBRP	CBR using TRL probe
CHP	Constant Head Permeability Test
COND	Electrical conductivity
HV	Strength from Hand Vane
ICBR	CBR Test
IDEN	Density Test
IRES	Resistivity Test
MEX	CBR using Mexecone Probe Test
PKR	Packer Permeability Test
PLT	Plate Load Test
PP	Strength from Pocket Penetrometer
Temp	Temperature
VHP	Variable Head Permeability Test
VN	Strength from Insitu Vane
w%	Water content

(All other strengths from undrained triaxial testing)

S	Standard Penetration Test (SPT)
C	SPT with cone
N	SPT Result
-/-	Blows/penetration (mm) after seating drive
-*/- (mm)	Total blows/penetration
( )	Extrapolated value

Groundwater

Water Strike

Depth Water Rose To

Instrumentation

Seal

Filter

Seal



Strata

Made Ground Granular

Made Ground Cohesive

Topsoil

Cobbles and Boulders

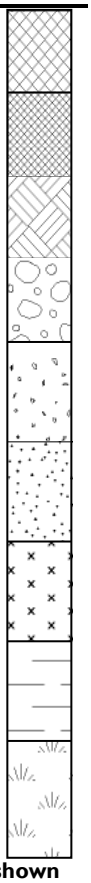
Gravel

Sand

Silt

Clay

Peat



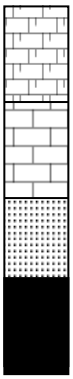
Note: Composite soil types shown by combined symbols

Chalk

Limestone

Sandstone

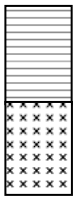
Coal



Strata, Continued

Mudstone

Siltstone

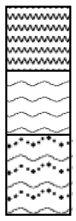


Metamorphic Rock

Fine Grained

Medium Grained

Coarse Grained

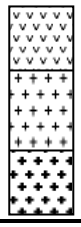


Igneous Rock

Fine Grained

Medium Grained

Coarse Grained



Backfill Materials

Arisings

Bentonite Seal

Concrete

Fine Gravel Filter

General Fill

Gravel Filter

Grout

Sand Filter

Tarmacadam



Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (m)	Maximum Minimum
NI	Non-intact core
NR	No core recovery
AZCL	Assumed zone of core loss

(where core recovery is unknown it is assumed to be at the base of the run)

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole / Project No	BH05/1B / PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385647.3 E, 394094.6 N	Ground Level	40.98 m OD

Scale 1:25

Sampling: Depth	Sample Type	Depth Cased & (to Water)	Properties: Strength kPa	w %	Strata: Description	Depth	Legend	Level m OD
						G.L.		40.98
					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.	0.10		40.88
0.20- 0.40	B				MADE GROUND: Dark greyish brown mottled red gravelly fine to coarse sand with a medium cobble content of whole brick. Gravel is angular to subangular fine to coarse including sandstone and broken brick and concrete.	0.40		40.58
0.20	ES				MADE GROUND: Firm brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse including siltstone, sandstone and occasional coal. At 0.65m, clay surface drain encountered.	0.65		40.33
0.40- 0.65	B				End of Borehole			
0.50	ES							

Boring

Depth	Hole Dia	Technique	Crew
0.65	0.40	Inspection Pit	AL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			12/06/15	08:00
0.65		DRY	12/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Clay surface drain encountered at 0.65m depth leading to vertical clay drain pipe dipped to 1.85m depth. Hole backfilled and moved to BH05A/1B.
Backfill details from base of hole: concrete up to 0.30m, arisings up to ground level.

Logged by PC

Figure 1 of 1

11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole / Project No	BH06/1B / PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385726.4 E, 394089.6 N	Ground Level	41.87 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Level m OD
							G.L.	41.87
0.10	D					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand with many rootlets. Gravel is angular to subangular fine to medium including brick fragments and sandstone.		
0.15	D						0.15	41.72
0.20- 0.50	B							
0.20	ES							
						MADE GROUND: Soft to firm dark brown mottled dark grey slightly sandy gravelly clay with a low to medium cobble content of brick. Gravel is angular to subangular fine to coarse including brick fragments, sandstone and siltstone.		
0.50	ES							
0.60- 0.80	B						0.60	41.27
0.60	D							
						MADE GROUND: Firm light brown mottled black slightly gravelly sandy clay. Gravel is subangular to subrounded fine to coarse including sandstone and siltstone.		
0.80- 1.00	B						0.80	41.07
0.80	D							
1.00	ES							
						Firm reddish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse including siltstone, sandstone and occasional coal.		
1.20- 1.65	U78	(DRY)						
						Below 1.70m, stiff, brown.		
1.70- 2.00	B							
1.70	D							
1.70- 2.15	D	(DRY)			S32			
2.00	ES							
2.35	D							
2.50- 3.00	B						2.50	39.37
2.50	D					Very dense reddish brown fine to coarse SAND (possibly weathered sandstone).		
2.50- 2.93	D	2.40 (DRY)			S50/ 280			
3.30	D							
3.50	D						3.50	38.37
3.50- 3.61	D	3.50 (DRY)			S50/65	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).		
4.00- 4.50	B							
4.00	D							
4.50- 4.60	D	4.10 (DRY)			S50/35			
5.00	D							

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
6.00	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			10/06/15	08:00
3.60	3.30	DRY	10/06/15	18:00
3.60	3.30	DRY	11/06/15	08:00
6.00	4.40	DRY	11/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 3.50m and 5.90m.
Backfill details from base of hole: bentonite grout up to 3.50m, arisings up to ground level.
Chiselling: 5.70-5.90m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**

Engineer **COFFEY GEOTECHNICS**

Borehole **BH06/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**

National Grid Coordinates **385726.4** E **394089.6** N

Ground Level **41.87** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.50- 5.61	D	4.40 (DRY)			S50/30				
5.90- 6.00		4.40 (DRY)			C50/35				
						End of Borehole	6.00		35.87

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BH06/2
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385690.1 E 394289.6 N	Ground Level	44.49 m OD

Scale 1:25

Sampling			Properties		Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description	Depth	Legend	Level m OD
						G.L.		44.49
					MADE GROUND: Black Tarmacadam.	0.05		44.44
0.20	ES				MADE GROUND: Light yellowish brown slightly sandy clayey angular to subangular fine to coarse gravel of limestone and sandstone.	0.15		44.34
0.50	ES				MADE GROUND: Dark greyish brown clayey gravelly fine to coarse sand with a medium cobble content of brick. Gravel is angular to subangular fine to coarse including sandstone, siltstone, quartz, slate and broken brick. At 0.80m, concrete obstruction.			
0.80	ES				End of Borehole	0.80		43.69

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
0.80	0.40	Inspection Pit		G.L. 0.80			16/06/15 16/06/15	08:00 09:00						None encountered.

Remarks

Inspection pit hand excavated to 0.80m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
The Trial Pit was terminated at 0.80m depth on encountering a concrete obstruction.
Backfill details from base of hole: arisings up to 0.50m, concrete up to 0.10m, tarmacadam up to ground level.

Logged by PC

Figure 1 of 1

11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole / Project No	BH07/1A / PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	386056.4 E, 394284 N	Ground Level	44.58 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.58
						Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to medium sand. Gravel is angular to subangular fine of sandstone. Some rootlets	0.20		44.38
0.20- 0.50	B								
0.20	ES						0.30		44.28
						MADE GROUND: Dark greyish brown clayey gravelly fine to coarse sand with ash. Gravel is angular to subangular fine to coarse including brick fragments, siltstone and sandstone.			
0.50- 1.20	B						0.50		44.08
0.50	ES								
						MADE GROUND: Soft greyish brown mottled orange slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse including brick fragments, siltstone and sandstone.			
1.00	ES					Firm to stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to medium of siltstone, sandstone and occasional coal.			
1.20- 1.65	U64	(DRY)	73	19		At 1.20m, medium strength			
1.70	D								
1.80	D								
2.00- 2.45	B					Below 2.00m, occasional grey mottling.			
2.00- 2.45	D	1.70 (DRY)			S15				
2.80	D								
3.00- 3.45	B					Below 3.00m, very stiff, light brown.			
3.00- 3.45	D	3.00 (DRY)			S34				
							3.70		40.88
						Very dense reddish brown clayey fine to coarse SAND (possibly weathered sandstone).			
3.80	D								
4.00- 4.45	B								
4.00- 4.17	D	4.00 (DRY)			S50/62				
4.80	D						4.80		39.78
						Extremely weak reddish brown fine to medium grained SANDSTONE.			
5.00- 5.15		4.70 (3.90)			C50/58				

Boring / Progress / Groundwater

Boring Depth	Hole Dia	Technique	Crew	Progress Depth of Hole	Depth Cased	Depth to Water	Date	Time	Groundwater Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.50	Inspection Pit	SL/AR	G.L.			28/05/15	11:00						None encountered.
5.15	0.15	Cable Percussion	SL/AR	5.15	4.70	3.90	28/05/15	17:00						

Remarks (AGS)

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.00m and 5.00m.
Backfill details from base of hole: arisings up to 0.70m, gravel filter up to 0.30m, arisings up to ground level.
Chiselling: 4.75-5.00m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH07/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386056.4** E **394284** N
Ground Level **44.58** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						End of Borehole	**5.15**		**39.43**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH07/1B**
Project No **PN153349**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385779.8 E 394086.8 N**
Ground Level **41.59** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Level m OD
							G.L.	41.59
						MADE GROUND: Black Tarmacadam.		
0.10	D							
0.18- 0.35	B						0.20	41.39
0.18	D					MADE GROUND: Black mottled red sandy angular to subangular fine to coarse gravel including brick fragments, siltstone, sandstone, clinker and slate. Some ash and pockets of clay.		
0.20	ES						0.35	41.24
0.35	D					Firm light reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium including siltstone, sandstone and occasional coal. Below 0.65m, brown, sandy.		
0.40- 0.65	B							
0.50	ES							
0.65	D							
0.70- 1.00	B							
1.00	ES							
1.20- 1.65	U65	(DRY)	42	12		At 1.20m, medium strength		
							1.50	40.09
1.60- 2.00	B					Dense reddish brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is subrounded to rounded fine to medium including siltstone, sandstone and quartz.		
1.70	D							
1.70- 2.15	D	(DRY)			S41			
2.00	ES							
2.30- 2.50	D						2.30	39.29
2.50- 2.63	D	2.50 (DRY)			S50/75	Extremely weak reddish brown fine to coarse grained SANDSTONE.		
3.30	D							
3.50- 3.00	B							
3.50- 3.65	D	3.20 (DRY)			S50/95			
4.00- 4.14		3.20 (DRY)			C50/72			
							4.14	37.45
						End of Borehole		

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
4.14	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			11/06/15	08:00
4.14	3.20	DRY	11/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks (AGS)

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to 2.30m, arisings up to 0.50m, concrete up to 0.15m, tarmacadam up to ground level.
Chiselling: 3.80-4.00m for 30 minutes.

Logged by **PC**

Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BH07/2
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385719.4 E 394290.2 N	Ground Level	44.49 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.49
0.05	D					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand. Gravel is angular to subrounded fine to coarse including sandstone and brick fragments.	0.20		44.29
0.15	D								
0.20	ES								
0.30- 0.40	B					MADE GROUND: Soft dark greyish brown slightly sandy gravelly clay with a low cobble content of brick. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.			
0.50- 1.00	B								
0.50	D								
0.50	ES								
							0.80		43.69
1.00- 1.20	B					MADE GROUND: Soft greyish brown slightly sandy slightly gravelly clay. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.	1.00		43.49
1.00	D								
1.00	ES								
1.20- 1.65	U48	(DRY)	92	22		Stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium including siltstone, sandstone and occasional coal. At 1.20m, high strength			
						At 1.70m, firm.			
1.70	D								
1.70- 2.15	D	(DRY)			S12				
2.00- 2.50	B					Below 2.00m, occasional grey mottling.			
2.00	ES								
2.50- 2.95	D	2.50 (DRY)			S15				
						Below 3.40m, very stiff, brown.			
3.40	D								
3.50- 4.00	B								
3.50- 3.95	D	3.20 (DRY)			S31				
							4.10		40.39
4.15	D					Reddish brown clayey fine to coarse SAND.			
4.20- 4.50	B								
4.50	D						4.50		39.99
4.50- 4.69	D	4.50 (DRY)			S50/70	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
4.70- 5.00	B								
4.70	D								
5.00- 5.17	D	4.50 (3.60)			S50/80				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
5.48	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			17/06/15	08:00
5.48	4.50	3.20	17/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.50m and 5.50m.
Backfill details from base of hole: bentonite grout up to 4.50m, arisings up to ground level.
Chiselling: 5.15-5.40m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH07/2**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385719.4** E **394290.2** N
Ground Level **44.49** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.15- 5.40	**D**								
5.40- 5.48		**4.50 (3.70)**			**C50/35**				
						End of Borehole	**5.48**		**39.01**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH08/1B** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385611.5 E 394064.7 N** | Ground Level **40.06** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		40.06
0.05	D					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to medium including sandstone and brick fragments.	0.10		39.96
0.10	D								
0.20- 0.50	B								
0.20	ES					MADE GROUND: Brown mottled red slightly clayey sandy angular fine to coarse gravel of brick fragments, slate and sandstone with a medium cobble content of whole bricks. Some ash.			
0.50	ES								
1.00	ES								
1.20	D								
1.20- 1.47		1.20 (DRY)			C50/ 120				
							1.70		38.36
1.70- 2.00	B					Stiff to very stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse including siltstone, sandstone and occasional coal.			
1.70	D								
2.00- 2.45	D	1.85 (DRY)			S32	Below 2.00m, brown with black speckles.			
2.00	ES								
2.50	D					Below 2.50m, brown.			
2.50- 2.90	U100	2.30 (DRY)	146	16		At 2.50m, high strength			
2.90	D						2.90		37.16
2.90- 3.10	D	2.30 (DRY)			S50/ 115	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
3.00	D								
3.30- 3.60	B								
4.00- 4.24	D	3.80 (DRY)			S50/ 125				
4.60	D								
5.00- 5.27	D	4.30 (DRY)			S50/ 135				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
5.50	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/06/15	08:00
1.20		DRY	09/06/15	18:00
1.20		DRY	10/06/15	08:00
5.50	4.30	DRY	10/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 3.00m and 5.40m.
Backfill details from base of hole: bentonite grout up to 2.90m, arisings up to ground level.
Chiselling: 1.50-1.60m for 15 minutes and 5.20-5.40m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH08/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385611.5** E **394064.7** N
Ground Level **40.06** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.40- 5.50		**4.30 (DRY)**			**C50/42**	**End of Borehole**	**5.50**		**34.56**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH09/1A** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386127 E 394268.7 N** | Ground Level **44.73** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Level m OD
							G.L.	44.73
0.00- 0.40	B					Grass over TOPSOIL: Dark greyish brown clayey fine to coarse sand with many rootlets.		
0.20	ES					MADE GROUND: Soft greyish brown slightly gravelly sandy clay with rootlets. Gravel is angular to subangular fine to coarse including sandstone, quartz, brick fragments and ceramic.	0.20	44.53
0.40- 1.20	B						0.40	44.33
0.50	ES					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse including siltstone, sandstone and occasional coal.		
1.00	ES							
1.20- 1.65	D	(DRY)			S8			
1.65- 2.20	D					Below 1.70m, stiff.		
2.20- 2.65	D	2.20 (DRY)			S22	Below 2.30m, brown.		
2.65- 3.20	D							
3.20- 3.65	#	3.20			S32	Below 3.20m, very stiff.		
3.20- 3.65	B	(DRY)						
3.80	B						3.80	40.93
3.80- 4.11	D	3.80 (DRY)			S50/ 160	Very dense reddish brown slightly clayey fine to coarse SAND (possibly weather sandstone). Below 4.00m, clay absent.		
4.11- 4.80	D							
4.80- 4.98	D	4.80 (DRY)			S50/90			
5.00- 5.07	D	5.00 (DRY)			S50/30			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
5.07	0.15	Cable Percussion	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			08/06/15	08:00
3.20	3.20	DRY	08/06/15	18:00
3.20	3.20	DRY	09/06/15	08:00
5.07	5.00	DRY	09/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to ground level.
Chiselling: 4.80-5.00m for 30 minutes.

Logged by **PC**

Figure **1 of 2**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**

Engineer **COFFEY GEOTECHNICS**

Borehole **BH09/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**

National Grid Coordinates **386127** E **394268.7** N

Ground Level **44.73** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						End of Borehole	**5.07**		**39.66**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH09/1B** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385639.4 E 394054 N** | Ground Level **40.22** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		40.22
0.00- 0.15	B					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.	0.15		40.07
0.10	D								
0.15	D								
0.20- 0.50	B								
0.20	ES					MADE GROUND: Light brown clayey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse including brick fragments, siltstone, sandstone and quartz.			
0.50	ES								
1.00	ES								
1.20- 1.65		(DRY)			C13	Below 1.30m, whole bricks.			
1.30	D								
1.60- 1.80	B						1.60		38.62
1.60	D					MADE GROUND: Dark greyish brown mottled black slightly sandy slightly gravelly clay. Gravel is angular to subangular fine to coarse including brick fragments and siltstone.			
1.80	D						1.80		38.42
2.00- 2.45	D	1.80			S19	Stiff orange mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse including siltstone, sandstone and occasional coal.			
2.00	ES	(DRY)				Below 2.00m, brown.			
						Below 2.60m, low cobble content of sandstone.			
2.60	D								
2.70- 2.90	B								
2.90	D						2.90		37.32
3.00- 3.50	B					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
3.00- 3.36	D	2.80 (DRY)			S50/ 210				
3.70	D								
4.00- 4.18	D	4.00 (DRY)			S50/95				
4.40- 4.53		4.00 (DRY)			C50/65				
						End of Borehole	4.53		35.69

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
4.53	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/06/15	08:00
4.53	4.00	DRY	09/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to 2.90m, arisings up to ground level.
Chiselling: 2.60-2.65m for 10 minutes and 4.20-4.40m for 30 minutes.

Logged by **PC**

Figure **1 of 1**

11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH09/2**
Project No **PN153349**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385632.8** E **394247.8** N
Ground Level **44.30** m OD
Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						MADE GROUND: Black Tarmacadam.	G.L.		44.30
							0.10		44.20
0.20	ES					**MADE GROUND: Firm black slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse of sandstone, quartz and brick fragments.**			
0.40- 1.20	B								
0.50	ES								
1.00	ES								
1.20- 1.65	#	(DRY)			S2	**MADE GROUND: Very soft to soft greyish brown mottled black slightly sandy slightly gravelly clay with occasional pockets of sand. Gravel is angular to subangular fine to coarse of sandstone, clayware and brick fragments.**	1.20		43.10
1.20- 1.65	B								
1.65- 2.10	B	(DRY)			C6	**Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of siltstone, sandstone and occasional coal.**	1.70		42.60
2.10- 2.55	D	2.10 (DRY)			S19				
2.60- 3.50	B					**Very dense reddish brown slightly clayey fine to coarse SAND.**	2.60		41.70
2.60	D								
2.60- 2.67	D	2.60 (DRY)			S50/30				
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	3.00		41.30
3.50- 3.54		3.50 (DRY)			C50/20				
						End of Borehole	3.54		40.76

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.50	Inspection Pit	PB/DG	G.L.			18/06/15	08:00						None encountered.
3.54	0.15	Cable Percussion	PB/DG	3.54	3.50	DRY	18/06/15	18:00						

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars
Backfill details from base of hole: bentonite seal up to 3.00m, arisings up to 0.20m, concrete up to 0.10m, tarmacadam up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH10/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386077.6** E **394244.7** N
Ground Level **44.70** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.70
0.00- 0.35	B					Grass over TOPSOIL: Dark greyish brown clayey fine to coarse sand with many rootlets.			
0.20	ES								
0.35- 1.20	B						0.35		44.35
0.50	ES					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse including siltstone, sandstone and occasional coal.			
1.00	ES								
1.20- 1.65	#	(DRY)			S7				
1.20- 1.65	B								
1.65- 2.00	D								
2.00- 2.45	D	2.00 (DRY)			S12				
2.45- 2.90	U85	2.00 (DRY)							
2.90- 3.35	D	2.90 (DRY)			S26	Below 2.90m, stiff, brown.			
3.40	B						3.40		41.30
3.40- 3.85	D	3.20 (DRY)			S37	Dense reddish brown fine to coarse SAND with pockets of clay.			
4.10	B						4.10		40.60
4.10- 4.46	D	4.10 (DRY)			S50/ 210	Extremely weak reddish brown MUDSTONE with sandy pockets (recovered as sandy clay).			
4.46- 5.10	D						4.50		40.20
						Extremely weak reddish brown fine to medium grained SANDSTONE.			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
5.24	0.15	Cable Percussion	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			05/06/15	08:00
5.24	4.50	DRY	05/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to ground level.
Chiselling: 4.90-5.10m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH10/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386077.6** E **394244.7** N
Ground Level **44.70** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.10- 5.24		**4.50 (DRY)**			**C50/50**				
						End of Borehole	**5.24**		**39.46**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH10/1B** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385722 E 394033.1 N** | Ground Level **39.98** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		39.98
0.00- 0.18	B					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand with some rootlets. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.	0.15		39.83
0.05	D								
0.18	D								
0.20- 0.50	B								
0.20	ES					MADE GROUND: Grey sandy angular to subangular fine to coarse gravel including sandstone, siltstone, quartz, limestone and broken concrete.			
0.50	ES								
0.60	D								
0.70- 1.00	B					MADE GROUND: Greyish brown mottled red clayey gravelly fine to medium sand with pockets of firm clay. Gravel is angular to subangular fine to coarse including sandstone, siltstone, slate, quartz and brick fragments.	0.70		39.28
1.00	ES								
1.20- 1.63		1.20 (DRY)			C50/ 275				
1.40	D					MADE GROUND: Soft to firm dark brown mottled red and black slightly sandy gravelly clay with a low to medium cobble content of brick. Gravel is angular to subangular fine to coarse including siltstone, sandstone and brick fragments.	1.40		38.58
1.80	D								
1.90	D								
2.00- 2.45	D	1.80 (DRY)			S36	Dense reddish brown slightly silty slightly gravelly fine to coarse SAND. Gravel is rounded fine to medium of sandstone.	1.90		38.08
2.00	ES								
2.50- 2.80	B					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	2.50		37.48
2.80	D								
3.00- 3.43	D	3.00 (DRY)			S50/ 275				
3.70	D								
4.00- 4.37	D	3.80 (DRY)			S50/ 220				
4.60	D								
5.00- 5.20	D	4.10 (DRY)			S50/ 100				

Boring Progress

Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time
1.20	0.40	Inspection Pit	NT/CT	G.L.			10/06/15	08:00
5.63	0.15	Cable Percussion	NT/CT	5.63	4.10	DRY	10/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.00m and 5.50m.
Backfill details from base of hole: bentonite grout up to 2.50m, arisings up to ground level.
Chiselling: 1.60-1.70m for 15 minutes and 5.35-5.55m for 30 minutes.

Logged by **PC**

Figure **1 of 2**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH10/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385722** E **394033.1** N
Ground Level **39.98** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.50- 5.63		**4.10 (DRY)**			**C50/45**	**End of Borehole**	**5.63**		**34.35**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole / Project No	BH11/1A / PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	386102.7 E, 394244.4 N	Ground Level	44.87 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.87
0.10	D					Grass over TOPSOIL: Dark greyish brown clayey fine to coarse sand with many rootlets.			
							0.20		44.67
0.20- 0.35	B					MADE GROUND: Dark greyish brown slightly gravelly clayey fine to coarse sand with pockets of clay. Gravel is angular to subangular fine to coarse including siltstone and sandstone. Some rootlets.			
0.20	ES								
0.30	D						0.35		44.52
0.35	D								
0.40- 0.80	B								
0.50	ES					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium including siltstone, sandstone and occasional coal.			
0.85	D								
0.90- 1.20	B								
1.00	ES								
1.20- 1.65	D	1.20 (DRY)			S11				
1.80	D								
2.00- 2.45	D	1.70 (DRY)			S18	Below 2.00m, stiff.			
2.00	ES								
2.50- 2.80	U100	2.50 (DRY)							
2.80	D								
3.00- 3.50	B					Below 3.00m, very stiff, brown.			
3.00- 3.45	D	3.00 (DRY)			S35				
3.80	D								
4.00- 4.40	B						4.00		40.87
4.00	D					Extremely weak reddish brown MUDSTONE (recovered as clay).			
4.00- 4.45	D	3.90 (DRY)			S35				
4.80- 5.00	B			10					
4.80	D								
5.00- 5.29	D	4.70 (DRY)			S50/ 140				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
6.25	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			08/06/15	08:00
6.52	4.70	DRY	08/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks (AGS)

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to ground level.
Chiselling: 2.90-3.00m for 15 minutes and 6.20-6.40m for 30 minutes.

Logged by PC

Figure 1 of 2

11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH11/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386102.7** E **394244.4** N
Ground Level **44.87** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.80	**D**								
6.00- 6.17	**D**	**4.70 (DRY)**			**S50/55**	**Below 6.00m, sandy.**			
6.40- 6.52		**4.70 (DRY)**			**C50/50**				
						End of Borehole	**6.52**		**38.35**

Boring

Depth	Hole Dia	Technique	Crew

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH11/2** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385761.6 E, 394259.4 N** | Ground Level **44.74** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.74
0.10- 0.90	B					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand. Gravel is subangular to subrounded fine to coarse including sandstone, siltstone and quartz.	0.10		44.64
0.20	ES								
0.50	ES					MADE GROUND: Dark greyish brown gravelly fine to medium sand with pockets of firm clay. Gravel is angular to subangular fine to coarse of siltstone, sandstone, brick fragments.			
0.90- 1.20	B						0.90		43.84
1.00	ES					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium including sandstone, siltstone and occasional coal.			
1.20- 1.65	B								
1.20- 1.65	D	(DRY)			S10				
1.80	D								
2.00- 2.45	D	1.70 (DRY)			S12	Below 2.00m, brown.			
							2.60		42.14
2.80	D					Reddish brown fine to coarse SAND with pockets of clay.			
3.00- 3.29	D	3.00 (DRY)			S50/ 138		3.00		41.74
3.80	D					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as fine to coarse sand).			
4.00- 4.13	B	3.00 (2.70)			C50/58				
4.80	D								
5.00- 5.11	B	3.00 (3.20)			C50/34				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
5.68	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			18/06/15	08:00
5.68	3.00	3.50	18/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars
Backfill details from base of hole: bentonite grout up to 3.00m, arisings up to ground level.
Chiselling: 5.30-5.50m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH11/2**
Project No **PN153349**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385761.6** E **394259.4** N
Ground Level **44.74** m OD
Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.60- 5.68		3.00 (3.50)			C50/30				
						End of Borehole	5.68		39.06

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BH12/1A
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	386127.9 E 394243 N	Ground Level	44.89 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.89
0.10	D					Grass over TOPSOIL: Dark greyish brown clayey fine to coarse sand with many rootlets.			
0.10- 0.40	D						0.20		44.69
0.20	ES					MADE GROUND: Dark greyish brown clayey fine to coarse sand with pockets of clay. Some rootlets.			
0.40- 0.75	B						0.40		44.49
0.40	D					Soft to firm reddish brown slightly sandy slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded fine to coarse including sandstone, siltstone and occasional coal.			
0.50	ES								
0.75	D								
0.80- 1.20	B								
1.00	ES								
1.20- 1.65	D	1.20 (DRY)			S9				
1.80	D								
2.00- 2.45	D	1.80 (DRY)			S18	Below 2.00m, stiff.			
2.00	ES								
2.80- 3.10	B								
2.80	D								
3.00- 3.45	D	2.90 (DRY)			S34	Below 3.00m, very stiff, brown.			
						Below 3.70m, sandy.			
3.70	D								
3.90- 4.30	B						3.90		40.99
3.90	D					Extremely weak reddish brown MUDSTONE (recovered as clay).			
4.00- 4.42	D	3.80 (DRY)			S50/ 265				
						Below 4.60m, sandy.			
4.60	D								
4.70- 5.00	B								
5.00- 5.31	D	4.50 (DRY)			S50/ 155	Below 5.00m, thin beds of sandstone.			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
6.56	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			08/06/15	08:00
5.31	4.50	DRY	08/06/15	18:00
5.31	4.50	DRY	09/06/15	08:00
6.56	4.50	DRY	09/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to ground level.
Chiselling: 6.15-6.40m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH12/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386127.9** E **394243** N
Ground Level **44.89** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.70	D								
6.00- 6.15	D	4.50 (DRY)			S50/70				
6.40- 6.56		4.50 (DRY)			C50/90				
						End of Borehole	6.56		38.33

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole / Project No	BH12/1B / PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385656.4 E, 394019.1 N	Ground Level	39.82 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		39.82
0.00- 0.50	B					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand with some rootlets. Gravel is angular to subrounded fine including sandstone and brick fragments.	0.10		39.72
0.20	ES								
						MADE GROUND: Medium dense dark brown mottled red slightly clayey gravelly fine to coarse sand with a medium cobble content of brick. Gravel is angular to subangular fine to coarse including siltstone, sandstone, slate, quartz and brick fragments.			
0.50- 1.20	B								
0.50	ES								
1.00	ES								
1.20- 1.65	B								
1.20- 1.65		(DRY)			C15				
1.80	D								
2.00- 2.45	B								
2.00- 2.45		1.70 (DRY)			C12				
							2.20		37.62
2.30	ES					MADE GROUND: Medium dense dark reddish brown slightly sandy clayey angular to subangular fine to coarse gravel of sandstone, siltstone and brick fragments. Some ash.			
							2.60		37.22
2.80	D					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
3.00- 3.45	B								
3.00- 3.45	D	3.00			S27				
3.00	ES	(DRY)							
3.80	D								
4.00- 4.45	B								
4.00- 4.41		4.00 (2.20)			C50/ 262				
							4.70		35.12
4.80	D					Extremely weak reddish brown MUDSTONE.			
							4.90		34.92
5.00- 5.45	B					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
6.60	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			10/06/15	08:00
6.60	4.70	3.20	10/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 3.00m and 6.50m.
Backfill details from base of hole: bentonite grout up to 2.60m, arisings up to ground level.
Chiselling: 6.30-6.50m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH12/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385656.4** E **394019.1** N
Ground Level **39.82** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.00- 5.12		4.70 (2.70)			C50/48				
6.00	D								
6.50- 6.60		4.70 (3.20)			C50/44				
						End of Borehole	6.60		33.22

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH12/2** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385807.1** E **394249.5** N | Ground Level **44.52** m OD

Scale 1:25

Sampling: Depth	Sample Type	Depth Cased & (to Water)	Properties: Strength kPa	w %	SPT N	Strata: Description	Depth	Legend	Level m OD
							G.L.		44.52
0.00- 0.25	B					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand. Gravel is subangular to subrounded fine to coarse including siltstone, sandstone and quartz.			
0.10	D						0.20		44.32
0.20	ES								
0.25	D								
0.30- 0.60	B					MADE GROUND: Dark brown and black sandy angular to subangular fine to coarse gravel of broken brick, slag, clinker, sandstone, siltstone and slate. Some ash.			
0.50	ES								
							0.70		43.82
0.70	D					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse including siltstone, sandstone and occasional coal.			
0.75- 0.95	B								
0.95	D								
1.00- 1.20	B								
1.00	ES								
1.20- 1.65	U65	1.20 (DRY)							
						Below 1.70m, stiff.			
1.70	D								
1.70- 2.15	D	1.20 (DRY)			S21				
2.00	ES								
2.10	D								
2.20- 2.50	B								
						Below 2.40m, brown mottled black.			
2.50- 2.95	D	2.30 (DRY)			S33	Below 2.50m, very stiff. Gravel is fine to medium.			
						Below 2.80m, pockets of fine to coarse sand.			
							3.20		41.32
3.20- 3.50	B					Very dense reddish brown clayey fine to coarse SAND.			
3.20	D								
3.50- 3.72	D	3.10 (DRY)			S50/90				
4.00- 4.50	B					Below 4.00m, clay absent.			
4.00	D								
							4.10		40.42
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
4.50- 4.61	D	4.10 (DRY)			S50/40				
4.50- 5.00	D								
5.00- 5.08		4.10 (DRY)			C50/35				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
5.08	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			15/06/15	08:00
5.08	4.10	DRY	15/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to 4.10m, arisings up to ground level.
Chiselling: 4.80-5.00m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**

Engineer **COFFEY GEOTECHNICS**

Borehole **BH12/2**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**

National Grid Coordinates **385807.1** E **394249.5** N

Ground Level **44.52** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						End of Borehole	**5.08**		**39.44**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH14/1B** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385784.7 E 393970.5 N** | Ground Level **40.14** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		40.14
0.00- 0.50	B					Grass over TOPSOIL: Dark greyish brown clayey fine to coarse sand with many rootlets.			
							0.20		39.94
0.20	ES					MADE GROUND: Soft dark greyish brown mottled orange slightly sandy slightly gravelly clay with pockets of orange sand. Gravel is angular to subangular fine to coarse including slate, brick fragments, sandstone and occasional coal.			
0.50- 1.20	B						0.50		39.64
0.50	ES					MADE GROUND: Soft brown mottled dark grey slightly gravelly sandy clay. Gravel is angular to subangular fine to coarse including brick fragments, sandstone and siltstone (old topsoil).			
1.00	ES								
							1.10		39.04
1.20- 1.65	B					Firm light brown slightly sandy CLAY.			
1.20- 1.65	D	(DRY)			S4				
1.70	D								
1.80- 2.25	U46	1.70 (DRY)							
2.30	D					Below 2.30m, slightly gravelly, sandy. Gravel is subangular to subrounded fine to medium.			
2.35	ES								
2.50- 3.00	B								
							2.60		37.54
2.70	D					Very dense light yellowish brown slightly gravelly fine to coarse SAND with pockets of clay. Gravel is subangular to subrounded fine to medium of sandstone.			
3.00- 3.45	B					Below 3.00m, reddish brown, gravel absent.			
3.00- 3.29	D	3.00 (DRY)			S50/ 142				
3.80	D						3.80		36.34
4.00- 4.45	B					Extremely weak reddish brown fine to coarse grained SANDSTONE.			
4.00- 4.25		4.00 (2.90)			C50/ 113				
4.80	D								
5.00- 5.45	B								

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
8.05	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/06/15	08:00
7.67	6.00	4.20	09/06/15	18:00
7.67	6.00	DRY	10/06/15	08:00
8.05	6.00	DRY	10/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 3.00m and 7.60m.
Backfill details from base of hole: bentonite grout up to 3.80m, arisings up to ground level.
Chiselling: 4.80-5.00m for 30 minutes and 5.70-5.80m for 20 minutes and 7.40-7.60m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH14/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385784.7** E **393970.5** N
Ground Level **40.14** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.00- 5.09		4.70 (3.30)			C50/29				
6.00	D								
6.50- 6.95	B								
6.50- 6.57		6.00 (3.70)			C50/26				
7.60- 8.05	B								
7.60	D								
7.60- 7.67		6.00 (3.70)			C50/27				
						End of Borehole	8.05		32.09

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH14/2** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385687.5 E** **394215.9 N** | Ground Level **44.42** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.42
						MADE GROUND: Black Tarmacadam.			
0.10	D						0.10		44.32
0.15	D					**MADE GROUND: Light yellow slightly clayey gravelly medium to coarse sand. Gravel is angular to subangular fine to coarse of limestone and sandstone.**			
0.20- 0.45	B								
0.20	ES								
							0.45		43.97
0.45- 0.80	B					**MADE GROUND: Soft greyish brown slightly gravelly sandy clay. Gravel is angular to subangular fine to medium of brick, sandstone and siltstone.**			
0.45	D								
0.50	ES								
0.80	D						0.80		43.62
0.90- 1.20	B					**MADE GROUND: Very soft to soft brown slightly gravelly clay. Gravel is angular to subangular fine to coarse of brick and sandstone.**	0.90		43.52
1.00	ES								
1.20- 1.65	U59	(DRY)		18		**Stiff light reddish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of siltstone, sandstone and occasional coal.**			
							1.60		42.82
1.70	D					**Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).**			
1.70- 2.15	D	1.20			S38				
1.80- 2.20	B	(DRY)							
2.00	ES								
2.50- 2.67	D	2.40 (DRY)			S50/65				
2.70	D								
2.70- 3.00	D								
3.00- 3.25	D								
3.00- 3.08		2.40 (DRY)			C50/30				
3.25- 3.31		2.40 (DRY)			C50/25				
						End of Borehole	3.31		41.11

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
3.31	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			17/06/15	08:00
3.31	2.40	DRY	17/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to 1.60m, arisings up to ground level.
Chiselling: 3.05-3.25m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH15/1A** / **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386132.8 E, 394210.8 N** | Ground Level **44.99** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.99
						Grass over TOPSOIL: Dark greyish brown clayey fine to coarse sand with many rootlets.	0.15		44.84
0.20- 0.70	B					MADE GROUND: Dark greyish brown clayey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse including brick, sandstone and siltstone.			
0.20	ES								
0.50	ES						0.50		44.49
0.70- 1.20	B					Firm to stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY with occasional lenses of sand. Gravel is angular to subangular fine to medium of siltstone, sandstone and coal. Between 0.80m and 1.60m, black speckles.			
1.00	ES								
1.20- 1.65	U63	(DRY)	112	18		At 1.20m, high strength			
1.70	D								
1.80- 2.25	B								
1.80	D								
1.80- 2.25	D	1.70 (DRY)			S15				
						Below 2.30m, stiff to very stiff, brown. Gravel is angular to subangular fine to medium of coal and sandstone.			
2.80	D								
3.00- 3.45	B								
3.00- 3.45	D	3.00 (DRY)			S45				
						Dense reddish brown slightly clayey fine to coarse SAND.	3.30		41.69
						Extremely weak reddish brown MUDSTONE.	3.50		41.49
3.80	D								
4.00- 4.45	B								
4.00- 4.38	D	4.00 (DRY)			S50/ 225				
4.80	D								
5.00- 5.45	B								

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	SL/AR
6.66	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			27/05/15	08:00
6.66	4.70	DRY	27/05/15	15:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
At 0.40m, white ducting pipe with 200mm of pea gravel above. Pit extended northward and borehole continued.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to 3.52m, arisings up to ground level.
Chiselling: 6.30-6.50m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH15/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386132.8** E **394210.8** N
Ground Level **44.99** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.00- 5.24		**4.70 (DRY)**			**C50/ 101**				
6.00	**D**								
6.50- 6.66		**4.70 (DRY)**			**C50/58**				
						End of Borehole	**6.66**		**38.33**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BH15/2
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385727 E 394222.3 N	Ground Level	44.50 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		44.50
0.00- 0.18	B					Grass over TOPSOIL: Dark brown slightly gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.	0.10		44.40
0.10	D								
0.18	D								
0.20- 0.40	B								
0.20	ES								
						MADE GROUND: Dark greyish brown slightly gravelly clayey fine to medium sand with pockets of clay. Gravel is angular to subangular fine to coarse including siltstone, sandstone, quartz and brick fragments.	0.45		44.05
0.45	D								
0.50- 0.80	B								
0.50	ES								
						Firm reddish brown mottled grey slightly gravelly sandy CLAY. Gravel is angular to subangular fine to coarse including siltstone, sandstone and occasional coal. Below 0.80m, slightly sandy.			
0.80	D								
0.90- 1.20	B								
1.00	ES								
1.20- 1.65	U63	(DRY)							
						Below 1.70m, stiff, brown mottled black.			
1.70	D								
1.70- 2.15	D	(DRY)			S19				
						Below 1.90m, mottling absent.			
1.90	D								
2.00- 2.30	B								
2.00	ES								
2.30	D						2.30		42.20
						Very dense reddish brown slightly clayey fine to coarse SAND.			
2.50- 3.00	B								
2.50- 2.84	D	2.50 (DRY)			S50/ 185				
3.00	D								
3.50- 3.71	D	3.40 (DRY)			S50/95		3.50		41.00
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
4.00- 4.50	B								
4.00	D								
4.50- 4.61	D	4.00 (3.30)			S50/45				
4.60- 4.80	D								
4.80- 4.90		4.00 (4.20)			C50/50				
						End of Borehole	4.90		39.60

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
4.90	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			16/06/15	08:00
4.90	4.00	4.20	16/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

AGS

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 3.70m and 4.80m.
Backfill details from base of hole: bentonite grout up to 3.50m, arisings up to ground level.
Chiselling: 4.60-4.80m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 1

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH16/1A** / **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385888.9 E, 394338 N** | Ground Level **44.38** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						MADE GROUND: Black Tarmacadam.	G.L.		44.38
0.15	D						0.15		44.23
0.20- 0.45	B					**MADE GROUND: Light yellowish brown mottled white and black sandy angular to subangular fine to coarse gravel including broken concrete, tarmacadam and sandstone.**	0.20		44.18
0.20	ES						0.20		44.18
0.25	D								
0.40- 0.70	B						0.45		43.93
0.45	D					**MADE GROUND: Light greyish brown slightly clayey sandy angular to subangular fine to coarse gravel including siltstone, limestone and sandstone.**			
0.50	ES						0.70		43.68
0.70- 0.95	B								
0.70	D					**MADE GROUND: Black slightly sandy angular to subangular fine to coarse gravel of clinker. Some ash.**			
0.95- 1.20	B								
0.95	D					**MADE GROUND:Firm dark greyish brown slightly sandy slightly gravelly clay. Gravel is angular to subangular fine to coarse including brick fragments, siltstone and sandstone. Slight hydrocarbon odour.**			
1.00	ES								
1.20- 1.65	D	(DRY)			S9				
1.40	D					**Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY with lenses of sand. Gravel is angular to subangular fine to coarse of siltstone, sandstone and occasional coal.**			
1.70- 2.00	B								
1.80	D								
2.00- 2.45	D	1.80			S16	**Below 2.00m, stiff.**			
2.00	ES	(DRY)							
2.50- 2.95	U74	1.80 (DRY)							
3.00	D					**Below 3.00m, very stiff, brown.**			
3.00- 3.45	D	3.00 (DRY)			S33				
3.20	D								
3.30- 3.60	B								
3.80	D								
4.00- 4.35	D	3.70 (DRY)			S50/ 200				
							4.30		40.08
						Very dense reddish brown slightly clayey fine to coarse SAND.			
4.50- 5.00	B								
4.50	D								
5.00- 5.12	D	4.90 (DRY)			S50/45		5.00		39.38

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
5.30	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			09/06/15	08:00
5.30	4.90	DRY	09/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to 0.50m, concrete up to 0.15m, tarmacadam up to ground level.
Chiselling: 5.10-5.25m for 20 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH16/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385888.9** E **394338** N
Ground Level **44.38** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.25- 5.30		4.90 (DRY)			C50/25	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	5.00		39.38
						End of Borehole	5.30		39.08

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH16/2** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385782.3 E 394226.3 N** | Ground Level **44.48** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
							G.L.		44.48
0.00- 0.25	B					Grass over TOPSOIL: Dark greyish brown clayey gravelly fine to coarse sand with rootlets. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.	0.10		44.38
0.10	D								
0.20	ES						0.25		44.23
0.25- 0.55	B					MADE GROUND: Dark greyish brown clayey gravelly fine to coarse sand with a low cobble content. Gravel is angular to subangular fine to coarse including sandstone, siltstone, quartz and brick fragments.			
0.25	D								
0.50	ES								
0.55	D								
0.70- 1.00	B					Firm reddish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse including siltstone, sandstone and occasional coal.			
1.00	ES								
1.05- 1.20	B								
1.05	D								
1.20- 1.65	U75	1.20 (DRY)							
						Below 1.70m, stiff, brown.			
1.70	D								
1.70- 2.15	D	1.20 (DRY)			S24				
2.00- 2.50	B								
2.00	ES								
2.50- 2.80	D	2.40 (DRY)			S50/ 145	Very dense reddish brown slightly clayey fine to coarse SAND with pockets of firm brown clay.	2.50		41.98
						Below 2.80m, very clayey.			
2.80	D								
3.00- 3.40	B								
3.40	D						3.40		41.08
3.50- 3.70	D	3.40 (DRY)			S50/90	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
3.60- 4.00	B								
4.00	D								
4.50- 4.60	D	3.70 (DRY)			S50/35				
4.50- 4.65	D								
4.65- 4.71		3.70 (DRY)			C50/25		4.71		39.77
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
4.71	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			15/06/15	08:00
4.71	3.70	DRY	15/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to 3.40m, arisings up to ground level.
Chiselling: 4.50-4.65m for 30 minutes.

Logged by **PC**

Figure **1 of 1**

11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole / Project No	BH17/1A / PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385921.5 E, 394340.9 N	Ground Level	44.44 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Level m OD
							G.L.	44.44
0.10- 0.50	B					MADE GROUND: Black Tarmacadam.	0.10	44.34
0.20	ES					MADE GROUND: Light yellow mottled white slightly silty slightly sandy angular to subangular fine to coarse gravel of limestone and sandstone.		
0.50- 0.80	B						0.50	43.94
0.50	ES					MADE GROUND: Soft dark greyish brown slightly sandy slightly gravelly clay with ash. Gravel is subangular to rounded fine to coarse including brick fragments, siltstone and sandstone. Slight hydrocarbon odour.		
0.80- 1.20	B						0.80	43.64
1.00	ES					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium including siltstone, sandstone and occasional coal.		
1.20- 1.65	B							
1.20- 1.65	D	(0.80)			S9			
1.70- 2.15	U47	1.70 (DRY)	84	21		Below 1.70m, stiff. At 1.70m, high strength		
2.20- 2.65	B							
2.20	D							
2.20- 2.65	D	1.70 (DRY)			S19			
2.80	D							
3.00- 3.45	B					Below 3.00m, brown.		
3.00- 3.45	D	3.00 (DRY)			S21			
3.80	D							
4.00- 4.45	B							
4.00- 4.33	D	4.00 (DRY)			S50/ 176			
							4.10	40.34
						Very dense reddish brown fine to coarse SAND (possibly weathered sandstone).		
4.80	D							
5.00- 5.45	B							

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	SL/AR
5.13	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			01/06/15	15:00
0.30		DRY	01/06/15	17:00
0.30		WET	02/06/15	08:00
5.13	4.70	3.90	02/06/15	13:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
0.80				1.20	No rise.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.10m and 5.20m.
Backfill details from base of hole: arisings up to 1.00m, bentonite seal up to 0.50m, concrete up to 0.30m, tarmacadam up to ground level.
Chiselling: 2.70-2.80m for 30 minutes and 5.00-5.20m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH17/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385921.5** E **394340.9** N
Ground Level **44.44** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.00- 5.13		**4.70 (3.90)**			**C50/57**	**End of Borehole**	**5.13**		**39.31**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH18/1A** / **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385959.9 E, 394344 N** | Ground Level **44.45** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Level m OD
							G.L.	44.45
0.10- 0.60	B					MADE GROUND: Black Tarmacadam.	0.10	44.35
0.20	ES					MADE GROUND: White mottled light yellow slightly sandy angular to subangular fine to coarse gravel including sandstone, quartz, limestone, tarmacadam and brick fragments.	0.25	44.20
0.60- 1.00	B					MADE GROUND: Light greyish brown sandy angular to subangular fine to coarse gravel including sandstone, siltstone, slag, brick fragments and ceramic. Some plastic	0.60	43.85
0.60	ES						0.80	43.65
1.00- 1.20	B			28		MADE GROUND: Black gravelly fine to coarse sand with ash. Gravel is angular to subangular fine to coarse including clinker and occasional brick fragments.	1.00	43.45
1.00	ES							
1.20- 1.65	B					MADE GROUND: Black slightly sandy angular to subangular fine to coarse gravel of clinker. Some ash.		
1.20- 1.65	D	(1.00)			S1			
						MADE GROUND: Soft to firm reddish brown mottled grey slightly sandy slightly gravelly clay with ash. Gravel is angular to subrounded fine to coarse including siltstone, sandstone, coal, clayware and brick fragments.		
1.80	D							
2.00- 2.45	B							
2.00- 2.45	D	1.70			S0/450			
2.00	ES	(1.90)						
2.80	D							
3.00- 3.45	B							
3.00- 3.45	D	3.00			S22			
3.00	ES	(2.10)					3.10	41.35
						Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium including siltstone, sandstone and coal.		
3.80	D							
4.00- 4.45	B					Below 4.00m, very stiff.		
4.00- 4.41	D	4.00 (3.70)			S50/ 255			
4.00	ES							
							4.60	39.85
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).		
4.80	D							
5.00- 5.45	B							

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	SL/AR
5.72	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			01/06/15	08:00
5.72	4.70	4.10	01/06/15	15:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.00					No rise.
2.60	2.00	2.10	20		Fast inflow.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite seal up to 3.00m, arisings up to 0.40m, concrete up to 0.20m, tarmacadam up to ground level.
Chiselling: 5.45-5.60m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH18/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385959.9** E **394344** N
Ground Level **44.45** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.00- 5.16		**4.70 (3.70)**			**C50/67**				
5.60- 5.72		**4.70 (4.10)**			**C50/58**				
						End of Borehole	**5.72**		**38.73**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH18/2** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385695.9 E 394183 N** | Ground Level **43.41** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		43.41
0.10- 0.40	B					MADE GROUND: Black Tarmacadam.	0.10		43.31
0.20	ES					MADE GROUND: Light yellow mottled white slightly clayey sandy angular to subangular fine to coarse gravel of limestone.	0.40		43.01
0.50- 1.20	B					Firm reddish brown mottled grey with occasional black speckles slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of siltstone, sandstone and occasional coal.			
0.50	ES								
1.00	ES								
1.20- 1.65	B						1.20		42.21
1.20- 1.64	D	(DRY)			S50/ 293	Very dense reddish brown slightly clayey fine to coarse SAND.			
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	1.40		42.01
1.80	D								
2.00- 2.45	B								
2.00- 2.10		1.70 (1.50)			C50/38				
2.50- 2.58		1.70 (1.70)			C50/31				
						End of Borehole	2.58		40.83

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	SL/AR
2.58	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			17/06/15	08:00
2.58	1.70	1.70	17/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 1.50m and 2.50m.
Backfill details from base of hole: bentonite seal up to 1.40m, arisings up to 0.50m, concrete up to 0.15m, tarmacadam up to ground level.
Chiselling: 2.30-2.50m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BH19/2
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385623.9 E 394144.4 N	Ground Level	42.43 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		42.43
0.00- 0.50	B					Grass over TOPSOIL: Dark greyish brown slightly clayey fine to medium sand with many rootlets.	0.10		42.33
0.20	ES					MADE GROUND: Dark greyish brown slightly clayey slightly gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse including sandstone and siltstone.	0.30		42.13
0.50- 1.20	B					Firm reddish brown mottled grey and black slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse including siltstone, sandstone and occasional coal.			
0.50	ES								
1.00	ES								
1.20- 1.65	B								
1.20- 1.65	D	(DRY)			S11				
						Below 1.50m, stiff, brown, occasional rootlets.			
1.70- 2.15	U78	(DRY)		17					
2.20	D						2.20		40.23
2.20- 2.41	D	(DRY)			S50/72	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
2.80	D								
3.00- 3.45	B								
3.00- 3.26		3.00 (1.90)			C50/ 113				
3.80	D								
4.00- 4.13		4.00 (2.50)			C50/53				
4.30	D								
4.80	D								
5.00- 5.11		4.70 (2.90)			C50/49				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
5.70	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			15/06/15	08:00
3.50	3.00	1.90	15/06/15	18:00
3.50	3.00	2.50	16/06/15	08:00
5.70	4.70	2.60	16/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 2.30m and 5.60m.
Backfill details from base of hole: bentonite grout up to 2.20m, arisings up to ground level.
Chiselling: 5.40-5.60m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH19/2**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385623.9** E **394144.4** N
Ground Level **42.43** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.30	**D**								
5.60- 5.70		**4.70 (2.60)**			**C50/38**				
						End of Borehole	**5.70**		**36.73**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH20/2** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385689.2 E, 394140.7 N** | Ground Level **42.92** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		42.92
0.00- 0.70	B					Grass over TOPSOIL: Dark greyish brown clayey fine sand bounded by rootlets.	0.10		42.82
0.20	ES					MADE GROUND: Dark greyish brown slightly clayey gravelly fine to coarse sand with a low to medium cobble content of brick. Gravel is angular to subangular fine to coarse of sandstone, siltstone, quartzite and brick fragments. With ash.			
0.50	ES								
0.70- 1.20	B					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of sandstone, siltstone and occasional coal.	0.70		42.22
1.00	ES								
1.20- 1.65	B								
1.20- 1.65	D	(DRY)			S13				
1.70- 2.15	U83	1.70 (DRY)							
						Very dense reddish brown slightly clayey fine to coarse SAND.	2.00		40.92
2.20	D								
2.20- 2.34	D	1.70 (DRY)			S50/63	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	2.30		40.62
2.80	D								
3.00- 3.16		3.00			C50/53				
3.03- 3.45	B	(1.80)							
3.80	D								
4.00- 4.10		3.00 (2.10)			C50/46				
4.30	D								
4.50- 4.58		3.00 (2.60)			C50/28				
						End of Borehole	4.58		38.34

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
4.58	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			17/06/15	08:00
4.58	3.00	2.60	17/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 2.30m and 4.50m.
Backfill details from base of hole: bentonite grout up to 2.00m, arisings up to 0.50m, concrete up to 0.15m, tarmacadam up to ground level.
Chiselling: 4.30-4.50m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH21/2** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385744.8** E **394156** N | Ground Level **43.85** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		43.85
0.05	D					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand with many rootlets. Gravel is angular to subangular fine to coarse including brick fragments and sandstone.			
0.15	D						0.15		43.70
0.20- 0.50	B					MADE GROUND: Dark greyish brown clayey gravelly fine to coarse sand with occasional rootlets. Gravel is angular to subangular fine to coarse including brick fragments. Some plastic.			
0.20	ES								
0.50	ES								
0.85	D						0.85		43.00
0.90- 1.10	B					Soft to firm light brown slightly sandy CLAY with rootlets. Below 1.10m, gravelly. Gravel is subangular to subrounded fine to coarse including sandstone and siltstone.			
1.00	ES								
1.10- 1.40	B								
1.10	D								
1.20- 1.65	U65	(DRY)							
							1.70		42.15
1.70- 2.20	B					Medium dense reddish brown slightly clayey fine to coarse SAND.			
1.70	D								
1.70- 2.15	D	(DRY)			S21				
2.00	ES								
						Below 2.35m, clay absent.			
2.35	D								
2.50- 2.60	D	2.40			S50/35				
2.55	D	(DRY)					2.55		41.30
2.60- 3.00	B					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand). At 2.70m, bed of extremely weak reddish brown mudstone up to 100mm thick.			
3.30	D								
3.50- 3.68		3.20 (DRY)			C50/80				
4.00	D								
4.50- 4.60	D	4.30 (DRY)			S50/35				
4.80	D								

Boring Progress

Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time
1.20	0.40	Inspection Pit	NT/CT	G.L.			11/06/15	08:00
6.05	0.15	Cable Percussion	NT/CT	6.05	4.30	DRY	11/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks (AGS)

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: bentonite grout up to 2.55m, arisings up to ground level.
Chiselling: 5.70-5.90m for 30 minutes.

Logged by **PC**

Figure **1 of 2**

11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH21/2**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385744.8** E **394156** N
Ground Level **43.85** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.50- 5.64		4.30 (DRY)			C50/55				
5.70- 5.90	D								
5.90- 6.05		4.30 (DRY)			C50/70				
						End of Borehole	6.05		37.80

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH22/2** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385770.7 E, 394166.5 N** | Ground Level **43.64** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		43.64
0.00- 0.25	B					Grass over TOPSOIL: Dark brown slightly clayey slightly gravelly fine to medium sand with many rootlets. Gravel is angular to subangular fine to coarse including siltstone and siltstone.	0.15		43.49
0.10	D								
0.20- 0.50	B					MADE GROUND: Dark brown gravelly fine to medium sand with pockets of firm clay. Gravel is angular to subangular fine to coarse including sandstone and siltstone.			
0.20	ES								
0.25	D								
0.50	ES								
0.75- 1.00	B					MADE GROUND: Dark brown mottled black sandy angular to subangular fine to coarse gravel including brick, clinker, slate, sandstone, siltstone and occasional coal. Some ash.	0.75		42.89
0.75	D								
1.00	ES								
1.20- 1.65		(DRY)			C16				
1.35	D					Firm to stiff light reddish brown mottled grey slightly sandy slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse including sandstone, siltstone and occasional coal.	1.35		42.29
1.40- 1.70	B								
1.70- 2.15	U65	1.60 (DRY)							
2.00	ES								
2.10- 2.50	B								
2.20	D					Very dense reddish brown slightly gravelly slightly clayey fine to coarse SAND. Gravel is rounded fine to medium of sandstone .	2.20		41.44
2.50- 2.87	D	2.40 (DRY)			S50/ 215				
2.80	D					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	2.80		40.84
3.00- 3.50	B								
3.50- 3.72	D	3.15 (DRY)			S50/ 110				
4.00	D								
4.50- 4.59	D	3.15 (DRY)			S50/32				
4.60- 4.85	D								
4.85- 4.94		3.15 (DRY)			C50/40				
						End of Borehole	4.94		38.70

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
4.94	0.15	Cable Percussion	NT/CT

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			12/06/15	08:00
4.94	3.15	DRY	12/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 3.50m and 4.80m.
Backfill details from base of hole: bentonite grout up to 2.80m, arisings up to ground level.
Chiselling: 4.60-4.85m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole **BHA1** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385988.8 E 394304.7 N** | Ground Level **46.67** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		46.67
0.00- 0.70	B					MADE GROUND: Greyish brown clayey gravelly fine to coarse sand with pockets of clay with a medium cobble content. Gravel is angular to subangular fine to coarse of siltstone, sandstone, slate, concrete, tarmac and brick fragments.			
0.20	ES								
0.50	ES								
							0.70		45.97
0.70- 1.20	B					MADE GROUND: Soft to firm greyish brown gravelly slightly sandy clay with a slight odour. Gravel is angular to subangular fine to coarse of sandstone, siltstone and brick fragments.			
1.00	ES								
1.20- 1.65	B	(DRY)			S6				
1.80	D								
2.00- 2.45	B								
2.00- 2.45	D	1.70			S9				
2.00	ES	(DRY)							
							2.30		44.37
						MADE GROUND: Black slightly sandy angular to subangular fine to coarse gravel of ash and brick with a hydrocarbon odour.			
2.80	D						2.80		43.87
						Firm grey mottled orange slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of sandstone and siltstone. Below 3.00m, orange mottled grey and gravel is subrounded to rounded.			
3.00	ES								
3.00- 3.45	U53	3.00 (DRY)							
3.50	D								
3.80	D								
4.00- 4.45	B					Below 4.00m, stiff, brown			
4.00- 4.45	D	4.00			S19				
4.00	ES	(DRY)							
4.80	D								
5.00- 5.45	B					Below 5.00m, very stiff.			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
7.08	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			22/06/15	08:00
7.08	6.00	4.90	22/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 5.50m and 7.00m.
Backfill details from base of hole: arisings up to ground level.
Chiselling: 6.80-7.00m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BHA1**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385988.8** E **394304.7** N
Ground Level **46.67** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.00- 5.45	D	4.70 (DRY)			S45				
5.50- 5.67	B	5.50 (DRY)			C50/63	Extremely weak reddish brown fine to coarse grained SANDSTONE.	5.50		41.17
6.50	D								
7.00- 7.08		6.00 (4.90)			C50/39	End of Borehole	7.08		39.59

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BHA2
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385980 E, 394258.3 N	Ground Level	45.71 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		45.71
0.10- 0.50	B					Grass over MADE GROUND: Dark greyish brown slightly gravelly clayey fine to coarse sand with rootlets. Gravel is angular to subangular fine to coarse of brick, sandstone, plastic wood, ceramic, concrete and metal. Medium cobble content.			
0.20	ES								
							0.40		45.31
0.50- 1.20	B					MADE GROUND: Firm light brown sandy gravelly clay. Gravel is angular to subangular fine to coarse of sandstone, concrete, slag, ash and brick fragments.			
0.50	ES								
1.00	ES								
1.20- 1.65	B								
1.20- 1.65	D	(DRY)			S7				
							1.50		44.21
1.80	D					Very soft to soft dark greyish brown slightly sandy slightly gravelly CLAY with organic content and sand lenses. Gravel is subrounded to rounded fine to medium of sandstone and siltstone.			
2.00- 2.45	B						2.00		43.71
2.00- 2.45	D	1.70			S8	Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of siltstone, sandstone and coal.			
2.00	ES	(DRY)							
2.80	D								
3.00	ES								
3.00- 3.45	U100	3.00 (DRY)							
3.50	D								
3.80	D								
4.00- 4.40	B	4.00 (DRY)			S50/ 247		4.00		41.71
						Extremely weak reddish brown fine to coarse grained SANDSTONE.			
4.80	D								
5.00- 5.14	B	4.70 (3.80)			C50/68				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
5.81	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			22/06/15	08:00
5.81	5.50	4.20	22/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered

Remarks

AGS

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.00m and 5.70m.
Backfill details from base of hole: arisings up to ground level.
Chiselling: 5.50-5.70m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BHA2**
Project No **PN153349**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385980** E **394258.3** N
Ground Level **45.71** m OD
Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
5.70- 5.81		5.50 (4.20)			C50/38				
						End of Borehole	5.81		39.90

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BHA3**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385986.6** E **394227.8** N
Ground Level **46.50** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
0.00- 0.20	B					Grass over MADE GROUND: Dark brown slightly gravelly fine to medium sand with pockets of clay and rootlets. Gravel is angular to subangular fine to medium of sandstone and siltstone.	G.L.		46.50
0.20	ES								
0.50- 1.20	B					MADE GROUND: Soft dark greyish brown mottled red slightly gravelly sandy clay with pockets of sand and a medium cobble content of brick. Gravel is angular to subangular fine to coarse of sandstone, brick, concrete, plastic and polystyrene. At 0.50m, grey pipe ducting encountered.	0.50		46.00
0.50	ES								
1.00	ES								
1.20- 1.30	B				C50/53	MADE GROUND: Greyish brown gravelly fine to medium sand. Gravel is angular to subangular fine to coarse of concrete and sandstone.	1.20		45.30
						At 1.50m, obstruction.	1.50		45.00
						End of Borehole			

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	SL/AR	G.L.			19/06/15	08:00						None encountered
1.50	0.15	Cable Percussion	SL/AR	1.50	1.30		19/06/15	18:00						

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar
At 0.50m depth, grey pipe duct encountered. Hole moved to side of pipe.
Hole terminated at 1.50m depth on obstruction. Hole moved to BHA3A.
Backfill details from base of hole: arisings up to ground level.
Chiselling: 1.20-1.50m for 60 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 1**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BHA3A** / **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386015.8** E **394212.6** N | Ground Level **47.27** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		47.27
0.00- 0.50	B					Grass over MADE GROUND: Dark greyish brown gravelly fine to coarse sand with a medium cobble content. Gravel is angular to subangular fine to coarse of sandstone, slate, conglomerate, concrete, brick, plastic.			
0.20	ES								
0.50- 1.20	B						0.50		46.77
0.50	ES					MADE GROUND: Soft to firm black mottled brown gravelly clay. Gravel is angular to subangular fine to coarse of sandstone, siltstone,ash, clinker, tarmacadam.			
1.00	ES								
1.20- 1.65	B					Below 1.20m, sandy. Below 1.30m, medium cobble content of brick			
1.20- 1.65	D	(DRY)			S6				
1.80	D								
2.00- 2.45	B					Below 2.00m, slight hydrocarbon odour.			
2.00- 2.45	D	1.70			S7				
2.00	ES	(DRY)							
2.80	D								
3.00- 3.45	B	3.00			S9				
3.00	ES	(DRY)							
							3.40		43.87
3.80	D					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded fine to coarse of siltstone, sanstone, coal and quartz.			
4.00- 4.45	D								
4.00	ES								
4.00- 4.45	UF100	3.00 (DRY)							
4.50- 4.95	B						4.50		42.77
4.50- 4.95	D	4.50 (DRY)			S34	Dense reddish brown fine to coarse SAND with pockets of very stiff clay.			
							5.00		42.27

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
5.57	0.15	Cable Percussion	SL/AR

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			19/06/15	08:00
5.57	4.70	4.50	19/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.70m and 5.50m.
Backfill details from base of hole: arisings up to ground level.
Chiselling: 5.30-5.50m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BHA3A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386015.8** E **394212.6** N
Ground Level **47.27** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as fine to coarse sand).	**5.00**		**42.27**
5.30	**D**								
5.50- 5.57		**4.70 (4.50)**			**C50/32**				
						End of Borehole	**5.57**		**41.70**

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**
11/08/2015

geotechnics

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH06/1B	1.70	40.17	S	-	4	6	7	7	9	9	32	*
BH06/1B	2.50	39.37	S	-	6	10	11	13	14	12/55	50/280	>
BH06/1B	3.50	38.37	S	-	25/40		50/65				50/65	>
BH06/1B	4.50	37.37	S	-	25/60		50/35				50/35	>
BH06/1B	5.50	36.37	S	-	20	5/5	50/30				50/30	>
BH06/1B	5.90	35.97	C	-	25/60		50/35				50/35	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH07/1A	2.00	42.58	S	-	1	2	3	3	4	5	15	*
BH07/1A	3.00	41.58	S	-	3	5	6	7	9	12	34	*
BH07/1A	4.00	40.58	S	-	16	9/29	50/62	/0	/0	/0	50/62	>
BH07/1A	5.00	39.58	C	-	19	6/21	50/58	/0	/0	/0	50/58	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH07/1B	1.70	39.89	S	-	4	4	5	5	9	22	41	*
BH07/1B	2.50	39.09	S	-	25/55		47	3/0			50/75	>
BH07/1B	3.50	38.09	S	-	25/50		36	14/20			50/95	>
BH07/1B	4.00	37.59	C	-	25/65		50/72				50/72	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH07/2	1.70	42.79	S	-	2	2	2	3	3	4	12	*
BH07/2	2.50	41.99	S	-	2	3	3	4	4	4	15	*
BH07/2	3.50	40.99	S	-	4	5	5	7	9	10	31	*
BH07/2	4.50	39.99	S	-	11	14/40	50/70				50/70	>
BH07/2	5.00	39.49	S	-	19	6/10	41	9/5			50/80	>
BH07/2	5.40	39.09	C	-	25/45		50/35				50/35	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH08/1B	1.20	38.86	C	-	4	9	16	34/45			50/120	>
BH08/1B	2.00	38.06	S	-	5	6	7	7	8	10	32	*
BH08/1B	2.90	37.16	S	-	20	5/10	31	19/40			50/115	>
BH08/1B	4.00	36.06	S	-	12	13/40	21	29/50			50/125	>
BH08/1B	5.00	35.06	S	-	10	15/60	26	24/60			50/135	>
BH08/1B	5.40	34.66	C	-	25/60		50/42				50/42	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth	Level	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
	m bgl	m OD			0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH09/1A	1.20	43.53	S	-	1	1	2	2	2	2	8	*
BH09/1A	2.20	42.53	S	-	2	4	4	5	6	7	22	*
BH09/1A	3.20	41.53	S	-	4	6	8	7	8	9	32	*
BH09/1A	3.80	40.93	S	-	7	11	15	25	10/10		50/160	>
BH09/1A	4.80	39.93	S	-	18	7/15	40	10/15			50/90	>
BH09/1A	5.00	39.73	S	-	25/35		50/30				50/30	>

Driller	Paul Bridges
Hammer No.	SPT2
Energy Ratio, Er (%)	80.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH09/1B	1.20	39.02	C	-	3	4	5	3	3	2	13	*
BH09/1B	2.00	38.22	S	-	2	3	3	4	5	7	19	*
BH09/1B	3.00	37.22	S	-	6	10	18	17	15/60		50/210	>
BH09/1B	4.00	36.22	S	-	18	7/10	37	13/20			50/95	>
BH09/1B	4.40	35.82	C	-	25/60		50/65				50/65	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH09/2	1.20	43.10	S	-	1	-	-	1	-	1	2	*
BH09/2	1.65	42.65	C	-	1	-	1	1	2	2	6	*
BH09/2	2.10	42.20	S	-	1	2	4	5	5	5	19	*
BH09/2	2.60	41.70	S	-	25/40		50/30				50/30	>
BH09/2	3.50	40.80	C	-	25/15		50/20				50/20	>

Driller	Paul Bridges
Hammer No.	SPT2
Energy Ratio, Er (%)	80.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH10/1A	1.20	43.50	S	-	1	1	2	1	2	2	7	*
BH10/1A	2.00	42.70	S	-	1	2	2	3	3	4	12	*
BH10/1A	2.90	41.80	S	-	2	2	4	5	7	10	26	*
BH10/1A	3.40	41.30	S	-	4	5	6	8	11	12	37	*
BH10/1A	4.10	40.60	S	-	6	11	12	17	21/60		50/210	>
BH10/1A	5.10	39.60	C	-	20	5/10	50/50				50/50	>

Driller	Paul Bridges
Hammer No.	SPT2
Energy Ratio, Er (%)	80.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH10/1B	1.20	38.78	C	-	4	6	6	5	17	22/50	50/275	>
BH10/1B	2.00	37.98	S	-	4	5	7	9	9	11	36	*
BH10/1B	3.00	36.98	S	-	6	8	11	14	13	12/50	50/275	>
BH10/1B	4.00	35.98	S	-	10	14	16	15	19/70		50/220	>
BH10/1B	5.00	34.98	S	-	16	9/20	37	13/25			50/100	>
BH10/1B	5.50	34.48	C	-	19	6/10	50/45				50/45	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH11/1A	1.20	43.67	S	-	1	1	2	3	3	3	11	*
BH11/1A	2.00	42.87	S	-	3	2	4	4	5	5	18	*
BH11/1A	3.00	41.87	S	-	4	5	5	7	9	14	35	*
BH11/1A	4.00	40.87	S	-	6	7	8	8	9	10	35	*
BH11/1A	5.00	39.87	S	-	9	16	25	25/65			50/140	>
BH11/1A	6.00	38.87	S	-	15	10/35	50/55				50/55	>
BH11/1A	6.40	38.47	C	-	25/65		50/50				50/50	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH11/2	1.20	43.54	S	-	1	2	2	2	3	3	10	*
BH11/2	2.00	42.74	S	-	1	2	2	3	3	4	12	*
BH11/2	3.00	41.74	S	-	9	12	18	32/63			50/138	>
BH11/2	4.00	40.74	C	-	25/70		50/58				50/58	>
BH11/2	5.00	39.74	C	-	25		50/34				50/34	>
BH11/2	5.60	39.14	C	-	25/47		50/30				50/30	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH12/1A	1.20	43.69	S	-	1	2	1	3	2	3	9	*
BH12/1A	2.00	42.89	S	-	2	3	3	5	5	5	18	*
BH12/1A	3.00	41.89	S	-	4	5	7	7	8	12	34	*
BH12/1A	4.00	40.89	S	-	4	5	7	9	15	19/40	50/265	>
BH12/1A	5.00	39.89	S	-	8	15	19	27	4/5		50/155	>
BH12/1A	6.00	38.89	S	-	20	5/8	50/70				50/70	>
BH12/1A	6.40	38.49	C	-	25/65		39	11/15			50/90	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH12/1B	1.20	38.62	C	-	3	3	4	3	4	4	15	*
BH12/1B	2.00	37.82	C	-	3	4	3	2	3	4	12	*
BH12/1B	3.00	36.82	S	-	3	4	5	5	8	9	27	*
BH12/1B	4.00	35.82	C	-	7	9	11	13	16	10/37	50/262	>
BH12/1B	5.00	34.82	C	-	25		50/48				50/48	>
BH12/1B	6.50	33.32	C	-	25/52		50/44				50/44	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH12/2	1.70	42.82	S	-	2	3	4	4	5	8	21	*
BH12/2	2.50	42.02	S	-	4	6	7	7	9	10	33	*
BH12/2	3.50	41.02	S	-	7	18/55	37	13/15			50/90	>
BH12/2	4.50	40.02	S	-	25/72		50/40				50/40	>
BH12/2	5.00	39.52	C	-	25/45		50/35				50/35	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH14/1B	1.20	38.94	S	-	1	-	1	1	1	1	4	*
BH14/1B	3.00	37.14	S	-	8	17/73	21	29/67			50/142	>
BH14/1B	4.00	36.14	C	-	14	11/63	37	13/38			50/113	>
BH14/1B	5.00	35.14	C	-	25/62		50/29				50/29	>
BH14/1B	6.50	33.64	C	-	25/48		50/26				50/26	>
BH14/1B	7.60	32.54	C	-	25/45		50/27				50/27	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH14/2	1.70	42.72	S	-	4	5	7	7	9	15	38	*
BH14/2	2.50	41.92	S	-	15	10/25	50/65				50/65	>
BH14/2	3.00	41.42	C	-	25/45		50/30				50/30	>
BH14/2	3.25	41.17	C	-	25/30		50/25				50/25	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH15/1A	1.80	43.19	S	-	1	2	3	3	4	5	15	*
BH15/1A	3.00	41.99	S	-	7	8	10	10	12	13	45	*
BH15/1A	4.00	40.99	S	-	6	8	10	14	26	/0	50/225	>
BH15/1A	5.00	39.99	C	-	12	13/63	32	18/26	/0	/0	50/101	>
BH15/1A	6.50	38.49	C	-	17	8/22	50/58	/0	/0	/0	50/58	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH15/2	1.70	42.80	S	-	2	2	3	3	5	8	19	*
BH15/2	2.50	42.00	S	-	4	5	9	24	17/35		50/185	>
BH15/2	3.50	41.00	S	-	11	14/35	34	16/20			50/95	>
BH15/2	4.50	40.00	S	-	25/60		50/45				50/45	>
BH15/2	4.80	39.70	C	-	25/45		50/50				50/50	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH16/1A	1.20	43.18	S	-	1	2	1	2	3	3	9	*
BH16/1A	2.00	42.38	S	-	1	2	3	4	4	5	16	*
BH16/1A	3.00	41.38	S	-	3	5	5	7	9	12	33	*
BH16/1A	4.00	40.38	S	-	4	9	17	18	15/50		50/200	>
BH16/1A	5.00	39.38	S	-	25/70		50/45				50/45	>
BH16/1A	5.25	39.13	C	-	25/20		50/25				50/25	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH16/2	1.70	42.78	S	-	3	4	4	5	7	8	24	*
BH16/2	2.50	41.98	S	-	7	11	16	34/70			50/145	>
BH16/2	3.50	40.98	S	-	15	10/35	39	11/15			50/90	>
BH16/2	4.50	39.98	S	-	25/60		50/35				50/35	>
BH16/2	4.65	39.83	C	-	25/35		50/25				50/25	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH17/1A	1.20	43.24	S	-	1	1	1	2	3	3	9	*
BH17/1A	2.20	42.24	S	-	2	3	4	4	5	6	19	*
BH17/1A	3.00	41.44	S	-	2	2	3	5	6	7	21	*
BH17/1A	4.00	40.44	S	-	6	9	17	22	11/26	/0	50/176	>
BH17/1A	5.00	39.44	C	-	25/71	/0	50/57	/0	/0	/0	50/57	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH18/1A	1.20	43.25	S	-	1	1	1	-	-	-	1	*
BH18/1A	2.00	42.45	S	-	-	-	-	-	-	-	0/450	*
BH18/1A	3.00	41.45	S	-	1	3	4	5	6	7	22	*
BH18/1A	4.00	40.45	S	-	3	8	11	14	17	8/30	50/255	>
BH18/1A	5.00	39.45	C	-	19	6/14	50/67	/0	/0	/0	50/67	>
BH18/1A	5.60	38.85	C	-	25/63	/0	50/58				50/58	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH18/2	1.20	42.21	S	-	2	2	3	11	18	18/68	50/293	>
BH18/2	2.00	41.41	C	-	25/59		50/38				50/38	>
BH18/2	2.50	40.91	C	-	25/45		50/31				50/31	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH19/2	1.20	41.23	S	-	2	2	3	2	3	3	11	*
BH19/2	2.20	40.23	S	-	11	14/64	50/72				50/72	>
BH19/2	3.00	39.43	C	-	9	15	19	31/38			50/113	>
BH19/2	4.00	38.43	C	-	25/72		50/53				50/53	>
BH19/2	5.00	37.43	C	-	25/61		50/49				50/49	>
BH19/2	5.60	36.83	C	-	25/63		50/38				50/38	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH20/2	1.20	41.72	S	-	1	2	3	3	4	3	13	*
BH20/2	2.20	40.72	S	-	25/72		50/63				50/63	>
BH20/2	3.00	39.92	C	-	16	9/27	50/53				50/53	>
BH20/2	4.00	38.92	C	-	25/58		50/46				50/46	>
BH20/2	4.50	38.42	C	-	25/52		50/28				50/28	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH21/2	1.70	42.15	S	-	3	4	4	5	6	6	21	*
BH21/2	2.50	41.35	S	-	25/62		50/35				50/35	>
BH21/2	3.50	40.35	C	-	16	9/20	46	4/5			50/80	>
BH21/2	4.50	39.35	S	-	25/60		50/35				50/35	>
BH21/2	5.50	38.35	C	-	19	6/5	50/55				50/55	>
BH21/2	5.90	37.95	C	-	21	4/5	50/70				50/70	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH22/2	1.20	42.44	C	-	3	4	3	4	4	5	16	*
BH22/2	2.50	41.14	S	-	5	6	9	15	26/65		50/215	>
BH22/2	3.50	40.14	S	-	16	9/30	34	16/35			50/110	>
BH22/2	4.50	39.14	S	-	25/60		50/32				50/32	>
BH22/2	4.85	38.79	C	-	25/45		50/40				50/40	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' (10 20 30 40 50)
BHA1	1.20	45.47	S	-	1	-	1	2	1	2	6	*
BHA1	2.00	44.67	S	-	1	1	1	2	3	3	9	*
BHA1	4.00	42.67	S	-	2	3	4	4	5	6	19	*
BHA1	5.00	41.67	S	-	3	5	8	9	12	16	45	*
BHA1	5.50	41.17	C	-	16	9/31	50/63				50/63	>
BHA1	7.00	39.67	C	-	25/45		50/39				50/39	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BHA2	1.20	44.51	S	-	1	1	1	2	2	2	7	*
BHA2	2.00	43.71	S	-	1	1	1	2	2	3	8	*
BHA2	4.00	41.71	S	-	7	9	9	14	19	8/22	50/247	>
BHA2	5.00	40.71	C	-	25		50/68				50/68	>
BHA2	5.70	40.01	C	-	25/67		50/38				50/38	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BHA3	1.20	45.30	C	-	25/46		50/53				50/53	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BHA3A	1.20	46.07	S	-	1	1	1	1	2	2	6	*
BHA3A	2.00	45.27	S	-	5	4	2	1	2	2	7	*
BHA3A	3.00	44.27	S	-	1	-	1	2	3	3	9	*
BHA3A	4.50	42.77	S	-	4	8	8	8	9	9	34	*
BHA3A	5.50	41.77	C	-	25/36		50/32				50/32	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

testconsult
Specialist Testing Services

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Testconsult Ltd
Ruby House
40a Hardwick Grange
Woolston
Warrington
WA1 4RF

SPT Hammer Ref:	MGSPT2
Test Date:	17/04/2015
Report Date:	24/04/2015
File Name:	MGSPT2.spt
Test Operator:	TS

UKAS TESTING 0955

Instrumented Rod Data

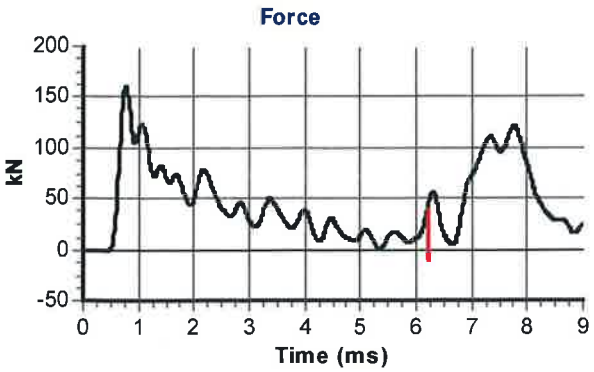
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	7.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	8965
Accelerometer No.2:	8966

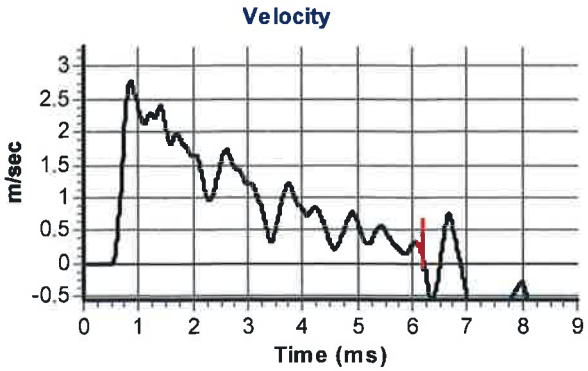
SPT Hammer Information

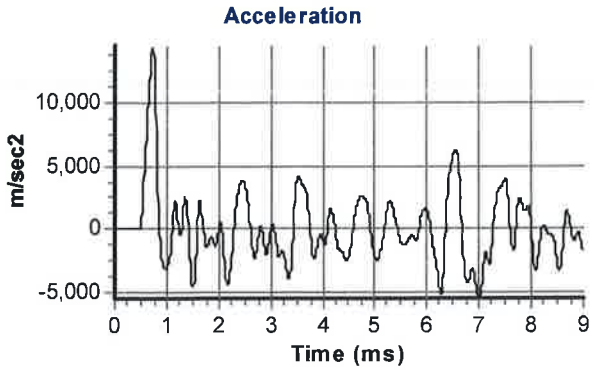
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	14.5

Comments / Location

Client: Macklin Geotech Ltd
Location: Testconsult Laboratory
Type: Trip









Calculations

Area of Rod A (mm2):	1034
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	378

Energy Ratio E_r (%): **80**

The recommended calibration interval is 12 months

Signed: Dean Kendall
Title: Operations Manager

TESTCONSULT CERTIFIED CALIBRATION

SPTMAN ver.1.94 All rights reserved, Testconsult ©2010

testconsult
EQUIPMENT

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Testconsult Limited
40A Hardwick Grange
Warrington
Cheshire
WA1 4RF

SPT Hammer Ref:	SL01
Test Date:	11/02/2015
Report Date:	11/02/2015
File Name:	SL01.spt
Test Operator:	TS

UKAS TESTING
0955

Instrumented Rod Data

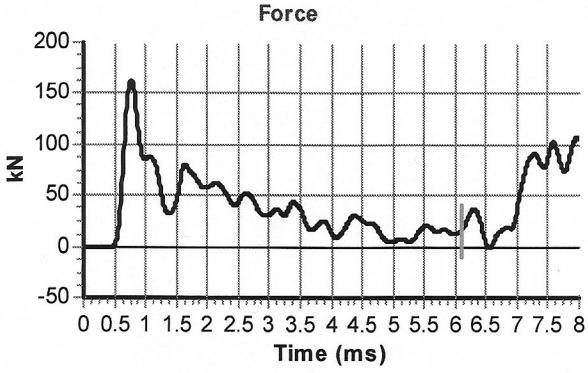
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	7.0
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	8965
Accelerometer No.2:	8966

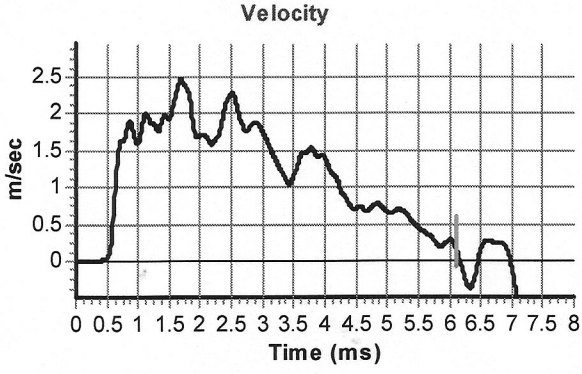
SPT Hammer Information

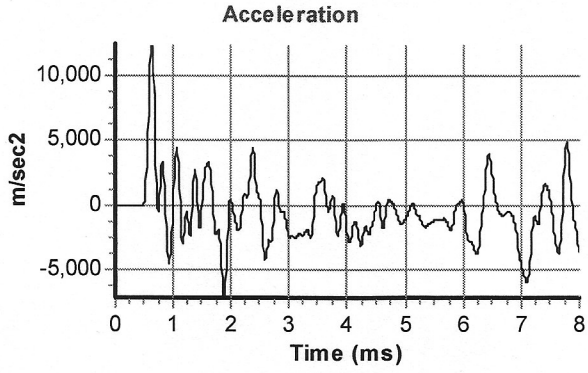
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	14.5

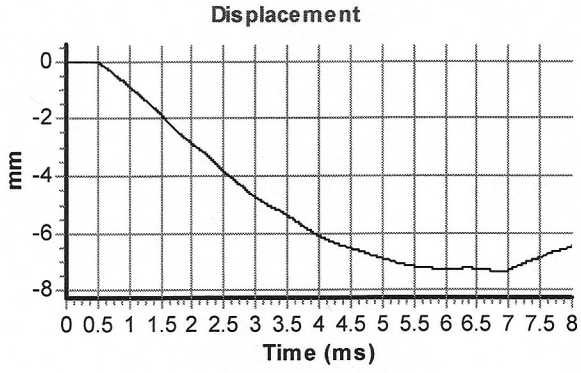
Comments / Location

Client: Steve Lowery Drilling Ltd
Location: Testconsult Laboratory
Type: Trip Hammer









Calculations

Area of Rod A (mm2):	1034
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	350

Energy Ratio E_r (%): **74**

TESTCONSULT CERTIFIED CALIBRATION

Signed: Tony Suchland
Title: Senior Electronics Technician

The recommended calibration interval is 12 months

SPTMAN ver.1.94 All rights reserved, Testconsult ©2010

Allied Exploration & Geotechnics Ltd.

Unit 25 Stella Gill Industrial Estate
Pelton Fell
Chester-le-Street
DH2 2RG

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

UKAS TESTING 1367

SPT Hammer Ref:	TQ3
Test Date:	20/02/2015
Report Date:	20/02/2015
File Name:	TQ3.spt
Test Operator:	GW

Instrumented Rod Data

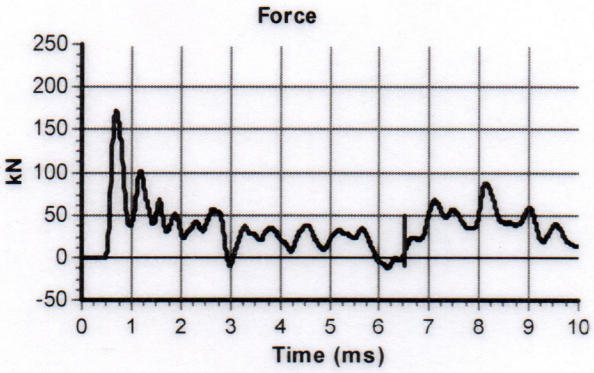
Diameter d_r (mm):	67
Wall Thickness t_r (mm):	8.9
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	6469
Accelerometer No.2:	6471

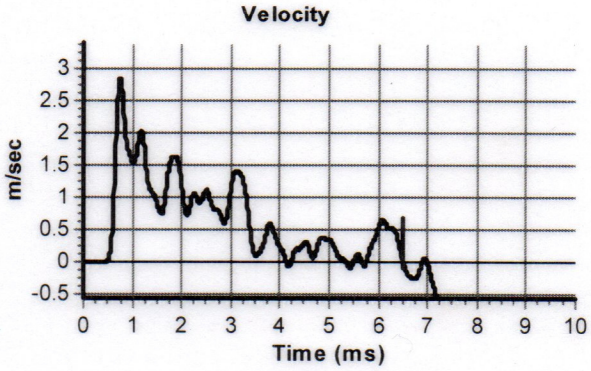
SPT Hammer Information

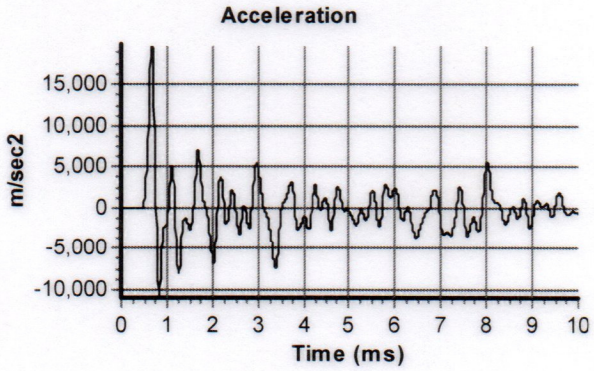
Hammer Mass m (kg):	63.0
Falling Height h (mm):	758
SPT String Length L (m):	11.7

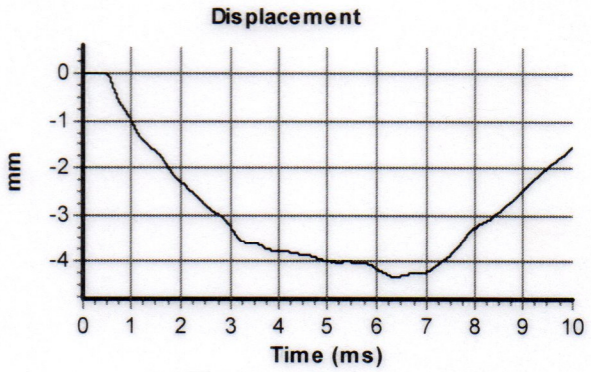
Comments / Location

Mass and Height Checked









Calculations

Area of Rod A (mm2):	1624
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	228

Energy Ratio E_r (%): 48

Signed: Gareth Wear

Title: Senior Laboratory Technician

The recommended calibration interval is 6 months

SPTMAN ver.1.92 All rights reserved, Testconsult ©2010

APPENDIX 3

Rotary Drillhole Records

DATA SHEET - Symbols and Abbreviations used on Records

Sample Types

B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
LB	Large bulk disturbed sample
P	Piston sample (PF - failed P sample)
TW	Thin walled push in sample
U	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
UT	Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample)
V	Vial sample
W	Water sample
#	Sample Not Recovered

Insitu Testing / Properties

CBRP	CBR using TRL probe
CHP	Constant Head Permeability Test
COND	Electrical conductivity
HV	Strength from Hand Vane
ICBR	CBR Test
IDEN	Density Test
IRES	Resistivity Test
MEX	CBR using Mexecone Probe Test
PKR	Packer Permeability Test
PLT	Plate Load Test
PP	Strength from Pocket Penetrometer
Temp	Temperature
VHP	Variable Head Permeability Test
VN	Strength from Insitu Vane
w%	Water content

(All other strengths from undrained triaxial testing)

S	Standard Penetration Test (SPT)
C	SPT with cone
N	SPT Result
-/-	Blows/penetration (mm) after seating drive
-*/- (mm)	Total blows/penetration
( )	Extrapolated value

Groundwater

Water Strike

Depth Water Rose To

Instrumentation

Seal

Filter

Seal



Strata

Made Ground Granular

Made Ground Cohesive

Topsoil

Cobbles and Boulders

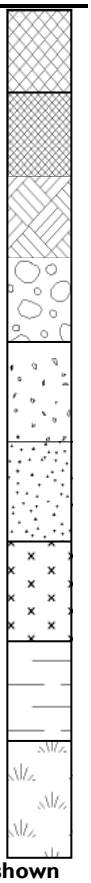
Gravel

Sand

Silt

Clay

Peat



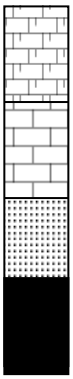
Note: Composite soil types shown by combined symbols

Chalk

Limestone

Sandstone

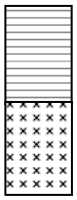
Coal



Strata, Continued

Mudstone

Siltstone

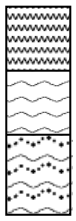


Metamorphic Rock

Fine Grained

Medium Grained

Coarse Grained

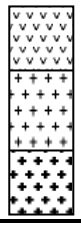


Igneous Rock

Fine Grained

Medium Grained

Coarse Grained



Backfill Materials

Arisings

Bentonite Seal

Concrete

Fine Gravel Filter

General Fill

Gravel Filter

Grout

Sand Filter

Tarmacadam



Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (m)	Maximum Minimum
NI	Non-intact core
NR	No core recovery
AZCL	Assumed zone of core loss

(where core recovery is unknown it is assumed to be at the base of the run)

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH04/1B** Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385701.6** E **394120.6** N | Ground Level **42.26** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
							G.L.		42.26
0.10- 0.40	B					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.	0.10		42.16
0.20	ES								
0.40- 1.20	B					MADE GROUND: Firm dark greyish brown mottled red slightly sandy slightly gravelly clay. Gravel is angular to subangular fine to coarse including sandstone, siltstone and brick fragments.	0.40		41.86
0.50	ES								
						MADE GROUND: Medium dense dark brown mottled red slightly sandy clayey angular to subangular fine to coarse gravel including sandstone, siltstone and brick fragments. Some ash and plastic.			
1.00	ES								
1.20- 1.65	B								
1.20- 1.65		(DRY)			C16				
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	1.50		40.76
1.65- 2.20	D								
2.20- 2.30	B								
2.20- 2.27		2.20			C50/30				
2.30- 3.20	D	(DRY)							
3.20- 3.26		3.20			C50/30				
3.30- 3.40	D	(3.00)							
3.40- 3.45		3.20 (3.00)			C50/25		3.45		38.81

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail
3.45- 4.70	3.40	56	0.17	18	(AZCL)	Extremely weak reddish brown fine to coarse grained SANDSTONE. Discontinuities are very closely to closely spaced horizontal to inclined at 10 degrees planar clean.	Between 3.45m and 3.86m, assumed zone of core loss.
	(ADDED)	45	0.01		(NI)		Between 3.86m and 3.90m, non intact.
					(14)		Between 4.11m and 4.14m, non intact.
					(NI)		
					(27)		Between 4.36m and 4.41m, non intact.
4.45- 4.56		C			(NI)		
					(0)		Between 4.58m and 4.63m, non intact.
					(NI)		Between 4.70m and 5.81m, assumed zone of core loss.
4.70- 6.20	3.40	26	0.04	0	(0)		
	(ADDED)	3	0.01				

Boring

Depth	Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
3.45	0.15	Cable Percussion	PB/DG
7.70	0.12	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			11/06/15	08:00
3.45	3.40	3.00	11/06/15	18:00
3.40	3.40	DRY	12/06/15	08:00
7.70	3.40	DRY	12/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 1.80m and 3.40m.
Backfill details from base of hole: bentonite grout up to 1.50m, arisings up to ground level.
Chiselling: 3.20-3.40m for 30 minutes.
Flush: 3.40-7.70m, Air/Mist, 100% returns.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH04/1B** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385701.6 E 394120.6 N** | Ground Level **42.26** m OD

Drilling | Properties/Sampling | Strata | Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
					(AZCL)					
							Between 5.81m and 6.16m, non intact.			
					(NI)					
6.20- 7.70	3.40 (ADDED)	95 90	0.29 0.01	61	(0)		Between 6.20m and 6.27m, assumed zone of core loss.	6.29		35.97
6.33- 6.47		C			(AZCL)	Extremely weak reddish brown MUDSTONE.	Between 6.29m and 6.35m, non intact.	6.39		35.87
					(0)					
					(NI)	Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE. Discontinuities are closely spaced horizontal to inclined at 10 degrees planar clean.				
6.80- 6.90		C			(9)					
							Between 7.39m and 7.42m, non intact.			
					(NI)					
					(7)					
						End of Borehole		7.70		34.56

Drilling				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH05A/1B** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385655.9 E 394103.1 N** | Ground Level **41.40** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
							G.L.		41.40
0.10- 0.30	B					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.	0.10		41.30
0.20	ES								
0.50- 1.20	B					MADE GROUND: Dark greyish brown mottled red gravelly fine to coarse sand with a medium cobble content of whole brick. Gravel is angular to subangular fine to coarse including sandstone and broken brick and concrete.	0.40		41.00
0.50	ES								
						MADE GROUND: Firm brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse including siltstone, sandstone and occasional coal.			
1.00	ES						1.00		40.40
1.20- 1.65	D	(DRY)			S14	Firm to stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse including siltstone, sandstone and mudstone.			
1.70- 2.15	U77	(DRY)		15					
							2.00		39.40
2.20	D					Very dense reddish brown fine to coarse SAND.			
2.20- 2.53	D	1.70 (DRY)			S50/ 178				
2.80	D								
3.00- 3.45	B								
3.00- 3.19		1.70 (2.10)			C50/53				
							3.50		37.90
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
3.80	D								
4.00- 4.14		4.00 (2.70)			C50/67				
4.30	D								
4.80	D								
5.00- 5.13		4.70 (2.30)			C50/60				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
7.78	0.15	Cable Percussion	SL/AR
12.00	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			12/06/15	08:00
3.50	3.00	2.10	12/06/15	18:00
3.50	3.00	2.70	15/06/15	08:00
12.00	7.70	WET	15/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 2.00m and 7.70m.
Backfill details from base of hole: bentonite grout up to ground level.
Chiselling: 4.20-4.30m for 20 minutes and 6.10-6.30m for 30 minutes and 7.50-7.70m for 30 minutes.
Flush: 7.70-12.00m, Air/Mist, 100% returns.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD - Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH05A/1B** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385655.9** E **394103.1** N | Ground Level **41.40** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
5.30	D								
6.00	D								
6.50- 6.61		4.70 (2.80)			C50/48				
6.80	D								
7.50	D								
7.70- 7.78		4.70 (3.20)			C50/30	Below 7.70m, fine to medium.	7.78		33.62

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail		
7.78- 9.00	7.70 (ADDED)	78 44	0.21 0.01	15	(AZCL) (NI)	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	Between 7.78m and 7.95m, assumed zone of core loss. Between 7.95m and 8.08m, non intact.	8.00	33.40
8.00- 8.15		D			(8)			8.15	33.25
					(NI)	Extremely weak dark reddish brown MUDSTONE.	Recovered as very stiff reddish brown slightly sandy slightly gravelly clay.	8.40	33.00
8.90- 9.00		C			(10)	Very weak to weak reddish brown fine to medium grained SANDSTONE.			
9.00-10.50	7.70 (ADDED)	89 52	0.14 0.01	16	(AZCL) (NI)	Extremely weak to weak thinly bedded reddish brown fine to medium grained SANDSTONE. Dip of bedding subhorizontal at 10 degrees. Discontinuities are closely spaced subhorizontal to inclined to 10 degrees planar clean.	Between 8.45m and 8.80m, non intact. Between 9.00m and 9.21m, assumed zone of core loss. Between 9.21m and 9.60m, non intact.		
9.60- 9.72		C			(10)				

Boring				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH05A/1B** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385655.9** E **394103.1** N | Ground Level **41.40** m OD

Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
					(NI)		Between 10.00m and 10.10m, non intact with many rounded clasts of quartzite up to 20mm.			
					(12)					
10.50-12.00	7.70 (ADDED)	93 81	0.24 0.01	66	(AZCL) (NI)		Between 10.50m and 10.60m, assumed zone of core loss. Between 10.60m and 10.68m, non intact.			
11.38-11.55		C			(7)					
						End of Borehole		12.00		29.40

Drilling				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **3 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BH06/1A
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	386009 E 394351.3 N	Ground Level	44.00 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Level m OD
							G.L.	44.00
0.00- 0.50	B					MADE GROUND: Light grey mottled red and black sandy angular to subangular fine to coarse gravel of various lithologies.		
0.20	ES						0.20	43.80
						MADE GROUND: Soft black slightly sandy gravelly clay with ash. Gravel is angular to subangular fine to coarse of siltstone, sandstone, limestone and coal. Slight hydrocarbon odour.		
0.50- 1.20	B						0.50	43.50
0.50	ES					Soft to firm grey mottled orange slightly gravelly slightly sandy CLAY. Gravel is subangular fine of coal and siltstone. Below 0.70m, orange mottled grey.		
1.00	ES							
1.20- 1.65	B					Below 1.20m, reddish brown mottled grey. Gravel is angular to subangular fine to coarse including siltstone, sandstone and coal.		
1.20- 1.65	D	(DRY)		22	S9			
						Below 1.80m, stiff.		
1.80	D							
2.00- 2.45	B							
2.00- 2.45	D	1.70 (DRY)			S16			
						Below 2.30m, brown.		
2.80	D							
3.00- 3.45	B					Below 3.00m, very stiff (friable).		
3.00- 3.45	D	3.00 (DRY)			S35			
						Below 3.80m, sandy.		
3.80	D							
							3.90	40.10
4.00- 4.45	B					Very dense reddish brown fine to medium SAND (possibly weathered sandstone).		
4.00- 4.44	D	4.00 (DRY)			S50/ 293			
4.80	D							
5.00- 5.45	B							

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	SL/AR
6.60	0.15	Cable Percussion	SL/AR
10.50	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			29/05/15	08:00
6.60	6.20	3.10	29/05/15	17:00
6.60	6.20	WET	09/06/15	08:00
10.50	6.50	WET	09/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.00m and 6.50m.
Backfill details from base of hole: bentonite grout up to 2.00m, arisings up to ground level.
Chiselling: 3.60-3.70m for 20 minutes Cobble/boulder. and 4.70-4.90m for 30 minutes and 5.80-5.90m for 20 minutes and 6.30-6.50m for 30 minutes.
Flush: 6.50-10.50m, Air/Mist, 100% returns.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 3

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH06/1A** Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386009** E **394351.3** N | Ground Level **44.00** m OD

Sampling | Properties | Strata | Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
5.00- 5.37		4.70 (3.30)			C50/ 220				
6.00	D								
6.50- 6.60		6.20 (3.10)			C50/41		6.60		37.40

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail
6.60- 7.50	6.50 (ADDED)	82 71	0.13 0.01	24	(AZCL) (20)	Extremely weak to weak reddish brown fine to medium grained SANDSTONE. Discontinuities are very closely to closely spaced horizontal planar clean.	Between 6.50m and 6.73m, assumed zone of core loss. Between 6.78m and 6.85m, non intact.
6.97- 7.10		C			(NI) (15)		Between 7.45m and 7.50m, non intact.
7.50- 9.00	6.50 (ADDED)	81 77	0.25 0.01	42	(NI) (AZCL)		Between 7.50m and 9.00m, discontinuities are extremely closely spaced to medium spaced horizontal planar clean. Between 7.50m and 7.78m, assumed zone of core loss. Between 7.82m and 7.88m, non intact.
7.85- 7.98		C			(25) (NI)		Between 8.25m and 8.34m, light grey.
9.00-10.50	6.50 (ADDED)	100 96	0.19 0.01	36	(NI) (10)		Between 9.00m and 10.50m, discontinuities are horizontal to inclined at 10 degrees planar with some sandy clay infill. Between 9.00m and 9.09m, non intact.
					(14)		

Boring | Progress | Groundwater

Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH06/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386009** E **394351.3** N
Ground Level **44.00** m OD

Scale 1:25

Drilling: Core Run/Depth (Core Dia)	Drilling: Depth Cased & (to Water)	Properties/Sampling: Type TCR/SCR%	Properties/Sampling: Length Max/Min	Properties/Sampling: RQD %	Properties/Sampling: SPT N (FI)	Strata: Description General	Strata: Description Detail	Depth	Legend	Level m OD
10.20-10.30		**C**			**(NI)** (13)		**Between 10.07m and 10.11m, non intact.**			
						End of Borehole		**10.50**		**33.50**

Drilling: Depth	Hole Dia	Technique	Crew	Progress: Depth of Hole	Depth Cased	Depth to Water	Date	Time	Groundwater: Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **3 of 3**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH08/1A** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386098 E 394284.7 N** | Ground Level **44.64** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
							G.L.		44.64
0.00- 0.50	B					Grass over TOPSOIL: Dark greyish brown clayey fine to medium sand with rootlets.			
0.20	ES						0.20		44.44
						Probable MADE GROUND: Soft greyish brown mottled orange and black slightly sandy slightly gravelly clay with some rootlets. Gravel is subangular to subrounded fine to medium including siltstone,			
0.50- 1.20	B					sandstone, coal and quartzite.	0.50		44.14
0.50	ES								
						Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY with lenses of sand. Gravel is subangular fine of siltstone, sandstone and occasional coal.			
1.00	ES								
1.30	D								
1.50- 1.95	D	1.50 (DRY)			S19	Below 1.50m, stiff.			
2.00- 2.45	U88	1.50 (DRY)		15		Below 2.00m, very stiff, occasional grey mottling.			
2.50- 2.95	B								
2.50	D								
2.50- 2.95	D	1.50 (DRY)			S32				
						Below 3.00m, brown.			
3.30	D								
3.50- 3.95	D	3.00 (3.40)			S44				
							3.95		40.69
4.00- 4.50	B					Extremely weak reddish brown MUDSTONE with sandy bands (recovered as clay).			
4.30	D								
4.50- 4.95	D	3.00 (DRY)			S30				

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	SL/AR
6.54	0.15	Cable Percussion	SL/AR
10.50	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			02/06/15	13:00
3.50	3.00	DRY	02/06/15	18:00
3.50	3.00	2.40	03/06/15	08:00
6.54	3.00	5.10	03/06/15	18:00
6.54	3.00	WET	10/06/15	08:00
10.05	6.40	WET	10/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 6.30m and 6.40m.
A 50mm standpipe was installed to 5.00m with a geowrapped slotted section from 1.00m to 5.00m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 5.00m, gravel filter up to 1.00m, bentonite seal up to 0.10m, concrete up to ground level.
Chiselling: 2.90-3.00m for 20 minutes and 6.30-6.40m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH08/1A** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386098 E 394284.7 N** | Ground Level **44.64** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
5.30	D								
5.50- 5.86	D	3.00 (DRY)			S50/ 208	At 5.60m, band of yellow sandstone up to 100mm thick.			
6.30- 6.40	D								
6.40- 6.54		3.00 (5.10)			C50/33	Extremely weak reddish brown fine to medium grained SANDSTONE.	6.40		38.24
							6.54		38.10

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail	Depth	Level m OD
6.54- 7.80	6.40 (ADDED)	100 79	0.16 0.01	58	(NI) (7)	Very weak reddish brown fine to coarse grained SANDSTONE.	Between 6.54m and 6.62m, non intact. Discontinuities are closely spaced horizontal to inclined at 10 degrees planar smooth open with clayey infill.		
					(NI)	Extremely weak reddish brown MUDSTONE.	Discontinuities are very closely spaced horizontal at inclined at 10 degrees planar clean. Between 7.29m and 7.35m, non intact.	7.29	37.35
7.54- 7.63		C			(22)			7.63	37.01
7.80- 9.00	6.40 (ADDED)	91 39	0.06 0.01	0	(AZCL)	Extremely weak reddish brown fine to coarse grained SANDSTONE.	Discontinuities are very closely spaced horizontal to vertical planar clean. Between 7.80m and 7.91m, assumed zone of core loss. Between 7.91m and 8.34m, non intact. Below 8.28m, slightly clayey.		
					(NI)			8.34	36.30
8.47- 8.60		C			(17)	Extremely weak reddish brown MUDSTONE.	Discontinuities are very closely spaced horizontal to inclined at 20 degrees stepped clean.		
					(NI)			8.86	35.78
9.00-10.50	6.40 (ADDED)	100 97	0.26 0.01	34		Extremely weak to very weak reddish brown fine to medium grained SANDSTONE.	Discontinuities are very closely spaced to closely spaced horizontal to inclined at 10 degrees planar clean. Between 8.86m and 9.05m, non intact. Between 9.27m and 9.38m, light grey sandstone.		
9.80- 9.97		C			(42)				
						Extremely weak reddish brown MUDSTONE.	Discontinuities are very closely spaced horizontal to inclined at 10 degrees planar	9.79	34.85

Boring

Depth	Dia	Technique	Crew

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Flush: 6.40-10.50m, Air/Mist, 100% returns.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH08/1A**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386098** E **394284.7** N
Ground Level **44.64** m OD

Drilling | Properties/Sampling | Strata — Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
							clean.			
						Extremely weak to very weak reddish brown fine to medium grained SANDSTONE.	Discontinuities are very closely spaced horizontal to inclined at 10 degrees planar clean. Between 10.41m to 10.44m, light grey sandstone.	10.20		34.44
						End of Borehole		10.50		34.14

Drilling

Depth	Hole Dia	Technique	Crew

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **3 of 3**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH08/2** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385761.9 E 394294.4 N** | Ground Level **44.49** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
							G.L.		44.49
0.00- 0.15	B					Grass over TOPSOIL: Soft dark greyish brown slightly gravelly sandy clay. Gravel is angular to subangular fine to coarse including sandstone and brick fragments.			
0.10	D								
0.15	D						0.15		44.34
0.20- 0.50	B								
0.20	ES								
						MADE GROUND: Dark greyish brown slightly clayey gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse including sandstone, siltstone and brick fragments.			
0.50	ES						0.50		43.99
0.60- 0.90	B								
0.70	D					MADE GROUND: Soft dark brown mottled grey and black slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse including sandstone, siltstone, quartz and brick fragments. At 0.90m, pipe encountered.			
0.95- 1.10	B								
0.95	D								
1.00	ES						1.10		43.39
1.10- 1.30	B					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse including siltstone, sandstone and occasional coal.			
1.10	D								
1.30	D								
1.30- 1.75	U48	(DAMP)							
1.80	D								
1.80- 2.25	D	(DAMP)			S8				
2.00	ES								
2.00	ES								
2.35	D								
2.50- 2.95	D	2.40 (DRY)			S15	Below 2.50m, stiff.			
3.40	D								
3.50- 4.00	B					Below 3.50m, very stiff, brown.			
3.50- 3.95	D	3.10 (DRY)			S37				
3.90	D						3.90		40.59
4.00- 4.40	B					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
4.40	D								
4.50- 4.64	D	4.40 (4.00)			S50/92				
4.80- 5.10	B								

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
5.56	0.15	Cable Percussion	NT/CT
9.50	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			16/06/15	08:00
5.56	4.40	5.10	16/06/15	18:00
5.56	5.50	WET	18/06/15	08:00
9.50	5.50	WET	18/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.10				2.40	No inflow.

Remarks

Inspection pit hand excavated to 1.20m depth. Pipe encountered in inspection pit at 0.90m depth. Pit moved slightly to side and continued.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.20m and 5.50m.
Backfill details from base of hole: bentonite grout up to 3.90m, arisings up to ground level.
Chiselling: 4.65-4.75m for 15 minutes and 5.10-5.20m for 15 minutes and 5.35-5.45m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH08/2** Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385761.9** E **394294.4** N | Ground Level **44.49** m OD

Sampling | Properties | Strata | Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
5.20- 5.35		4.40 (4.50)			C50/80				
5.35- 5.50	D								
5.50- 5.56		4.40 (5.10)			C50/25		5.56		38.93

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail
5.56- 7.00	5.50 (ADDED)	69 61	0.01	37	(AZCL)	Extremely weak to very weak reddish brown fine to medium grained SANDSTONE. Discontinuities are closely spaced subhorizontal planar clean.	Between 5.56m and 6.00m, assumed zone of core loss. Between 6.00m and 6.19m, medium strong.
5.65- 5.75		C			(14)		
					(NI)		Between 6.29m and 6.37m, non intact with clasts of mudstone.
					(6)		
7.00- 8.50	5.50 (ADDED)	64 43	0.01	20	(AZCL)	Extremely weak to very weak reddish brown fine to medium grained SANDSTONE. Discontinuities are very closely spaced to closely spaced horizontal to inclined at 10 degrees planar with infill of fine to medium sand.	Between 7.00m and 7.50m, assumed zone of core loss.
7.44- 7.53		C			(NI)		Between 7.50m and 7.59m, non intact.
					(13)		
					(NI)		Between 8.13m and 8.22m, non intact with clasts of quartzite up to 10mm diameter.
					(18)		
8.50- 9.50	5.50 (ADDED)	100 78	0.01	46	(14)		
					(NI)		Between 8.99m and 9.04m, non intact.
					(15)		
9.26- 9.37		C			(NI)		Between 9.37m and 9.44m, non intact with clasts of mudstone and quartzite up to 10mm diameter. Between 9.46m and 9.50m, non intact.
					(50)		
					(NI)	End of Borehole	

Boring				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Flush: 5.56-9.50m, Air/Mist, 100% returns.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH10/2** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385692.7 E 394248.9 N** | Ground Level **44.58** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Level m OD
							G.L.	44.58
						MADE GROUND: Black Tarmacadam.	0.10	44.48
0.20	ES					**MADE GROUND: Dark greyish brown slightly clayey gravelly fine to coarse sand with a medium cobble content of brick. Gravel is angular to subangular fine to coarse including sandstone, siltstone, quartz and brick fragments. Some polystyrene.**	0.30	44.28
0.35- 0.50	B							
0.50- 0.70	B						0.50	44.08
0.50	ES					**MADE GROUND: Light yellow mottled grey slightly clayey sandy angular to subangular fine to coarse gravel of limestone and sandstone.**	0.70	43.88
0.70- 1.20	B					**MADE GROUND: Firm light brown mottled black and grey slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse including sandstone, siltstone and brick fragments.**		
1.00	ES							
1.20- 1.65	D	(DRY)			S14	**Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse including sandstone, siltstone and occasional coal.**		
						Below 1.60m, stiff, brown.		
1.65- 2.10	B							
1.65- 2.10	UF88	(DRY)						
2.10- 2.55	D	2.10 (DRY)			S40	**Below 2.10m, very stiff.**		
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	2.30	42.28
2.55- 3.12	B							
3.10- 3.29	D	3.10 (DRY)			S50/90			
3.29- 4.10	B							
4.10- 4.50	D							
4.10- 4.18		4.10 (3.80)			C50/40			
4.50- 4.56		4.50 (4.10)			C50/30		4.56	40.02

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail
4.56- 6.00	4.50 (ADDED)	61 19	0.08 0.01	0	(AZCL)	**Extremely weak to very weak reddish brown fine to medium grained SANDSTONE.**	**Between 4.56m and 5.07m, assumed zone of core loss.**

Boring

Depth	Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
4.56	0.15	Cable Percussion	PB/DG
8.50	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			16/06/15	08:00
4.56	4.50	4.10	16/06/15	18:00
5.46	4.50	WET	17/06/15	08:00
8.50	4.50	WET	17/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 3.20m and 450m.
A 50mm standpipe was installed to 7.00m with a geowrapped slotted section from 3.20m to 7.00m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 7.00m, gravel filter up to 3.20m, bentonite seal up to 0.50m, concrete up to 0.15m, tarmacadam up to ground level.
Chiselling: 4.10-4.50m for 60 minutes.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH10/2** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385692.7 E 394248.9 N** | Ground Level **44.58** m OD

Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
					(NI)	Discontinuities are very closely spaced to closely spaced horizontal to inclined at 10 degrees undulating to planar with occasional infill of fine to medium sand.	Between 5.07m and 5.57m, 5.63m and 5.71m, 5.78m and 5.82m,non intact with clasts of quartzite up to 20mm diameter.			
					(17)					
					(NI)					
					(14)					
5.90- 6.00		C								
6.00- 7.50	4.50 (ADDED)	80 53	0.23 0.01	37	(NI) (11)		Between 6.00m and 6.30m, assumed zone of core loss.			
					(AZCL)					
					(17)		Between 6.36m and 6.71m, 7.41m and 7.45mm, non intact with clasts of quartzite up to 20mm diameter.			
					(NI)					
7.00- 7.13		C			(9)					
7.50- 8.50	4.50 (ADDED)	45 31	0.09 0.01	0	(NI) (20)		Between 7.50m and 7.88m, assumed zone of core loss.			
					(AZCL)		Between 7.50m and 8.50m, discontinuities are clean.			
7.90- 8.00		C			(20)		Between 7.93m and 8.07m, 8.20m and 8.24m, non intact with clasts of quartzite up to 20mm diameter.			
					(NI)					
					(23)					
					(NI)					
					(27)					
						End of Borehole		8.50		36.08

Drilling				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks **Flush: 4.50-8.50m, Air/Mist, 100% returns.**

Logged by **PC**

Figure **2 of 2**

11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH11/1B** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385783.6 E 394020.5 N** | Ground Level **40.22** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
							G.L.		40.22
						MADE GROUND: Black Tarmacadam.			
0.10- 0.40	B						0.10		40.12
0.20	ES					MADE GROUND: Dark brown mottled red and black sandy angular to subangular fine to coarse gravel including brick fragments, clinker, sandstone and siltstone. Some ash and plastic.			
0.50- 1.20	B						0.50		39.72
0.50	ES					MADE GROUND: Light brown slightly gravelly clayey fine to medium sand with rootlets. Gravel is angular to subangular fine to medium of sandstone.			
1.00	ES								
1.20- 1.65	D	(DRY)		19	S37	Stiff light reddish brown occasionally mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse including sandstone, siltstone and occasional coal. Occasional rootlets in top of strata.	1.20		39.02
1.80	D					Dense reddish brown clayey fine to coarse SAND. Below 1.90m, clay absent.	1.80		38.42
2.00- 2.45	D	1.70			S32				
2.00	ES	(DRY)							
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	2.50		37.72
2.80	D								
3.00- 3.45	B								
3.00- 3.36		3.00 (2.20)			C50/ 213				
3.80- 4.00	D								
4.00- 4.06		4.00 (2.70)			C50/22		4.06		36.16

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail
					(NI)	Extremely weak to weak reddish brown fine to medium grained SANDSTONE. Discontinuities are very closely to closely spaced subhorizontal to inclined at 10 degrees planar clean.	
4.50- 6.00	4.50 (ADDED)	78 66	0.13 0.01	36			
4.68- 4.80		C			(6)		

Boring

Depth	Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
4.06	0.15	Cable Percussion	SL/AR
9.00	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			11/06/15	08:00
2.50	1.70	DRY	11/06/15	18:00
2.50	1.70	DRY	12/06/15	08:00
4.06	4.00	2.70	12/06/15	18:00
4.06	4.00	WET	15/06/15	08:00
9.00	4.50	WET	15/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 1.90m and 4.00m.
A 50mm standpipe was installed to 9.00m with a geowrapped slotted section from 2.50m to 9.00m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 2.50m, bentonite seal up to 0.20m, concrete up to 0.15m, tarmacadam up to ground level.
Chiselling: 3.80-4.00m for 30 minutes.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH11/1B**
Project No **PN153349**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385783.6** E **394020.5** N
Ground Level **40.22** m OD
Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
					(NI)		Between 5.17m and 5.22m, non intact.			
					(18)					
					(NI)		Between 5.49m and 5.82m, non intact.			
					(17)					
6.00- 7.50	4.50 (ADDED)	91 84	0.19 0.01	51	(NI)		Between 6.00m and 6.08m, non intact.			
					(11)					
					(NI)		Between 6.53m and 6.59m, non intact.			
							Below 6.80m, weak to medium strong.			
					(6)					
7.50- 9.00	4.50 (ADDED)	100 88	0.24 0.01	70						
7.60- 7.76		C								
					(9)		Below 8.00m, subhorizontal bedding.			
							Between 8.60m and 8.67m, non intact.			
8.69- 8.80		C			(NI)					
					(15)					
					(NI)	Very weak yellow brown fine to medium grained SANDSTONE.	Between 8.87m and 9.00m, non intact.	8.87		31.35
								9.00		31.22
						End of Borehole				

Drilling				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks **Flush: 4.50-9.00m, Air/Mist, 100% returns.**

Logged by **PC**

Figure **2 of 2**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BH13/1A
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	386152.5 E 394243.8 N	Ground Level	44.86 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Level m OD
							G.L.	44.86
0.00- 0.45	B					Grass over TOPSOIL: Dark greyish brown clayey fine to coarse sand with many rootlets.		
0.20	ES					MADE GROUND: Soft greyish brown slightly gravelly sandy clay with occasional rootlets. Gravel is angular to subrounded fine to coarse including siltstone, quartz, brick fragments and ceramic.	0.20	44.66
0.45- 1.20	B					Firm orangish brown mottled grey slightly sandy slightly gravelly CLAY with a low cobble content of sandstone and occasional lenses of sand. Gravel is angular to subangular fine to medium of siltstone, sandstone and occasional coal.	0.45	44.41
0.50	ES							
1.00	ES							
1.20- 1.65	D	(DRY)			S8	Below 1.20m, reddish brown mottled grey. Gravel is subangular to rounded fine to coarse.		
1.65- 2.10	U78	(DRY)						
						Below 2.00m, stiff, brown.		
2.10- 2.55	D	(DRY)			S20			
2.55- 3.10	D							
						Below 3.00m, very stiff.		
3.10- 3.55	D	3.10 (DRY)			S33			
3.80	D			16			3.80	41.06
3.80- 4.25	D	3.80 (DRY)			S18	Extremely weak reddish brown MUDSTONE (recovered as clay).		
4.25- 4.80	D					Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	4.25	40.61
4.80- 5.25	D	4.70 (DRY)			S44			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
7.88	0.15	Cable Percussion	PB/DG
12.20	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			08/06/15	08:00
7.88	7.70	7.20	08/06/15	18:00
7.88	7.70	WET	10/06/15	08:00
12.20	7.70	WET	10/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 6.50m and 7.70m.
Backfill details from base of hole: bentonite grout up to ground level.
Chiselling: 7.20-7.70m for 60 minutes.
Flush: 7.88-12.20m, Air/Mist, 100% returns.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 1 of 3

11/08/2015

geotechnics

BOREHOLE RECORD - Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH13/1A** Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386152.5** E **394243.8** N | Ground Level **44.86** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
5.25- 5.80	B								
5.80- 5.98	D	5.80 (DRY)			S50/85				
							5.90		38.96
5.99- 6.80	D					Extremely weak reddish brown MUDSTONE with thin beds of sand.			
6.80- 7.05	D	6.80 (6.60)			S50/ 100				
7.05- 7.70	D								
7.70- 7.88	D	7.70 (7.20)			S50/90				
							7.88		36.98

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail	Depth	Level m OD
7.88- 9.20	7.70 (ADDED)	99 93	0.11 0.01	14		Very weak to weak reddish brown fine to coarse grained SANDSTONE.	Discontinuities are very closely spaced horizontal to inclined at 50 degrees planar clean.		
8.55- 8.68		C			(18)				
						Extremely weak reddish brown MUDSTONE.	Discontinuities are very closely spaced horizontal to inclined at 60 degrees planar clean.	8.91	35.95
								9.14	35.72
9.20-10.70	7.70 (ADDED)	89 89	0.25 0.03	27	(AZCL)	Very weak reddish brown fine to coarse grained SANDSTONE.	Discontinuities are closely spaced horizontal to vertical planar clean. Between 9.20m and 9.36m, assumed zone of core loss.		
					(15)		Between 9.95m and 10.05m, extremely weak reddish brown mudstone.		

Boring

Depth	Dia	Technique	Crew

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH13/1A** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **386152.5 E 394243.8 N** | Ground Level **44.86** m OD

Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
							Between 10.07m and 10.13m, light grey fine to medium grained sandstone.			
10.50-10.67		**C**								
						Extremely weak to very weak reddish brown MUDSTONE.		**10.54**		**34.32**
								10.62		**34.24**
10.70-12.20	**7.70 (ADDED)**	**100 100**	**0.26 0.01**	**82**		**Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE.**	**Discontinuities are closely spaced inclined at 10 degrees to 50 degrees planar clean. Below 10.70m, discontinuities are open with some clayey infill.**			
11.50-11.60		**C**			**(10)**					
								12.20		**32.66**
						End of Borehole				

Drilling				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **3 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole **BH13/1B** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385683.3 E 394005 N** | Ground Level **39.62** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
							G.L.		39.62
0.00- 0.50	B					Grass over TOPSOIL: Dark greyish brown slightly gravelly clayey fine to coarse sand with many rootlets. Gravel is angular to subrounded fine to medium including sandstone and siltstone.	0.10		39.52
0.20	ES								
0.50- 1.20	B					MADE GROUND: Greyish brown slightly clayey gravelly fine to coarse sand with a medium cobble content of brick. Gravel is angular to subrounded fine to coarse including brick fragments, slate, sandstone, siltstone and quartz. Some ash and occasional pockets of clay.			
0.50	ES								
1.00	ES						1.00		38.62
1.20- 1.65	B					MADE GROUND: Soft to firm dark greyish brown mottled red and black slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse including brick fragments, siltstone, sandstone, slate and coal. Some ash.			
1.20- 1.65		(DRY)			C14				
1.80	D						1.80		37.82
2.00- 2.45	B					Firm to stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse including siltstone, sandstone and occasional coal. Below 2.00m, very stiff, brown.			
2.00- 2.45	D	1.70			S30				
2.00	ES	(DRY)							
							2.40		37.22
						Very dense reddish brown fine to coarse SAND (possibly weathered sandstone).			
2.80	D								
3.00- 3.37	D	3.00 (2.40)			S50/ 217				
3.80	D								
4.00- 4.45	B						4.00		35.62
4.00- 4.27		4.00 (2.90)			C50/ 124	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).			
4.80	D								
5.00- 5.45	B								

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
8.50	0.15	Cable Percussion	SL/AR
15.50	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			10/06/15	08:00
2.00	1.70	DRY	10/06/15	18:00
2.00	1.70	DRY	11/06/15	08:00
8.50	6.00	3.10	11/06/15	18:00
8.50	6.00	WET	12/06/15	08:00
15.50	8.50	WET	12/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 2.80m and 8.30m.
Backfill details from base of hole: bentonite grout up to ground level.
Chiselling: 5.30-5.50m for 35 minutes and 6.60-6.70m for 20 minutes and 7.20-7.30m for 15 minutes and 8.10-8.30m for 30 minutes.
Flush: 8.50-15.50m, Air/Mist, 100% returns.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 4**

11/08/2015

geotechnics

BOREHOLE RECORD - Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH13/1B** Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385683.3** E **394005** N | Ground Level **39.62** m OD

Sampling | Properties | Strata | Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
5.00- 5.10		4.70 (2.50)			C50/45				
6.00	D								
6.00- 6.09		6.00 (2.70)			C50/41				
6.50- 6.95	B								
7.50	D								
8.00- 8.45	B								
8.00- 8.07		6.00 (3.10)			C50/28				
							8.50		31.12

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail
8.50- 9.50	8.50 (ADDED)	0 0	0.01 0.01	0	(AZCL)	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	Between 8.50m and 9.50m, assumed zone of core loss.
9.50-11.00	8.50 (ADDED)	0 0	0.01 0.01	0			Between 9.50m and 11.00m, assumed zone of core loss.

Boring | Progress | Groundwater

Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 4**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH13/1B** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385683.3** E **394005** N | Ground Level **39.62** m OD

Drilling | Properties/Sampling | Strata | Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
					(AZCL)					
11.00-12.50	8.50 (ADDED)	0 0	0.01 0.01	0	(AZCL)		Between 11.00m and 12.50m, assumed zone of core loss.			
12.50-14.00	8.50 (ADDED)	27 0	0.01 0.01	0	(AZCL) (NI)		Between 12.50m and 13.60m, assumed zone of core loss. Between 13.60m and 13.79m, many subangular clasts of quartzite up to 50mm. Between 13.60m and 14.00m, non intact.			
14.00-15.50	8.50 (ADDED)	49 0	0.01 0.01	0	(AZCL)		Between 14.00m and 14.80m, assumed zone of core loss. Between 14.80m and 15.50m, non intact.			

Drilling

Depth	Hole Dia	Technique	Crew

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **3 of 4**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH13/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385683.3** E **394005** N
Ground Level **39.62** m OD

Drilling | Properties/Sampling | Strata — Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
					(NI)					
						End of Borehole		15.50		24.12

Drilling | Progress | Groundwater

Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **4 of 4**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH13/2** Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385635.9 E 394217.1 N** | Ground Level **43.85** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Legend	Level m OD
							G.L.		43.85
0.10- 0.60	B					MADE GROUND: Black Tarmacadam.	0.10		43.75
0.20	ES					MADE GROUND: Light yellowish mottled grey sandy angular to subangular fine to coarse gravel of limestone, sandstone and brick fragments.			
0.50	ES								
0.60- 1.20	B					Soft to firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of siltstone, sandstone and occasional coal.	0.60		43.25
1.00	ES								
1.20- 1.65	B								
1.20- 1.65	D	(DRY)			S6				
1.80	D					Very dense reddish brown fine to coarse SAND with pockets of clay.	1.80		42.05
2.00- 2.44	D	1.70 (DRY)			S50/ 292				
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	2.50		41.35
2.80	D								
3.00- 3.20	B								
3.00- 3.08		3.00 (1.40)			C50/38				
							3.20		40.65

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail
3.20- 4.70	3.20 (ADDED)	18 13	0.07 0.01	0	(AZCL)	Extremely weak to very weak reddish brown fine to medium grained SANDSTONE. Discontinuities are very closely spaced to closely spaced horizontal to inclined at 10 degrees undulating to planar with occasional infill of fine to medium sand.	Between 3.20m and 4.43m, assumed zone of core loss.
4.43- 4.53		C			(15) (NI)		Between 4.56m and 4.63m, non intact with clasts of quartzite and mudstone up to 30mm diameter.
4.70- 6.20	3.20 (ADDED)	53 9	0.08 0.01	0	(14)		Between 4.70m and 5.41m, assumed zone of core loss.
4.70- 4.82	3.20 (WET)				C50/35		

Boring

Depth	Dia	Technique	Crew
1.20	0.40	Inspection Pit	SL/AR
3.20	0.15	Cable Percussion	SL/AR
7.20	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			16/06/15	08:00
3.20	3.00	1.40	16/06/15	18:00
3.20	3.20	WET	17/06/15	08:00
7.20	3.20	WET	17/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vials, 1 x 1kg plastic tub and 1 x 258ml amber jars
Water was added to assist boring between 2.00m and 3.20m.
Backfill details from base of hole: bentonite grout up to ground level.
Chiselling: 2.70-3.20m for 60 minutes.
Flush: 3.20-7.20m, Air/Mist, 100% returns.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole / Project No	BH13/2 / PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385635.9 E, 394217.1 N	Ground Level	43.85 m OD

Drilling | Properties/Sampling | Strata | Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
					(AZCL)					
					(NI)		Between 5.41m and 5.60m, 5.72m and 6.18m, non intact with clasts of quartzite and mudstone up to 30mm diameter.			
5.60- 5.72		C			(17)					
					(NI)					
6.20- 7.20	3.20 (ADDED)	56 23	0.07 0.01	0	(50)		Between 6.20m and 6.64m, assumed zone of core loss.			
					(AZCL)					
					(NI)		Between 6.64m and 6.89m, 6.94m and 7.01m, 7.11m and 7.12m, non intact with clasts of quartzite and mudstone up to 30mm diameter.			
					(20)					
7.10- 7.17		C			(NI)					
					(20)			7.20		36.65
					(NI)	End of Borehole				
					(25)					

Drilling				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC

Figure 2 of 2

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	BH14/1A
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	386105.2 E 394207.5 N	Ground Level	45.03 m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description	Depth	Level m OD
							G.L.	45.03
0.00- 0.50	B					Grass over TOPSOIL: Dark greyish brown clayey fine to coarse sand with many rootlets.		
0.20	ES					Firm grey slightly gravelly sandy CLAY. Gravel is rounded fine to medium of sandstone.	0.20	44.83
0.50- 1.20	B							
0.50	ES					Firm reddish brown mottled grey occasionally black slightly sandy slightly gravelly CLAY with occasional lenses of sand. Gravel is subangular to subrounded fine to medium of siltstone, sandstone and coal.	0.50	44.53
1.00	ES							
1.20- 1.65	B							
1.20- 1.65	D	(DRY)			S14			
						Below 1.60m, grey mottling absent.		
1.80	D			25				
2.00- 2.45	B					Below 2.00m, stiff.		
2.00- 2.45	D	1.70 (DRY)			S26			
							2.70	42.33
2.80	D					Stiff light reddish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium of sandstone and coal.		
3.00- 3.45	B					Below 3.00m, gravel absent.		
3.00- 3.45	D	3.00 (DRY)			S19			
3.80	D							
4.00- 4.45	B							
4.00- 4.45	D	4.00 (DRY)			S46	Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	4.00	41.03
4.80	D							
5.00- 5.16	B							

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.50	Inspection Pit	SL/AR
5.16	0.15	Cable Percussion	SL/AR
11.60	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			27/05/15	15:00
2.00		DRY	27/05/15	17:00
2.00		DRY	28/05/15	08:00
5.16	4.70	4.10	28/05/15	11:00
5.16	4.70	WET	10/06/15	08:00
9.10	5.10	WET	10/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

AGS

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 4.00m and 5.10m.
A 50mm standpipe was installed to 5.70m with a geowrapped slotted section from 2.70m to 5.70m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 5.70m, gravel filter up to 2.70m, bentonite seal up to 0.30m, concrete up to ground level.
Chiselling: 5.00-5.10m for 30 minutes.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by PC`

Figure 1 of 3

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** Engineer **COFFEY GEOTECHNICS** Borehole **BH14/1A** Project No **PN153349**

Client **COFFEY GEOTECHNICS** National Grid Coordinates **386105.2 E 394207.5 N** Ground Level **45.03** m OD

Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Description		Depth	Legend / Level m OD
5.00- 5.16		**4.70 (4.10)**			**C50/38**				
Core Run / Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail	**5.16**	**39.87**
5.16- 6.10	**5.10 (ADDED)**	**87 87**	**0.14 0.03**	**38**	**(AZCL)** (12)	**Extremely weak reddish brown fine to coarse grained SANDSTONE.**	**Discontinuities are closely spaced inclined at 10 degrees to 40 degrees planar clean. Between 5.16m and 5.23m, assumed zone of core loss. Between 5.86m and 5.90m, extremely weak reddish brown mudstone.**		
6.10- 7.60	**5.10 (ADDED)**	**67 49**	**0.20 0.01**	**39**	**(AZCL)**	**Extremely weak to very weak reddish brown MUDSTONE.**	**Between 6.10m and 6.67m, assumed zone of core loss. Discontinuities are medium spaced horizontal planar clean.**	**6.10**	**38.93**
6.60- 6.70		**C**			(4)		**Between 6.95m and 7.15m, non intact.**		
					(NI)				
					(4)	**Extremely weak reddish brown fine to coarse grained SANDSTONE.**	**Discontinuities are closely spaced to medium spaced horizontal to inclined at 10 degrees planar clean. Between 7.42m and 7.46m, non intact. Between 7.60m and 7.62m, assumed zone of core loss.**	**7.15**	**37.88**
					(NI)				
7.60- 9.10	**5.10 (ADDED)**	**99 99**	**0.07 0.01**	**0**	(7) **(AZCL)**	**Extremely weak reddish brown MUDSTONE.**	**Discontinuities are very closely spaced horizontal to inclined at 10 degrees planar clean.**	**7.67**	**37.36**
					(22)	**Extremely weak reddish brown fine to coarse grained SANDSTONE.**	**Discontinuities are very closely spaced horizontal planar clean.**	**8.22**	**36.81**
8.90- 9.17		**C**				**Extremely weak to weak reddish brown MUDSTONE.**	**Discontinuities are very closely spaced horizontal planar clean. Between 9.10m and 9.16m, assumed zone of core loss.**	**8.69**	**36.34**
9.10-10.60	**5.10 (ADDED)**	**96 96**	**0.32 0.01**	**53**	**(AZCL)**				
9.30- 9.46		**C**							
					(17)	**Extremely weak reddish brown fine to coarse grained SANDSTONE.**	**Discontinuities are very closely spaced horizontal to inclined at 10 degrees planar clean.**	**9.48**	**35.55**

Boring				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
				9.10	**5.10**	**WET**	**11/06/15**	**08:00**						
				11.60	**5.10**	**WET**	**11/06/15**	**18:00**						

Flush: 5.45-11.60m, Air/Mist, 100% returns.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC`**

Figure **2 of 3**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **BH14/1A**
Project No **PN153349**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **386105.2** E **394207.5** N
Ground Level **45.03** m OD
Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
						Extremely weak to very weak reddish brown MUDSTONE.	Discontinuities are closely spaced inclined at 10 degrees planar clean.	10.15		34.88
10.60-11.60 10.80-10.95	5.10 (ADDED)	100 97 C	0.16 0.01	58	(16)	Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE.	Discontinuities are very closely spaced horizontal planar open with some clayey infill.	10.56		34.47
					(NI)	Extremely weak reddish brown MUDSTONE.	Discontinuities are closely spaced horizontal planar open with some clayey infill. Between 10.91m and 10.96m, non intact.	10.91		34.12
11.10-11.20		C			(6)			11.12		33.91
						Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE.	Discontinuities are closely spaced horizontal to inclined at 10 degrees open with some clayey infill. Between 11.17m and 11.19m, extremely weak reddish brown mudstone. Between 11.32m and 11.34m, light grey fine to coarse grained sandstone. Between 11.34m and 11.40m, extremely weak reddish brown mudstone.	11.60		33.43
						End of Borehole				

Drilling

Depth	Hole Dia	Technique	Crew

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC`**

Figure **3 of 3**
11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | **Borehole** **BH17/2** | Project No **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385821.6** E **394210.9** N | Ground Level **44.42** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N (FI)	Strata Description	Depth	Legend	Level m OD
							G.L.		44.42
						MADE GROUND: Black Tarmacadam.			
0.12- 0.35	B						0.10		44.32
0.12	D					**MADE GROUND: Light yellow slightly clayey sandy angular to subangular fine to coarse gravel of limestone and sandstone with a low to medium cobble and boulder content.**			
0.20	ES								
0.35- 0.50	B						0.35		44.07
0.35	D								
0.50- 0.80	B					**MADE GROUND: Dark brown mottled black slightly clayey sandy angular to subangular fine to coarse gravel of limestone, sandstone, siltstone and brick fragments.**	0.50		43.92
0.50	D								
0.50	ES								
0.80	D					**MADE GROUND: Black slightly sandy angular to subangular fine to coarse gravel of clinker and brick fragments. With ash. Hydrocarbon odour.**	0.80		43.62
0.90- 1.20	B								
1.00	ES								
						Stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of siltstone, sandstone and occasional coal.			
1.20- 1.65	U75	(DRY)							
						Below 1.70m, very stiff.			
1.70	D								
1.70- 2.15	D	1.20			S42				
1.80- 2.30	B	(DRY)							
2.00	ES								
2.30- 2.60	B						2.30		42.12
2.30	D					**Extremely weak reddish brown slightly gravelly fine to coarse grained SANDSTONE. Gravel is subrounded fine to medium of quartzite (recovered as gravelly fine to coarse sand).**			
2.50- 2.88	D	2.40 (DRY)			S50/ 230				
2.70- 3.00	B								
2.70	D								
3.00	D								
3.50- 3.69	D	3.10 (DRY)			S50/ 100				
3.70	D								
4.00- 4.30	D								
4.00- 4.15		3.30 (DRY)			C50/80				
4.50- 4.60		3.30 (DRY)			C50/58				
							4.60		39.82

Core Run Core Dia	Depth Cased	TCR/SCR %	Length Max/Min	RQD %	SPT (FI)	Continued by Rotary techniques General	Detail
4.60- 6.00	4.50	100	0.29	64	(NI)	**Very weak reddish brown fine to medium grained SANDSTONE. Discontinuities are very**	**Between 4.60m and 4.61m, non intact. Between 4.68m and 4.75m, non intact.**
	(ADDED)	87	0.01		(43)		
					(NI)		

Boring

Depth	Dia	Technique	Crew
1.20	0.40	Inspection Pit	NT/CT
4.60	0.15	Cable Percussion	NT/NT
9.00	0.09	Rotary Core	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			12/06/15	08:00
1.20	1.20	DRY	12/06/15	18:00
1.20	1.20	DRY	15/06/15	08:00
9.00	4.50	WET	15/06/15	18:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Water was added to assist boring between 3.70m and 4.50m.
Backfill details from base of hole: bentonite grout up to 0.50m, concrete up to 0.15m, tarmacadam up to ground level.
Chiselling: 3.70-3.80m for 15 minutes and 4.15-4.30m for 15 minutes and 4.30-4.50m for 15 minutes.
Flush: 4.60-9.00m, Air/Mist, 100% returns.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **1 of 2**

11/08/2015

geotechnics

BOREHOLE RECORD – Cable Percussion and Rotary

Project **PROJECT OAK SI SCOPE STAGE 2B** | Engineer **COFFEY GEOTECHNICS** | Borehole / Project No **BH17/2** **PN153349**

Client **COFFEY GEOTECHNICS** | National Grid Coordinates **385821.6** E **394210.9** N | Ground Level **44.42** m OD

Drilling | Properties/Sampling | Strata | Scale 1:25

Core Run/Depth (Core Dia)	Depth Cased & (to Water)	Type TCR/SCR%	Length Max/Min	RQD %	SPT N (FI)	Description General	Description Detail	Depth	Legend	Level m OD
						closely to closely spaced subhorizontal planar clean.	Between 4.75m and 5.04m, strong.			
5.30- 5.50		C			(9)					
								6.00		38.42
6.00- 7.50	4.50 (ADDED)	67 57	0.13 0.01	29	(AZCL)	Very weak reddish brown fine to medium grained SANDSTONE. Discontinuities are closely spaced horizontal to inclined at 10 degrees undulating to planar clean.	Between 6.00m and 6.50m, assumed zone of core loss.			
							Between 6.50m and 6.85m, non intact.			
6.65- 6.77		C			(NI)					
6.65- 6.77		C								
					(13)					
							Between 7.31m and 7.35m, non intact.			
					(NI)					
					(13)		Between 7.50m and 7.92m, assumed zone of core loss.			
7.50- 9.00	4.50 (ADDED)	70 35	0.13 0.01	23	(AZCL)					
							Between 7.92m and 8.40m, non intact.			
					(NI)					
8.35- 8.50		C								
					(9)					
							Between 8.85m and 8.93m, non intact.			
					(NI)			9.00		35.42
					(14)	End of Borehole				

Drilling

Depth	Hole Dia	Technique	Crew

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by **PC**

Figure **2 of 2**

11/08/2015

geotechnics

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH04/1B	1.20	41.06	C	-	1	-	1	2	4	9	16	*
BH04/1B	2.20	40.06	C	-	25/35		50/30				50/30	>
BH04/1B	3.20	39.06	C	-	25/30		50/30				50/30	>
BH04/1B	3.40	38.86	C	-	25/20		50/25				50/25	>

Driller	Paul Bridges
Hammer No.	SPT2
Energy Ratio, Er (%)	80.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth	Level	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
	m bgl	m OD			0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH05A/1B	1.20	40.20	S	-	2	2	3	4	3	4	14	*
BH05A/1B	2.20	39.20	S	-	9	13	17	22	11/28		50/178	>
BH05A/1B	3.00	38.40	C	-	14	11/58	50/53				50/53	>
BH05A/1B	4.00	37.40	C	-	25		50/67				50/67	>
BH05A/1B	5.00	36.40	C	-	25/69		50/60				50/60	>
BH05A/1B	6.50	34.90	C	-	25/57		50/48				50/48	>
BH05A/1B	7.70	33.70	C	-	25/47		50/30				50/30	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH06/1A	1.20	42.80	S	-	1	1	2	2	2	3	9	*
BH06/1A	2.00	42.00	S	-	1	2	3	4	4	5	16	*
BH06/1A	3.00	41.00	S	-	4	5	7	8	9	11	35	*
BH06/1A	4.00	40.00	S	-	6	8	9	13	15	13/68	50/293	>
BH06/1A	5.00	39.00	C	-	7	9	13	16	21/70	/0	50/220	>
BH06/1A	6.50	37.50	C	-	25/58	/0	50/41	/0	/0	/0	50/41	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH08/1A	1.50	43.14	S	-	1	2	3	4	5	7	19	*
BH08/1A	2.50	42.14	S	-	3	4	6	7	9	10	32	*
BH08/1A	3.50	41.14	S	-	6	10	10	11	9	14	44	*
BH08/1A	4.50	40.14	S	-	3	5	7	6	7	10	30	*
BH08/1A	5.50	39.14	S	-	7	11	15	16	19/58	/0	50/208	>
BH08/1A	6.40	38.24	C	-	12	13/27	50/33	/0	/0	/0	50/33	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH08/2	1.80	42.69	S	-	1	1	2	1	2	3	8	*
BH08/2	2.50	41.99	S	-	2	2	3	3	4	5	15	*
BH08/2	3.50	40.99	S	-	4	5	5	7	9	16	37	*
BH08/2	4.50	39.99	S	-	25/50		35	15/17			50/92	>
BH08/2	5.20	39.29	C	-	25/70		41	9/5			50/80	>
BH08/2	5.50	38.99	C	-	25/35		50/25				50/25	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH10/2	1.20	43.38	S	-	1	1	2	3	4	5	14	*
BH10/2	2.10	42.48	S	-	1	2	4	8	10	18	40	*
BH10/2	3.10	41.48	S	-	18	7/20	34	16/15			50/90	>
BH10/2	4.10	40.48	C	-	25/35		50/40				50/40	>
BH10/2	4.50	40.08	C	-	25/30		50/30				50/30	>

Driller	Paul Bridges
Hammer No.	SPT2
Energy Ratio, Er (%)	80.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH11/1B	1.20	39.02	S	-	7	9	10	10	9	8	37	*
BH11/1B	2.00	38.22	S	-	4	5	5	7	9	11	32	*
BH11/1B	3.00	37.22	C	-	7	10	15	16	19/63		50/213	>
BH11/1B	4.00	36.22	C	-	25/37		50/22				50/22	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth	Level	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
	m bgl	m OD			0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
BH13/1A	1.20	43.66	S	-	1	1	2	1	2	3	8	*
BH13/1A	2.10	42.76	S	-	1	2	4	4	5	7	20	*
BH13/1A	3.10	41.76	S	-	1	2	6	7	8	12	33	*
BH13/1A	3.80	41.06	S	-	1	2	3	4	5	6	18	*
BH13/1A	4.80	40.06	S	-	4	8	7	10	12	15	44	*
BH13/1A	5.80	39.06	S	-	18	7/15	40	10/10			50/85	>
BH13/1A	6.80	38.06	S	-	10	15	32	18/25			50/100	>
BH13/1A	7.70	37.16	S	-	20	5/10	38	12/15			50/90	>

Driller	Paul Bridges
Hammer No.	SPT2
Energy Ratio, Er (%)	80.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' (10 20 30 40 50)
BH13/1B	1.20	38.42	C	-	3	4	4	3	4	3	14	*
BH13/1B	2.00	37.62	S	-	4	6	6	7	8	9	30	*
BH13/1B	3.00	36.62	S	-	3	9	12	19	19/67		50/217	>
BH13/1B	4.00	35.62	C	-	7	13	22	28/49			50/124	>
BH13/1B	5.00	34.62	C	-	25/53		50/45				50/45	>
BH13/1B	6.00	33.62	C	-	25/48		50/41				50/41	>
BH13/1B	8.00	31.62	C	-	25/45		50/28				50/28	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH13/2	1.20	42.65	S	-	1	1	1	1	2	2	6	*
BH13/2	2.00	41.85	S	-	3	7	9	12	16	13/67	50/292	>
BH13/2	3.00	40.85	C	-	25/46		50/38				50/38	>
BH13/2	4.70	39.15	C	-	19	6/5	50/35				50/35	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
BH14/1A	1.20	43.83	S	-	1	2	3	3	4	4	14	*
BH14/1A	2.00	43.03	S	-	2	3	4	5	8	9	26	*
BH14/1A	3.00	42.03	S	-	2	3	4	4	5	6	19	*
BH14/1A	4.00	41.03	S	-	7	8	8	9	13	16	46	*
BH14/1A	5.00	40.03	C	-	14	11/44	50/38	/0	/0	/0	50/38	>

Driller	Steve Lowery
Hammer No.	SL01
Energy Ratio, Er (%)	74.00
Calibration Date	11/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
BH17/2	1.70	42.72	S	-	5	9	7	10	11	14	42	*
BH17/2	2.50	41.92	S	-	6	8	10	14	22	4/5	50/230	>
BH17/2	3.50	40.92	S	-	19	6/10	38	12/25			50/100	>
BH17/2	4.00	40.42	C	-	25/65	0	42	8/5			50/80	>
BH17/2	4.50	39.92	C	-	25/40		50/58				50/58	>

Driller	Nigel Thompson
Hammer No.	TQ3
Energy Ratio, Er (%)	48.00
Calibration Date	20/02/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

APPENDIX 5

Dynamic Sample Borehole Records

DATA SHEET - Symbols and Abbreviations used on Records

Sample Types

B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
LB	Large bulk disturbed sample
P	Piston sample (PF - failed P sample)
TW	Thin walled push in sample
U	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
UT	Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample)
V	Vial sample
W	Water sample
#	Sample Not Recovered

Insitu Testing / Properties

CBRP	CBR using TRL probe
CHP	Constant Head Permeability Test
COND	Electrical conductivity
HV	Strength from Hand Vane
ICBR	CBR Test
IDEN	Density Test
IRES	Resistivity Test
MEX	CBR using Mexecone Probe Test
PKR	Packer Permeability Test
PLT	Plate Load Test
PP	Strength from Pocket Penetrometer
Temp	Temperature
VHP	Variable Head Permeability Test
VN	Strength from Insitu Vane
w%	Water content

(All other strengths from undrained triaxial testing)

S	Standard Penetration Test (SPT)
C	SPT with cone
N	SPT Result
-/-	Blows/penetration (mm) after seating drive
-*/- (mm)	Total blows/penetration
( )	Extrapolated value

Groundwater

Water Strike

Depth Water Rose To

Instrumentation

Seal

Filter

Seal



Strata

Made Ground Granular

Made Ground Cohesive

Topsoil

Cobbles and Boulders

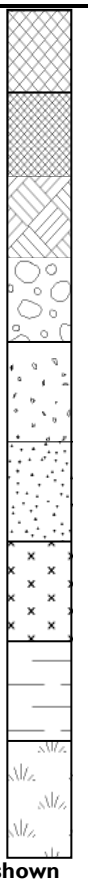
Gravel

Sand

Silt

Clay

Peat



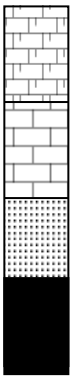
Note: Composite soil types shown by combined symbols

Chalk

Limestone

Sandstone

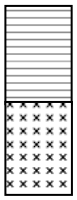
Coal



Strata, Continued

Mudstone

Siltstone

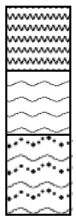


Metamorphic Rock

Fine Grained

Medium Grained

Coarse Grained

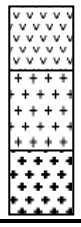


Igneous Rock

Fine Grained

Medium Grained

Coarse Grained



Backfill Materials

Arisings

Bentonite Seal

Concrete

Fine Gravel Filter

General Fill

Gravel Filter

Grout

Sand Filter

Tarmacadam



Rotary Core

RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (m)	Maximum Minimum
NI	Non-intact core
NR	No core recovery
AZCL	Assumed zone of core loss

(where core recovery is unknown it is assumed to be at the base of the run)

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS02/2**
Project No **PN153349**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385645.5** E **394288.3** N
Ground Level **44.37** m OD
Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						Grass over TOPSOIL: Brown clayey fine to coarse sand with roots.	**G.L.**		**44.37**
0.25	**D**								
0.25	**ES**								
0.35- 0.75	**B**					**MADE GROUND: Firm friable dark greyish brown slightly gravelly sandy clay with a low cobble content of brick. Gravel is angular to subrounded fine to coarse including sandstone, slate, broken concrete, brick and mortar and occasional ceramic. Some pieces of hardened tar with hydrocarbon odour. Between 0.38m and 0.47m, 90mm diameter yellow gas pipe.**	**0.35**		**44.02**
0.50	**D**								
0.50	**ES**								
0.75- 1.05	**B**						**0.75**		**43.62**
						MADE GROUND: Red and brown slightly clayey slightly sandy angular fine to coarse gravel of broken brick and mortar. High cobble content of brick. Occasional lumps of firm brown clay.	**1.05**		**43.32**
1.10	**D**								
1.10	**ES**								
1.20- 2.00	**B**								
1.20- 1.65	**D**	**(DRY)**			**S16**	**MADE GROUND: Firm to stiff orangish brown and brown slightly sandy slightly gravelly clay. Gravel is angular to subrounded fine to coarse including brick fragments.**	**1.30**		**43.07**
						Stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies. Below 1.45m, brown mottled grey.			
2.00	**D**								
2.00- 2.45	**D**	**(DRY)**			**S15**	**Below 2.10m, mottling absent.**			
2.00	**ES**								
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	**2.25**		**42.12**
2.50	**D**								
3.00- 3.33	**D**	**(DRY)**			**S50/ 180**				
						End of Borehole	**3.33**		**41.04**

Boring

Depth	Hole Dia	Technique	Crew
1.20	**0.40**	**Inspection Pit**	**PB/DG**
3.33	**0.10**	**Dynamic Sampler**	**PB/DG**

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.		**DRY**	**23/06/15**	**08:00**
3.33			**23/06/15**	**12:00**

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Between 0.38m and 0.47m depth, 90mm diameter yellow gas pipe encountered.
Backfill details from base of hole: arisings up to ground level.

Logged by **CJ**
Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS03/2**
Project No **PN153349**
Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385710.4** E **394273.4** N
Ground Level **45.03** m OD
Scale 1:25

Sampling			Properties			Strata			
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
						Grass over TOPSOIL: Firm friable dark brown slightly sandy slightly gravelly clay with many roots. Gravel is angular fine to medium including brick fragments.	G.L.		45.03
0.15- 0.60	B						0.15		44.88
0.30	D					**MADE GROUND: Dark grey and black slightly sandy slightly gravelly clay with a low cobble content of brick. Gravel is angular to subrounded fine to coarse including sandstone, slate, clinker, slag, broken concrete and brick. Some ash and occasional shell fragments.**			
0.30	ES								
0.60- 1.20	B						0.60		44.43
0.65	D								
0.65	ES								
						MADE GROUND: Brown and dark orangish brown slightly sandy slightly gravelly clay. Gravel is angular to rounded fine to medium including brick fragments and occasional ceramic.			
1.20	D						1.25		43.78
1.20- 1.65	D	(DRY)			S5	**Soft reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies.**			
1.20	ES								
1.25- 2.00	B								
2.00- 2.45	D	(DRY)			S18				
2.10- 3.00	B					**Below 2.00m, stiff, brown.**			
2.10	D								
2.10	ES								
2.50	D								
3.00- 3.41	D	(DRY)			S50/ 255				
3.10- 3.40	B						3.10		41.93
						Extremely weak reddish brown slightly gravelly fine to coarse grained SANDSTONE. Gravel is subrounded to rounded fine to medium of quartzite (recovered as slightly gravelly sand).			
							3.41		41.62
						End of Borehole			

Boring				Progress					Groundwater					
Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	PB/DG	G.L.			22/06/15	08:00						None encountered.
3.41	0.10	Dynamic Sampler	PB/DG	3.41		DRY	22/06/15	09:30						

Remarks
Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Logged by **CJ**
Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS04/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385614.1** E **394098.8** N
Ground Level **41.58** m OD

Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		41.58
0.15- 0.70	B					Grass over TOPSOIL: Firm dark brown slightly sandy slightly gravelly clay with rootlets. Gravel is angular to subangular fine to medium including limestone.	0.15		41.43
0.25	D								
0.25	ES								
						MADE GROUND: Dark brown and red slightly clayey slightly sandy angular to subangular fine to coarse gravel including sandstone, limestone, clinker and brick fragments. High cobble content of brick. Occasional fragments of polystyrene.			
0.65	D						0.70		40.88
0.65	ES					MADE GROUND: Black Tarmacadam.	0.75		40.83
						MADE GROUND: Dark grey slightly sandy angular fine to coarse gravel of limestone. Below 0.85m, black.			
1.00	D								
1.00	ES								
							1.20		40.38
1.20- 2.00	B					Soft reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies.			
1.20- 1.65	D	(DRY)			S6				
						Below 1.80m, very stiff, brown mottled grey.			
2.00- 2.45	B								
2.00	B					Below 2.10m, brown.			
2.00- 2.45	D	(DRY)			S23				
2.00	ES								
2.30	D								
							2.45		39.13
2.45- 2.50	B					Extremely weak reddish brown slightly gravelly fine to coarse grained SANDSTONE. Gravel is subrounded to rounded fine to medium of quartzite (recovered as gravelly sand).			
2.50	D								
2.50- 2.93	D	(DRY)			S50/ 275				
							2.93		38.65
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
2.93	0.10	Dynamic Sampler	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			19/06/15	08:00
2.93		DRY	19/06/15	11:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Logged by **CJ**
Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	WS04/2
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385743.6 E 394267.7 N	Ground Level	44.71 m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Properties Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
						Grass over TOPSOIL: Firm friable dark brown slightly sandy clay with many rootlets.	G.L.		44.71
0.25- 0.90	B					MADE GROUND: Dark grey and black sandy angular fine to coarse gravel including sandstone, clinker, slag and brick fragments. Some ash and glass fragments.	0.25		44.46
0.30	ES								
0.60	D								
0.60	D								
0.60	ES								
0.90- 1.20	B					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies.	0.90		43.81
1.00	D								
1.00	ES								
1.20- 2.00	B								
1.20- 1.65	D	(DRY)			S9				
2.00- 3.00	B					Below 2.00m, stiff.			
2.00	D								
2.00- 2.45	D	(DRY)			S17				
2.00	ES					Below 2.30m, brown.			
2.50	D								
3.00- 3.44	D	(DRY)			S50/ 285				
3.30- 3.40	B					Extremely weak reddish brown slightly gravelly fine to coarse grained SANDSTONE. Gravel is subrounded to rounded fine to medium of quartzite (recovered as slightly gravelly sand).	3.30		41.41
							3.44		41.27
						End of Borehole			

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
3.44	0.10	Dynamic Sampler	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			22/06/15	09:30
3.44		DRY	22/06/15	11:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

Logged by CJ

Figure 1 of 1

11/08/2015

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS05/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385700.3** E **394060.1** N
Ground Level **41.06** m OD

Sampling | Properties | Strata — Scale 1:25

Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Description	Depth	Legend	Level m OD
							G.L.		41.06
0.20- 0.80	B					Grass over TOPSOIL: Firm friable dark brown slightly sandy slightly gravelly clay with rootlets. Gravel is angular to subangular fine to medium including brick fragments.	0.20		40.86
0.30	D								
0.30	ES					MADE GROUND: Brown, dark grey and orangish brown slightly clayey sandy angular to subangular fine to coarse gravel including fragments of concrete and brick. Medium cobble content of concrete and brick.	0.40		40.66
						MADE GROUND: Intact brickwork.			
0.85	D					MADE GROUND: Firm dark grey slightly sandy clay with ash. Slight organic odour.	0.80		40.26
0.85	ES								
							1.10		39.96
1.30- 2.05	B					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies.			
1.30	D								
1.30- 1.75	D	(DRY)			S13				
1.30	ES					Below 1.60m, very stiff.			
1.80	D								
2.00- 2.45	D	(DRY)			S30				
2.05- 2.60	B						2.05		39.01
2.10	D					Extremely weak reddish brown slightly gravelly fine to coarse grained SANDSTONE. Gravel is subrounded to rounded fine to medium of quartzite (recovered as gravelly sand).			
2.60- 2.71	D	(DRY)			S50/40				
						End of Borehole	2.71		38.35

Boring | Progress | Groundwater

Depth	Hole Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	PB/DG	G.L.			19/06/15	11:00						None encountered.
2.71	0.10	Dynamic Sampler	PB/DG	2.71		DRY	19/06/15	14:00						

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar. Insufficient recovery for ES samples below 1.30m depth.
Backfill details from base of hole: arisings up to ground level.

Logged by **CJ**
Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS05/2**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385714.8** E **394242** N
Ground Level **44.54** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Properties Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
							G.L.		44.54
0.10- 0.95	B					Grass over TOPSOIL: Firm dark brown slightly sandy clay with many roots.	0.10		44.44
0.25	D					MADE GROUND: Dark greyish brown clayey very sandy angular to subangular fine to coarse gravel including sandstone, clinker and brick fragments. Medium cobble content of brick. Some ash. Occasional glass, ceramic and hardened tar. Hydrocarbon odour.			
0.25	ES								
0.50	D								
0.50	ES								
							0.95		43.59
0.95- 1.20	B					Firm becoming stiff reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies.			
1.00	D								
1.00	ES								
1.20- 2.00	B								
1.20- 1.65	D	(DRY)			S16				
2.00- 2.40	B								
2.00	D								
2.00- 2.44	D	(DRY)			S50/ 285	Extremely weak reddish brown slightly gravelly fine to coarse grained SANDSTONE. Gravel is subrounded to rounded fine to medium of quartzite (recovered as slightly gravelly sand).	2.05		42.49
2.00	ES								
						End of Borehole	2.44		42.10

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
2.44	0.10	Dynamic Sampler	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			22/06/15	11:00
2.44		DRY	22/06/15	12:30

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Logged by **CJ**
Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS06/1B**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385612.4** E **394041.2** N
Ground Level **39.91** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Properties Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
							G.L.		39.91
						Grass over TOPSOIL: Brown clayey fine to coarse sand with roots.			
0.15- 0.70	B						0.15		39.76
0.25	D					MADE GROUND: Dark grey, brown and red slightly clayey very sandy angular to subangular fine to coarse gravel including slate, clinker, limestone, sandstone and brick fragments. High cobble content of brick and sandstone. Some ash. Occasional fragments of glass, metal and plastic tile.			
0.25	ES								
0.60	D								
0.60	ES								
0.70	D					MADE GROUND: Black slightly sandy angular to subangular fine to coarse gravel of clinker and sandstone with ash.	0.70		39.21
							1.00		38.91
1.10	D					MADE GROUND: Soft dark brown slightly sandy slightly gravelly clay with ash. Gravel is angular to subangular fine to medium including clinker, sandstone and brick fragments (possible relic topsoil).			
1.10	ES								
1.20- 1.50	B								
1.20- 1.65	D	(DRY)			S5				
1.50- 2.00	B					Soft dark grey mottled reddish brown slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies.	1.50		38.41
2.00	D								
2.00- 2.45	D	(DRY)			S6				
2.00	ES								
2.10- 2.60	B								
2.40	D								
2.60- 3.80	B					Extremely weak reddish brown slightly gravelly fine to coarse grained SANDSTONE. Gravel is subrounded to rounded fine to medium of quartzite (recovered as gravelly sand).	2.60		37.31
3.00- 3.45	D	(DRY)			S29				
3.80- 3.91	D	(DRY)			S50/45				
						End of Borehole	3.91		36.00

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
3.91	0.10	Dynamic Sampler	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			19/06/15	14:00
3.91		DRY	19/06/16	17:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Logged by **CJ**
Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS06/2**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385625 E** **394205.3 N**
Ground Level **43.97** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
							G.L.		43.97
0.15- 0.40	B					Grass over TOPSOIL: Firm friable dark brown slightly sandy slightly gravelly clay with many rootlets. Gravel is angular fine to medium including brick fragments.	0.15		43.82
0.25	D								
0.25	ES								
0.40- 0.90	B					MADE GROUND: Dark grey slightly clayey very sandy angular to subangular fine to coarse gravel including sandstone, slate, clinker and brick fragments. With ash and some lumps of firm brown clay.	0.40		43.57
0.50	D								
0.50	ES								
0.90- 1.60	B					MADE GROUND: Firm to stiff brown slightly sandy slightly gravelly clay with a low cobble content of brick. Gravel is angular to rounded fine to coarse including sandstone and brick fragments and occasional ceramic.	0.90		43.07
1.00	D								
1.00	ES								
						MADE GROUND: Light grey and dark brown clayey very sandy angular to rounded fine to coarse gravel including sandstone and fragments of brick and mortar. Occasional lumps of firm brown clay. At 1.20m, very loose.			
						Below 1.50m, low cobble content of brick.			
1.60- 2.60	B								
1.60- 2.05	D	(DRY)			S3				
2.00	D								
2.00	ES								
2.60- 2.94	D	(DRY)			S50/ 190				
						Extremely weak reddish brown fine to coarse grained SANDSTONE (recovered as sand).	2.70		41.27
						End of Borehole	2.94		41.03

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
2.94	0.10	Dynamic Sampler	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			23/06/15	12:00
2.94		DRY	23/06/15	16:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Logged by **CJ**

Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project	PROJECT OAK SI SCOPE STAGE 2B	Engineer	COFFEY GEOTECHNICS	Borehole	WS07/2
				Project No	PN153349
Client	COFFEY GEOTECHNICS	National Grid Coordinates	385660.9 E 394178.9 N	Ground Level	43.38 m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Properties Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
							G.L.		43.38
						Grass over TOPSOIL: Firm friable dark brown sandy clay with many rootlets.	0.20		43.18
0.20- 0.65	B					MADE GROUND: Dark grey clayey very gravelly fine to coarse sand with a low cobble content of brick. Gravel is angular to subangular fine to coarse including clinker and brick fragments. With ash, roots and occasional metal and glass.			
0.30	D								
0.30	ES								
0.65- 1.00	B					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies. Occasional black roots. Below 0.80m, roots absent.	0.65		42.73
0.70	D								
0.70	ES								
1.00	D								
1.00	ES								
1.20- 1.60	B								
1.20- 1.65	D	(DRY)			S13				
						Below 1.50m, reddish brown.			
1.60- 1.70	D								
1.70- 1.90	B					Extremely weak reddish brown occasionally yellowish brown fine to coarse grained SANDSTONE (recovered as sand).	1.70		41.68
1.70- 1.91	D	(DRY)			S60/90				
						End of Borehole	1.91		41.47

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
1.91	0.10	Dynamic Sampler	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			22/06/15	13:00
1.91		DRY	22/06/15	15:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

AGS

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Logged by CJ

Figure 1 of 1

11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

BOREHOLE RECORD – Dynamic Sample

Project **PROJECT OAK SI SCOPE STAGE 2B**
Engineer **COFFEY GEOTECHNICS**
Borehole **WS08/2**
Project No **PN153349**

Client **COFFEY GEOTECHNICS**
National Grid Coordinates **385721.3 E 394189.9 N**
Ground Level **43.88** m OD

Scale 1:25

Sampling Depth	Sample Type	Depth Cased & (to Water)	Properties Strength kPa	w %	SPT N	Strata Description	Depth	Legend	Level m OD
							G.L.		43.88
0.20- 0.60	B					Grass over TOPSOIL: Soft to firm dark brown slightly sandy slightly gravelly clay with many rootlets. Gravel is angular fine to medium including brick fragments.	0.20		43.68
0.30	D								
0.30	ES								
						MADE GROUND: Dark grey sandy angular to subangular fine to coarse gravel including clinker, slag, brick fragments. Medium cobble content of brick. With ash. Occasional glass, ceramic and lumps of soft orangish brown and grey clay.	0.60		43.28
0.65	D								
0.65	ES					Firm reddish brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to coarse of various lithologies.			
1.10	D								
1.10	ES								
1.20- 1.65	D	(DRY)			S10				
1.30- 2.00	B						1.30		42.58
						Extremely weak reddish brown slightly gravelly fine to coarse grained SANDSTONE with occasional thin beds of sandy clay. Gravel is subrounded to rounded fine to medium of quartzite (recovered as slightly gravelly sand).			
1.60	D								
1.60	ES								
2.00- 2.31	D	(DRY)			S50/ 180				
						End of Borehole	2.31		41.57

Boring

Depth	Hole Dia	Technique	Crew
1.20	0.40	Inspection Pit	PB/DG
2.31	0.10	Dynamic Sampler	PB/DG

Progress

Depth of Hole	Depth Cased	Depth to Water	Date	Time
G.L.			22/06/15	15:00
2.31		DRY	22/06/15	17:00

Groundwater

Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
					None encountered.

Remarks

AGS

Inspection pit hand excavated to 1.20m depth.
ES Sample = 1 x 60ml VOC vial, 1 x 1kg plastic tub and 1 x 258ml amber jar.
Backfill details from base of hole: arisings up to ground level.

Logged by **CJ**

Figure **1 of 1**
11/08/2015

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:1999 + A2:2010

geotechnics

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS02/2	1.20	43.17	S	-	1	2	3	4	4	5	16	*
WS02/2	2.00	42.37	S	-	2	3	3	3	4	5	15	*
WS02/2	3.00	41.37	S	-	2	3	6	23	21/30		50/180	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS03/2	1.20	43.83	S	-	1	-	1	1	1	2	5	*
WS03/2	2.00	43.03	S	-	2	3	3	4	5	6	18	*
WS03/2	3.00	42.03	S	-	5	9	13	14	14	9/30	50/255	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS04/1B	1.20	40.38	S	-	1	-	1	1	2	2	6	*
WS04/1B	2.00	39.58	S	-	2	2	4	5	5	9	23	*
WS04/1B	2.50	39.08	S	-	8	8	8	12	15	15/50	50/275	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS04/2	1.20	43.51	S	-	1	1	1	2	3	3	9	*
WS04/2	2.00	42.71	S	-	2	2	4	4	4	5	17	*
WS04/2	3.00	41.71	S	-	4	5	9	12	14	15/60	50/285	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS05/1B	1.30	39.76	S	-	1	2	3	3	3	4	13	*
WS05/1B	2.00	39.06	S	-	3	4	5	6	7	12	30	*
WS05/1B	2.60	38.46	S	-	25/70		50/40				50/40	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS05/2	1.20	43.34	S	-	1	3	3	3	4	6	16	*
WS05/2	2.00	42.54	S	-	6	8	9	10	13	18/60	50/285	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
					0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		
WS06/1B	1.20	38.71	S	-	1	-	1	1	1	2	5	*
WS06/1B	2.00	37.91	S	-	1	-	1	1	2	2	6	*
WS06/1B	3.00	36.91	S	-	4	6	6	7	8	8	29	*
WS06/1B	3.80	36.11	S	-	25/65		50/45				50/45	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth	Level	Type	SWP (mm)	Seating Drive		Test Drive				SPT 'N' Value	Uncorrected SPT 'N'
	m bgl	m OD			0-75 (mm)	75-150 (mm)	0-75 (mm)	75-150 (mm)	150-225 (mm)	225-300 (mm)		10 20 30 40 50
WS06/2	1.60	42.37	S	-	1	-	1	-	1	1	3	*
WS06/2	2.60	41.37	S	-	1	2	3	25	22/40		50/190	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - *SPT Results Summary*

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS07/2	1.20	42.18	S	-	3	5	3	3	3	4	13	*
WS07/2	1.70	41.68	S	-	132	12/40	32	28/15			60/90	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

Fieldwork Results - SPT Results Summary

Project PROJECT OAK SI SCOPE STAGE 2B **Project No** PN153349

Client COFFEY GEOTECHNICS

Hole	Depth m bgl	Level m OD	Type	SWP (mm)	Seating Drive 0-75 (mm)	Seating Drive 75-150 (mm)	Test Drive 0-75 (mm)	Test Drive 75-150 (mm)	Test Drive 150-225 (mm)	Test Drive 225-300 (mm)	SPT 'N' Value	Uncorrected SPT 'N' 10 20 30 40 50
WS08/2	1.20	42.68	S	-	1	2	2	2	3	3	10	*
WS08/2	2.00	41.88	S	-	12	13/55	16	21	13/30		50/180	>

Driller	Paul Bridges
Hammer No.	MGWS5
Energy Ratio, Er (%)	82.00
Calibration Date	17/04/2015

Remarks
Equipment checked and calibration carried out in accordance with BS EN ISO 22476-3: 2005

-/- Blows/penetration (mm) after seating
-*/- Total blows/penetration (mm)
SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
C - SPT with cone
L - Split Spoon with liner used

testconsult
Specialist Testing Services

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Testconsult Ltd
Ruby House
40a Hardwick Grange
Woolston
Warrington
WA1 4RF

SPT Hammer Ref:	MGWS5
Test Date:	17/04/2015
Report Date:	24/04/2015
File Name:	MGWS5.spt
Test Operator:	TS

UKAS TESTING 0955

Instrumented Rod Data

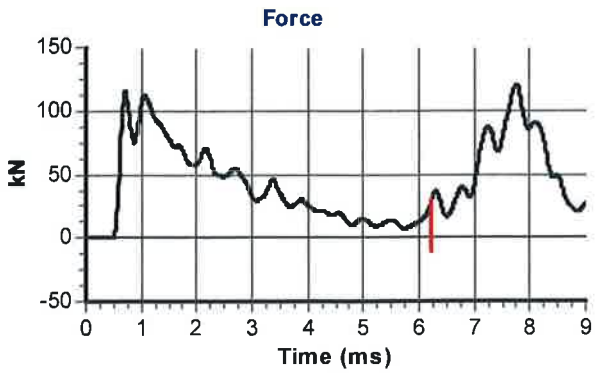
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	7.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	8965
Accelerometer No.2:	8966

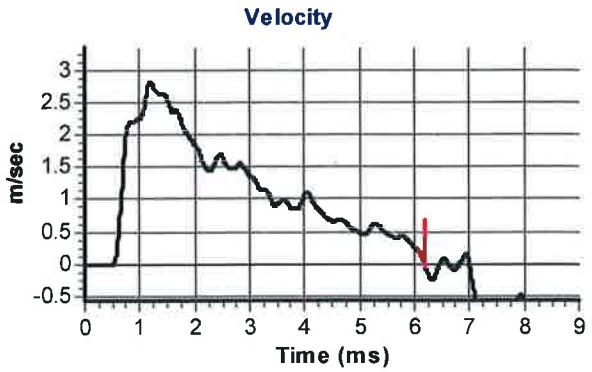
SPT Hammer Information

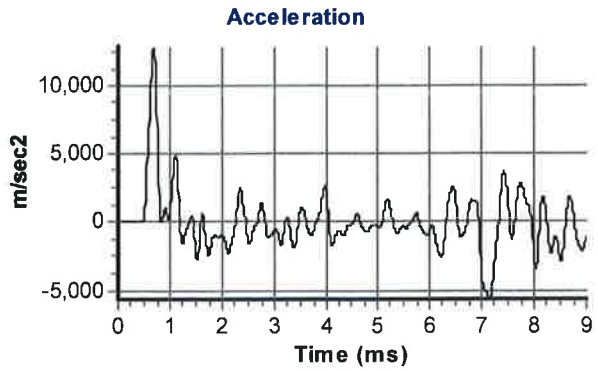
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	14.5

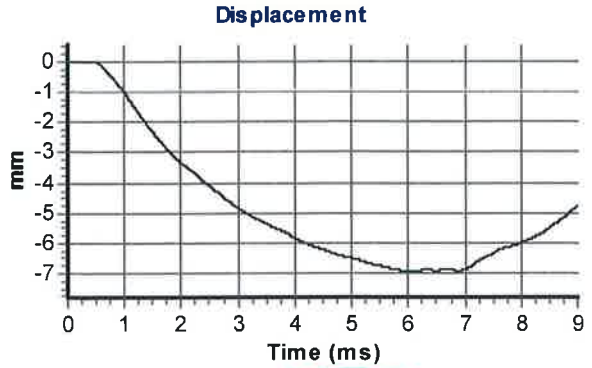
Comments / Location

Client: Macklin Geotech Ltd
Location: Testconsult Laboratory
Type: WS









Calculations

Area of Rod A (mm2):	1034
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	387

Energy Ratio E_r (%): **82**

TESTCONSULT CERTIFIED CALIBRATION

Signed: Dean Kendall
Title: Operations Manager

The recommended calibration interval is 12 months

SPTMAN ver.1.94 All rights reserved, Testconsult ©2010

Appendix B Groundsure Report

Copyright © 1976 - 2023 Buro Happold. All rights reserved

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

385731, 394144

Order Details

Date: 16/06/2022

Your ref: 0053454_Fallowfield

Our Ref: GS-8830801

Site Details

Location: 385733 394127

Area: 7.61 ha

Authority: Manchester City Council



Summary of findings p. 2

OS MasterMap site plan p.12

Aerial image p. 8

groundsure.com/insightuserguide

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	2	3	54	24	-
17	1.2	Historical tanks	0	0	0	0	-
17	1.3	Historical energy features	1	0	6	6	-
18	1.4	Historical petrol stations	0	0	0	0	-
18	1.5	Historical garages	0	2	2	18	-
19	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
20	2.1	Historical industrial land uses	6	3	93	42	-
26	2.2	Historical tanks	0	0	0	0	-
26	2.3	Historical energy features	3	0	10	13	-
27	2.4	Historical petrol stations	0	0	0	0	-
27	2.5	Historical garages	0	3	3	29	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
30	3.1	Active or recent landfill	0	0	0	0	-
30	3.2	Historical landfill (BGS records)	0	0	0	0	-
31	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
31	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
31	3.5	Historical waste sites	0	0	0	0	-
31	3.6	Licensed waste sites	0	0	0	0	-
31	3.7	Waste exemptions	4	0	8	20	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
35	4.1	Recent industrial land uses	1	1	10	-	-
36	4.2	Current or recent petrol stations	0	0	0	1	-
37	4.3	Electricity cables	0	0	0	0	-
37	4.4	Gas pipelines	0	0	0	0	-
37	4.5	Sites determined as Contaminated Land	0	0	0	0	-

37	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
37	4.7	Regulated explosive sites	0	0	0	0	-
38	4.8	Hazardous substance storage/usage	0	0	0	0	-
38	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
38	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
38	**4.11**	**Licensed pollutant release (Part A(2)/B)**	0	1	0	2	-
39	4.12	Radioactive Substance Authorisations	0	0	0	0	-
39	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
39	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
39	4.15	Pollutant release to public sewer	0	0	0	0	-
40	4.16	List 1 Dangerous Substances	0	0	0	0	-
40	4.17	List 2 Dangerous Substances	0	0	0	0	-
40	**4.18**	**Pollution Incidents (EA/NRW)**	0	0	0	1	-
40	4.19	Pollution inventory substances	0	0	0	0	-
41	4.20	Pollution inventory waste transfers	0	0	0	0	-
41	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
42	**5.1**	**Superficial aquifer**	Identified (within 500m)				
43	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
45	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
46	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
46	5.5	Groundwater vulnerability- local information	None (within 0m)				
47	**5.6**	**Groundwater abstractions**	0	0	0	0	1
48	5.7	Surface water abstractions	0	0	0	0	0
48	5.8	Potable abstractions	0	0	0	0	0
48	**5.9**	**Source Protection Zones**	1	0	0	0	-
49	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
50	**6.1**	**Water Network (OS MasterMap)**	0	0	2	-	-

51	6.2	Surface water features	0	0	1	-	-
51	6.3	WFD Surface water body catchments	1	-	-	-	-
51	6.4	WFD Surface water bodies	0	0	0	-	-
52	6.5	WFD Groundwater bodies	1	-	-	-	-

Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
53	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
53	7.2	Historical Flood Events	0	0	0	-	-
53	7.3	Flood Defences	0	0	0	-	-
54	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
54	7.5	Flood Storage Areas	0	0	0	-	-
55	7.6	Flood Zone 2	None (within 50m)				
55	7.7	Flood Zone 3	None (within 50m)				

Page	Section	Surface water flooding	
56	8.1	Surface water flooding	1 in 30 year, 0.3m - 1.0m (within 50m)

Page	Section	Groundwater flooding	
58	9.1	Groundwater flooding	High (within 50m)

Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
59	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
59	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
59	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
59	10.4	Special Protection Areas (SPA)	0	0	0	0	0
60	10.5	National Nature Reserves (NNR)	0	0	0	0	0
60	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
60	10.7	Designated Ancient Woodland	0	0	0	0	0
60	10.8	Biosphere Reserves	0	0	0	0	0
61	10.9	Forest Parks	0	0	0	0	0
61	10.10	Marine Conservation Zones	0	0	0	0	0
61	10.11	Green Belt	0	0	0	0	0
61	10.12	Proposed Ramsar sites	0	0	0	0	0

61	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
62	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
62	10.15	Nitrate Sensitive Areas	0	0	0	0	0
62	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
63	**10.17**	**SSSI Impact Risk Zones**	1	-	-	-	-
64	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
65	11.1	World Heritage Sites	0	0	0	-	-
66	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
66	11.3	National Parks	0	0	0	-	-
66	**11.4**	**Listed Buildings**	0	3	7	-	-
67	11.5	Conservation Areas	0	0	0	-	-
67	**11.6**	**Scheduled Ancient Monuments**	0	0	1	-	-
68	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
69	**12.1**	**Agricultural Land Classification**	Urban (within 250m)				
70	12.2	Open Access Land	0	0	0	-	-
70	12.3	Tree Felling Licences	0	0	0	-	-
70	12.4	Environmental Stewardship Schemes	0	0	0	-	-
70	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
71	**13.1**	**Priority Habitat Inventory**	1	3	10	-	-
72	13.2	Habitat Networks	0	0	0	-	-
72	13.3	Open Mosaic Habitat	0	0	0	-	-
73	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
74	**14.1**	**10k Availability**	Identified (within 500m)				
75	**14.2**	**Artificial and made ground (10k)**	0	0	6	12	-
77	**14.3**	**Superficial geology (10k)**	1	0	0	1	-

78	14.4	Landslip (10k)	0	0	0	0	-
79	14.5	Bedrock geology (10k)	1	0	0	3	-
80	14.6	Bedrock faults and other linear features (10k)	0	0	0	1	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
81	15.1	50k Availability	Identified (within 500m)				
82	15.2	Artificial and made ground (50k)	0	0	0	0	-
82	15.3	Artificial ground permeability (50k)	0	0	-	-	-
83	15.4	Superficial geology (50k)	1	0	1	1	-
84	15.5	Superficial permeability (50k)	Identified (within 50m)				
84	15.6	Landslip (50k)	0	0	0	0	-
84	15.7	Landslip permeability (50k)	None (within 50m)				
85	15.8	Bedrock geology (50k)	1	0	1	4	-
86	15.9	Bedrock permeability (50k)	Identified (within 50m)				
86	15.10	Bedrock faults and other linear features (50k)	0	0	0	2	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
87	16.1	BGS Boreholes	0	2	18	-	-
Page	Section	Natural ground subsidence					
89	17.1	Shrink swell clays	Very low (within 50m)				
90	17.2	Running sands	Low (within 50m)				
92	17.3	Compressible deposits	Negligible (within 50m)				
93	17.4	Collapsible deposits	Very low (within 50m)				
94	17.5	Landslides	Very low (within 50m)				
95	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
97	18.1	Natural cavities	0	0	0	0	-
98	18.2	BritPits	0	0	0	0	-
98	18.3	Surface ground workings	6	0	33	-	-
99	18.4	Underground workings	0	0	0	0	0
100	18.5	Historical Mineral Planning Areas	0	0	0	0	-

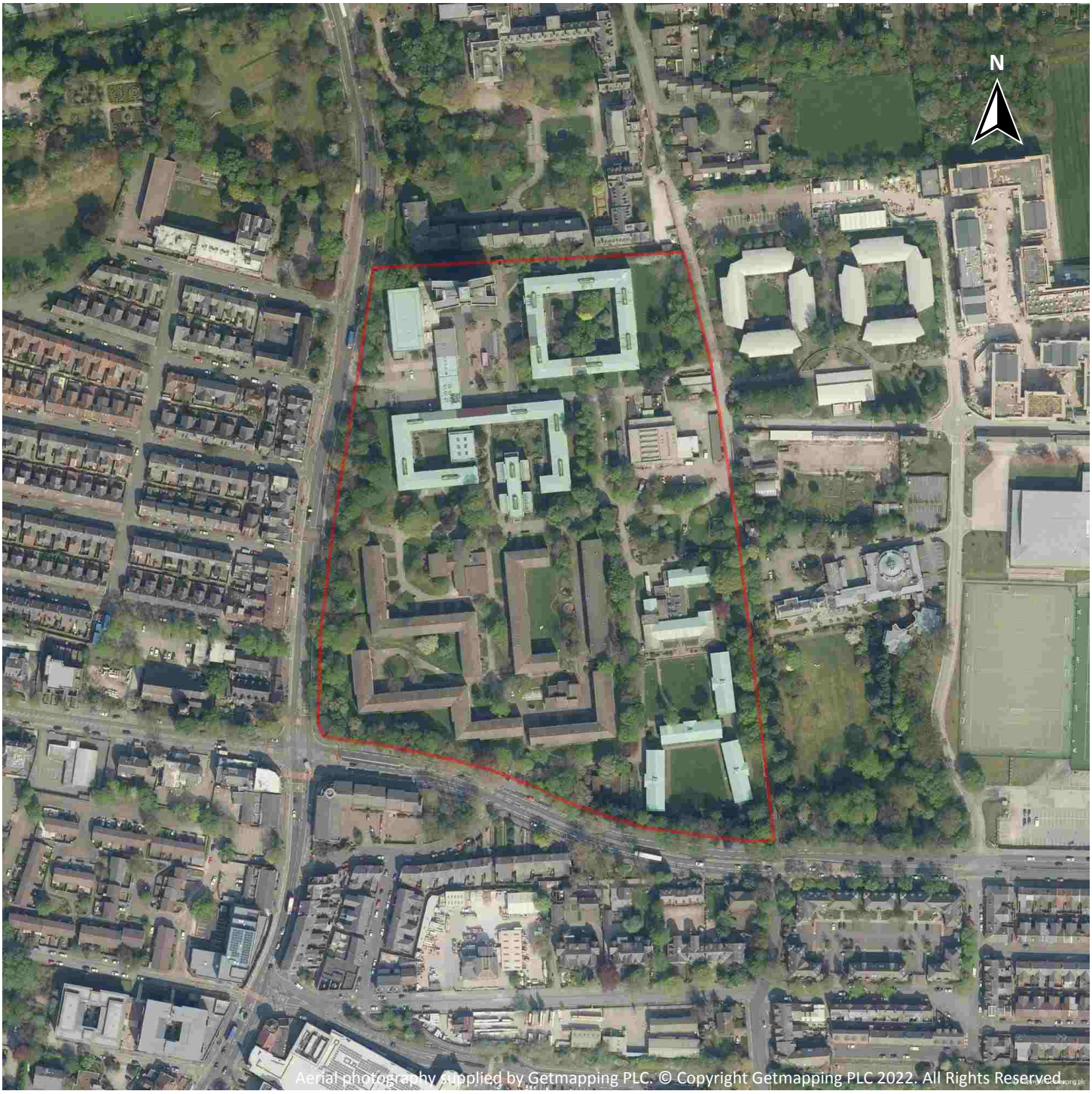
100	**18.6**	**Non-coal mining**	0	0	0	0	2
100	18.7	Mining cavities	0	0	0	0	0
101	**18.8**	**JPB mining areas**	Identified (within 0m)				
101	18.9	Coal mining	None (within 0m)				
101	18.10	Brine areas	None (within 0m)				
101	18.11	Gypsum areas	None (within 0m)				
102	18.12	Tin mining	None (within 0m)				
102	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
103	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
104	**20.1**	**BGS Estimated Background Soil Chemistry**	2	0	-	-	-
104	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
104	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
105	21.1	Underground railways (London)	0	0	0	-	-
105	21.2	Underground railways (Non-London)	0	0	0	-	-
106	21.3	Railway tunnels	0	0	0	-	-
106	**21.4**	**Historical railway and tunnel features**	0	0	26	-	-
107	21.5	Royal Mail tunnels	0	0	0	-	-
107	**21.6**	**Historical railways**	0	0	3	-	-
108	21.7	Railways	0	0	0	-	-
108	21.8	Crossrail 1	0	0	0	0	-
108	21.9	Crossrail 2	0	0	0	0	-
108	**21.10**	**HS2**	0	0	0	1	-

Recent aerial photograph



Capture Date: 22/04/2019

Site Area: 7.61ha

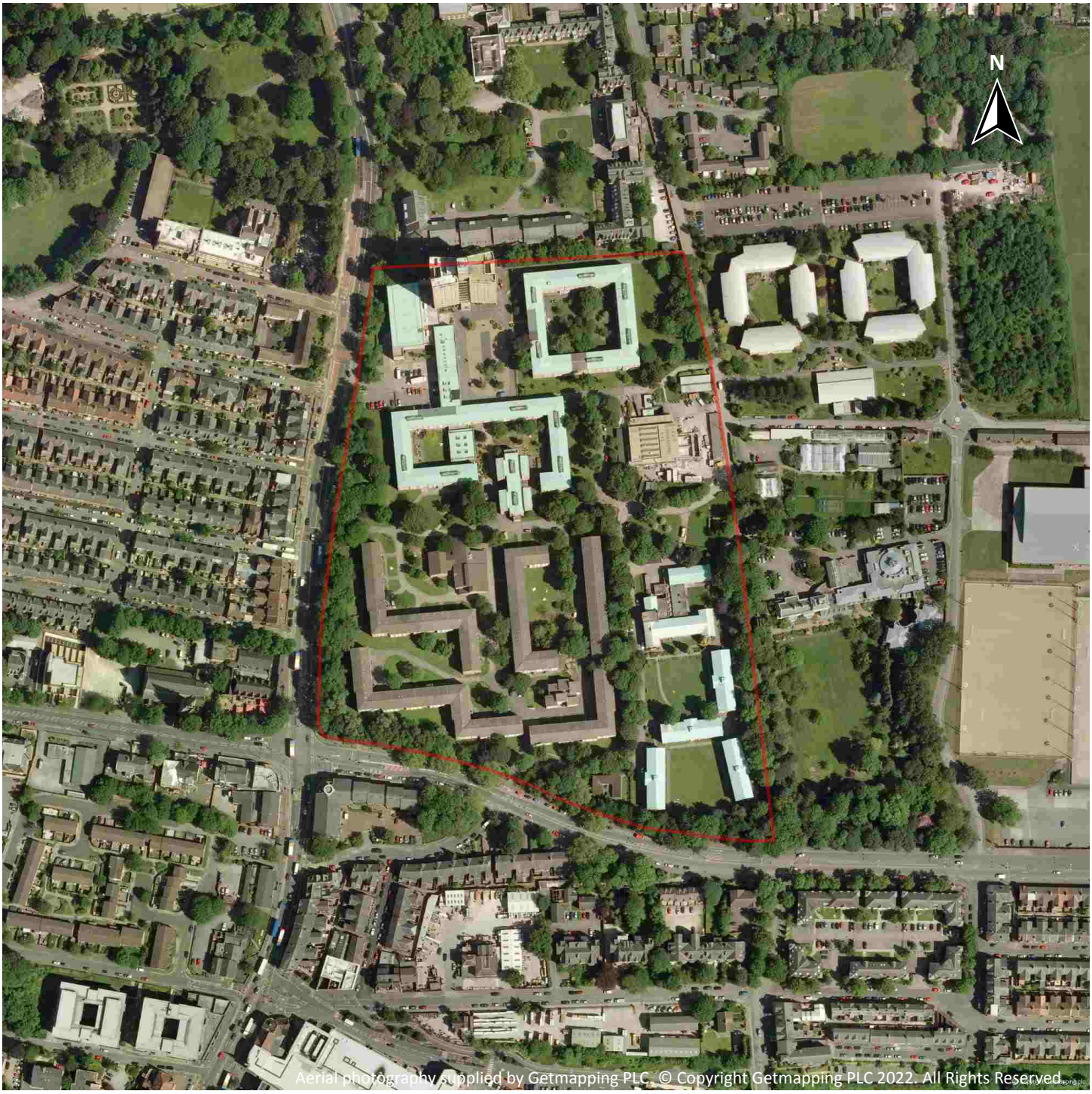
Recent site history - 2015 aerial photograph



Capture Date: 11/06/2015

Site Area: 7.61ha

Recent site history - 2009 aerial photograph



Capture Date: 02/06/2009

Site Area: 7.61ha

Recent site history - 2000 aerial photograph



Capture Date: 27/06/2000

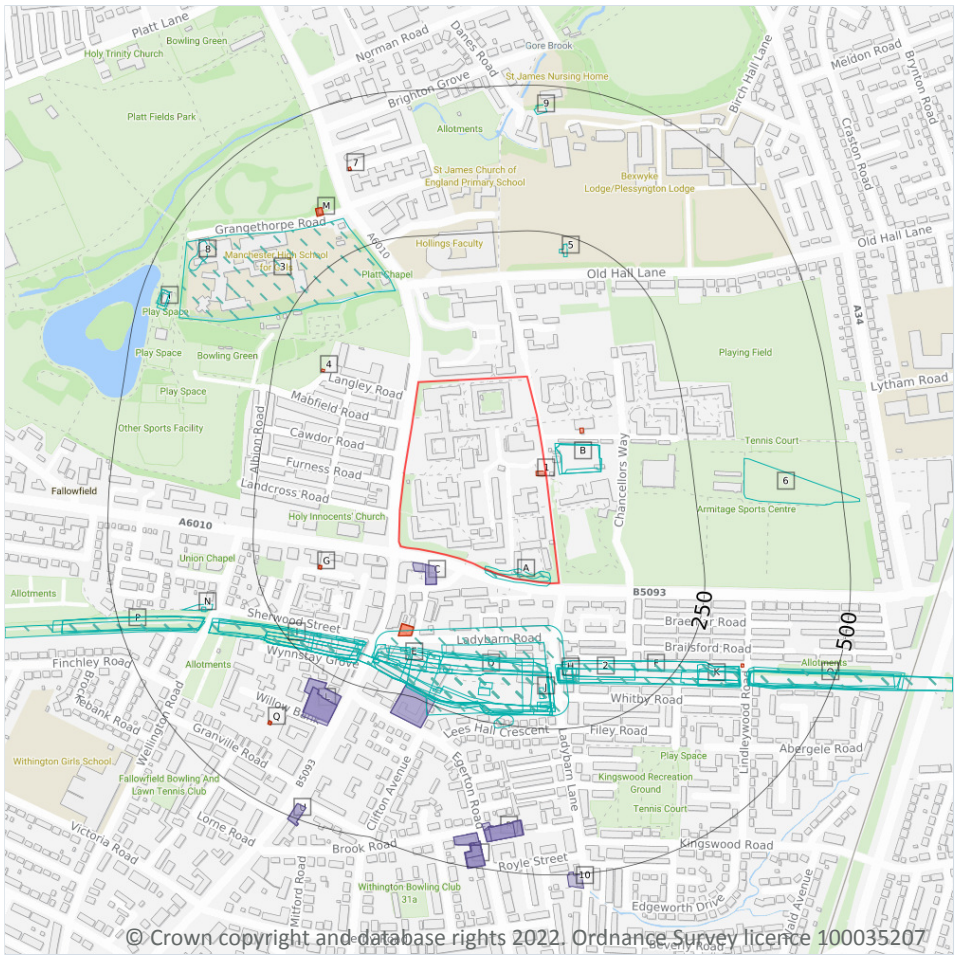
Site Area: 7.61ha

OS MasterMap site plan



Site Area: 7.61ha

1 Past land use



1.1 Historical industrial land uses

Records within 500m	83

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Heap**	**1955**	**951479**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Heap**	**1905 - 1938**	**991466**
B	21m E	Nursery	1916	915830
B	23m E	Nursery	1905	846212
B	23m E	Nursery	1923	872729
D	72m S	Goods Yard	1965 - 1974	858676
D	102m S	Nurseries	1905 - 1923	844868
D	130m S	Cuttings	1955	991834
D	131m S	Cuttings	1965	932561
F	135m S	Cuttings	1974	885069
F	135m S	Cuttings	1983	941216
F	135m S	Cuttings	1989	991169
D	136m S	Cuttings	1983 - 1989	874699
D	138m S	Cuttings	1892	896241
D	138m S	Cuttings	1934 - 1938	907483
2	140m S	Cuttings	1965	911165
H	140m S	Cuttings	1955	856533
H	145m S	Cuttings	1916	913547
F	147m S	Cuttings	1905	911232
H	147m S	Cuttings	1938	895792
H	147m S	Cuttings	1923	902542
H	147m S	Cuttings	1934	961387
F	147m S	Cuttings	1892	989159
D	151m S	Railway Sidings	1955	897675
D	153m S	Railway Sidings	1965	874077
D	153m S	Railway Sidings	1974	884850
D	159m S	Railway Sidings	1905	881542
D	159m S	Railway Sidings	1916	887932
D	159m S	Railway Sidings	1892	916607

ID	Location	Land use	Dates present	Group ID
D	159m S	Railway Sidings	1923 - 1938	985805
3	162m N	Hospital	1934 - 1938	883559
E	167m SW	Railway Station	1955	896302
E	168m S	Railway Building	1934 - 1938	850402
E	168m S	Railway Station	1965 - 1974	979556
E	173m SW	Railway Station	1892 - 1938	943476
I	174m S	Cuttings	1923 - 1974	849473
I	175m S	Railway Building	1934 - 1938	893946
I	175m S	Railway Building	1905 - 1923	844893
J	179m S	Railway Building	1905 - 1938	895924
I	180m SW	Cuttings	1983	961261
D	180m S	Railway Building	1916 - 1923	979348
I	181m S	Cuttings	1892 - 1905	883393
D	182m S	Railway Building	1974	820245
I	184m SW	Cuttings	1916	950800
I	185m SW	Railway Building	1934 - 1938	962211
I	190m S	Railway Sidings	1974	878123
I	190m S	Railway Sidings	1965	896404
I	190m S	Railway Sidings	1955	976259
D	193m S	Railway Building	1892 - 1938	986859
I	202m SW	Railway Building	1934 - 1938	890721
J	203m S	Railway Buildings	1905	833693
J	205m S	Railway Building	1892	820244
I	208m S	Railway Building	1934 - 1938	859914
I	208m S	Railway Building	1905 - 1923	915480
I	211m SW	Cuttings	1989	944822
J	214m S	Unspecified Ground Workings	1923	800652
5	215m N	Brick Kiln	1851	811030

ID	Location	Land use	Dates present	Group ID
D	218m S	Railway Buildings	1923	833692
J	232m S	Unspecified Pit	1905	840531
K	259m SE	Cuttings	1916 - 1923	905516
K	276m SE	Cuttings	1955	853718
K	283m SE	Cuttings	1934 - 1938	849456
K	321m SE	Cuttings	1965	976682
6	333m E	Unspecified Ground Workings	1965	800653
N	337m W	Valve House	1916 - 1923	961098
N	350m W	Valve House	1938	957942
O	357m SE	Cuttings	1955	979000
P	358m W	Cuttings	1965	937633
P	358m W	Cuttings	1983 - 1989	942118
P	358m W	Cuttings	1974	986931
O	359m SE	Cuttings	1916	975709
P	360m W	Cuttings	1892 - 1938	879919
O	360m SE	Cuttings	1923	866347
O	360m SE	Cuttings	1905	889359
P	361m W	Cuttings	1955	991709
O	362m SE	Cuttings	1934 - 1938	960043
O	362m SE	Cuttings	1892	881685
O	366m SE	Cuttings	1965 - 1989	896649
8	420m NW	Unspecified Pit	1934 - 1938	975537
9	450m N	Grave Yard	1851	817300
T	450m W	Boat House	1934 - 1938	940701
T	453m W	Boat House	1955 - 1974	958998
T	453m W	Boat House	1983 - 1989	965287

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	0

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	13

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Electricity Substation**	**1988 - 1995**	**76265**
B	69m E	Electricity Substation	1995	62150
E	130m S	Electricity Substation	1988	83256
E	131m S	Electricity Substation	1994 - 1996	84462
G	139m W	Electricity Substation	1995	74977
G	139m W	Electricity Substation	1958 - 1984	81401
4	162m W	Electricity Substation	1992	62148
M	330m NW	Electricity Substation	1983 - 1992	65353
M	330m NW	Electricity Substation	1956 - 1966	70760
K	342m SE	Electricity Substation	1988 - 1992	75305
Q	373m SW	Electricity Transformer	1958 - 1984	70853
Q	375m SW	Electricity Substation	1995	62149
7	381m N	Electricity Substation	1984 - 1992	75858

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	22

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
C	23m S	Garage	1957	27111
C	23m S	Garage	1971	21119
D	229m S	Garage	1957 - 1971	27185
D	229m S	Garage	1957	23288
L	266m SW	Garage	1978 - 1984	24819
L	267m SW	Garage	1958	23100
L	284m SW	Garage	1957	20786
L	284m SW	Garage	1957	22902
R	409m S	Garage	1994	22117
R	409m S	Garage	1957	22064
R	410m S	Garage	1981 - 1988	27200
R	415m S	Garage	1957 - 1971	26644
S	440m S	Garage	1981 - 1995	25661
S	440m S	Garage	1996	21068

ID	Location	Land use	Dates present	Group ID
S	454m S	Garage	1957	20832
S	458m S	Garage	1971	24054
S	458m S	Garage	1957	27829
S	461m S	Garage	1979 - 1982	27126
S	461m S	Garage	1992	23760
U	475m S	Garage	1978 - 1984	25367
U	475m S	Garage	1958	21149
10	496m S	Garage	1957	26920

This data is sourced from Ordnance Survey / Groundsure.

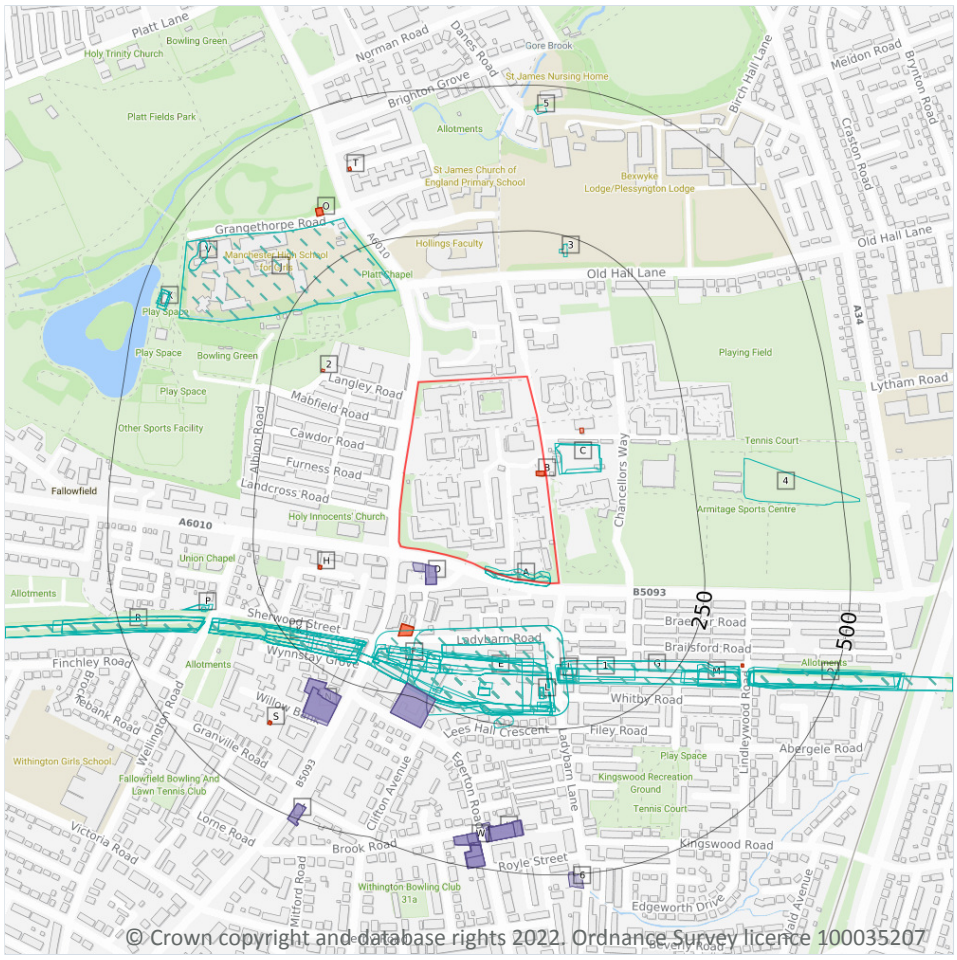
1.6 Historical military land

Records within 500m	**0**

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

2.1 Historical industrial land uses

Records within 500m	144

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Heap**	**1938**	**991466**
A	**On site**	**Unspecified Heap**	**1934**	**991466**
A	**On site**	**Unspecified Heap**	**1916**	**991466**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Unspecified Heap**	**1905**	**991466**
A	**On site**	**Unspecified Heap**	**1923**	**991466**
A	**On site**	**Unspecified Heap**	**1955**	**951479**
C	21m E	Nursery	1916	915830
C	23m E	Nursery	1905	846212
C	23m E	Nursery	1923	872729
E	72m S	Goods Yard	1974	858676
E	72m S	Goods Yard	1965	858676
E	102m S	Nurseries	1916	844868
E	102m S	Nurseries	1905	844868
E	102m S	Nurseries	1923	844868
E	130m S	Cuttings	1955	991834
E	131m S	Cuttings	1965	932561
G	135m S	Cuttings	1974	885069
G	135m S	Cuttings	1983	941216
G	135m S	Cuttings	1989	991169
E	136m S	Cuttings	1983	874699
E	136m S	Cuttings	1989	874699
E	138m S	Cuttings	1938	907483
E	138m S	Cuttings	1934	907483
E	138m S	Cuttings	1892	896241
1	140m S	Cuttings	1965	911165
I	140m S	Cuttings	1955	856533
I	145m S	Cuttings	1916	913547
G	147m S	Cuttings	1905	911232
I	147m S	Cuttings	1923	902542
I	147m S	Cuttings	1938	895792
I	147m S	Cuttings	1934	961387

ID	Location	Land Use	Date	Group ID
G	147m S	Cuttings	1892	989159
E	151m S	Railway Sidings	1955	897675
E	153m S	Railway Sidings	1974	884850
E	153m S	Railway Sidings	1965	874077
E	159m S	Railway Sidings	1938	985805
E	159m S	Railway Sidings	1934	985805
E	159m S	Railway Sidings	1916	887932
E	159m S	Railway Sidings	1905	881542
E	159m S	Railway Sidings	1892	916607
E	159m S	Railway Sidings	1923	985805
J	162m N	Hospital	1938	883559
J	162m N	Hospital	1934	883559
F	167m SW	Railway Station	1955	896302
F	168m S	Railway Building	1938	850402
F	168m S	Railway Building	1934	850402
F	168m S	Railway Station	1974	979556
F	168m S	Railway Station	1965	979556
F	173m SW	Railway Station	1938	943476
F	173m SW	Railway Station	1934	943476
F	173m SW	Railway Station	1916	943476
F	173m SW	Railway Station	1905	943476
F	173m SW	Railway Station	1892	943476
F	173m SW	Railway Station	1923	943476
K	174m S	Cuttings	1974	849473
K	174m S	Cuttings	1955	849473
K	174m S	Cuttings	1965	849473
K	175m S	Railway Building	1938	893946
K	175m S	Railway Building	1934	893946

ID	Location	Land Use	Date	Group ID
K	175m S	Railway Building	1916	844893
K	175m S	Railway Building	1905	844893
K	175m S	Railway Building	1923	844893
L	179m S	Railway Building	1938	895924
L	179m S	Railway Building	1934	895924
L	179m S	Railway Building	1916	895924
L	179m S	Railway Building	1905	895924
L	179m S	Railway Building	1923	895924
K	180m SW	Cuttings	1983	961261
E	180m S	Railway Building	1923	979348
K	181m S	Cuttings	1923	849473
K	181m S	Cuttings	1938	849473
K	181m S	Cuttings	1934	849473
K	181m S	Cuttings	1905	883393
K	181m S	Cuttings	1892	883393
E	182m S	Railway Building	1974	820245
E	183m S	Railway Building	1916	979348
K	184m SW	Cuttings	1916	950800
K	185m SW	Railway Building	1938	962211
K	185m SW	Railway Building	1934	962211
K	190m S	Railway Sidings	1974	878123
K	190m S	Railway Sidings	1955	976259
K	190m S	Railway Sidings	1965	896404
E	193m S	Railway Building	1938	986859
E	193m S	Railway Building	1934	986859
E	193m S	Railway Building	1916	986859
E	193m S	Railway Building	1905	986859
E	193m S	Railway Building	1892	986859

ID	Location	Land Use	Date	Group ID
E	193m S	Railway Building	1923	986859
K	202m SW	Railway Building	1938	890721
K	202m SW	Railway Building	1934	890721
L	203m S	Railway Buildings	1905	833693
L	205m S	Railway Building	1892	820244
K	208m S	Railway Building	1938	859914
K	208m S	Railway Building	1934	859914
K	208m S	Railway Building	1916	915480
K	208m S	Railway Building	1905	915480
K	208m S	Railway Building	1923	915480
K	211m SW	Cuttings	1989	944822
L	214m S	Unspecified Ground Workings	1923	800652
3	215m N	Brick Kiln	1851	811030
E	218m S	Railway Buildings	1923	833692
L	232m S	Unspecified Pit	1905	840531
M	259m SE	Cuttings	1916	905516
M	264m SE	Cuttings	1923	905516
M	276m SE	Cuttings	1955	853718
M	283m SE	Cuttings	1938	849456
M	283m SE	Cuttings	1934	849456
M	321m SE	Cuttings	1965	976682
4	333m E	Unspecified Ground Workings	1965	800653
P	337m W	Valve House	1923	961098
P	343m W	Valve House	1916	961098
P	350m W	Valve House	1938	957942
Q	357m SE	Cuttings	1955	979000
R	358m W	Cuttings	1974	986931
R	358m W	Cuttings	1983	942118

ID	Location	Land Use	Date	Group ID
R	358m W	Cuttings	1989	942118
R	358m W	Cuttings	1965	937633
Q	359m SE	Cuttings	1916	975709
R	360m W	Cuttings	1923	879919
R	360m W	Cuttings	1938	879919
R	360m W	Cuttings	1934	879919
R	360m W	Cuttings	1916	879919
R	360m W	Cuttings	1905	879919
R	360m W	Cuttings	1892	879919
Q	360m SE	Cuttings	1923	866347
Q	360m SE	Cuttings	1905	889359
R	361m W	Cuttings	1955	991709
Q	362m SE	Cuttings	1938	960043
Q	362m SE	Cuttings	1934	960043
Q	362m SE	Cuttings	1892	881685
Q	366m SE	Cuttings	1974	896649
Q	366m SE	Cuttings	1983	896649
Q	366m SE	Cuttings	1989	896649
Q	366m SE	Cuttings	1965	896649
V	420m NW	Unspecified Pit	1938	975537
V	420m NW	Unspecified Pit	1934	975537
5	450m N	Grave Yard	1851	817300
X	450m W	Boat House	1938	940701
X	450m W	Boat House	1934	940701
X	453m W	Boat House	1974	958998
X	453m W	Boat House	1983	965287
X	453m W	Boat House	1989	965287
X	453m W	Boat House	1955	958998

ID	Location	Land Use	Date	Group ID
X	453m W	Boat House	1965	958998

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**0**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**26**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
B	**On site**	**Electricity Substation**	**1995**	**76265**
B	**On site**	**Electricity Substation**	**1994**	**76265**
B	**On site**	**Electricity Substation**	**1988**	**76265**
C	69m E	Electricity Substation	1995	62150
F	130m S	Electricity Substation	1988	83256
F	131m S	Electricity Substation	1996	84462
F	131m S	Electricity Substation	1995	84462
F	131m S	Electricity Substation	1994	84462
H	139m W	Electricity Substation	1995	74977
H	139m W	Electricity Substation	1958	81401
H	139m W	Electricity Substation	1984	81401
H	139m W	Electricity Substation	1978	81401

ID	Location	Land Use	Date	Group ID
2	162m W	Electricity Substation	1992	62148
O	330m NW	Electricity Substation	1992	65353
O	330m NW	Electricity Substation	1956	70760
O	330m NW	Electricity Substation	1966	70760
O	330m NW	Electricity Substation	1956	70760
O	330m NW	Electricity Substation	1983	65353
M	342m SE	Electricity Substation	1988	75305
M	343m SE	Electricity Substation	1992	75305
S	373m SW	Electricity Transformer	1984	70853
S	373m SW	Electricity Transformer	1978	70853
S	374m SW	Electricity Transformer	1958	70853
S	375m SW	Electricity Substation	1995	62149
T	381m N	Electricity Substation	1992	75858
T	382m N	Electricity Substation	1984	75858

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	35

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

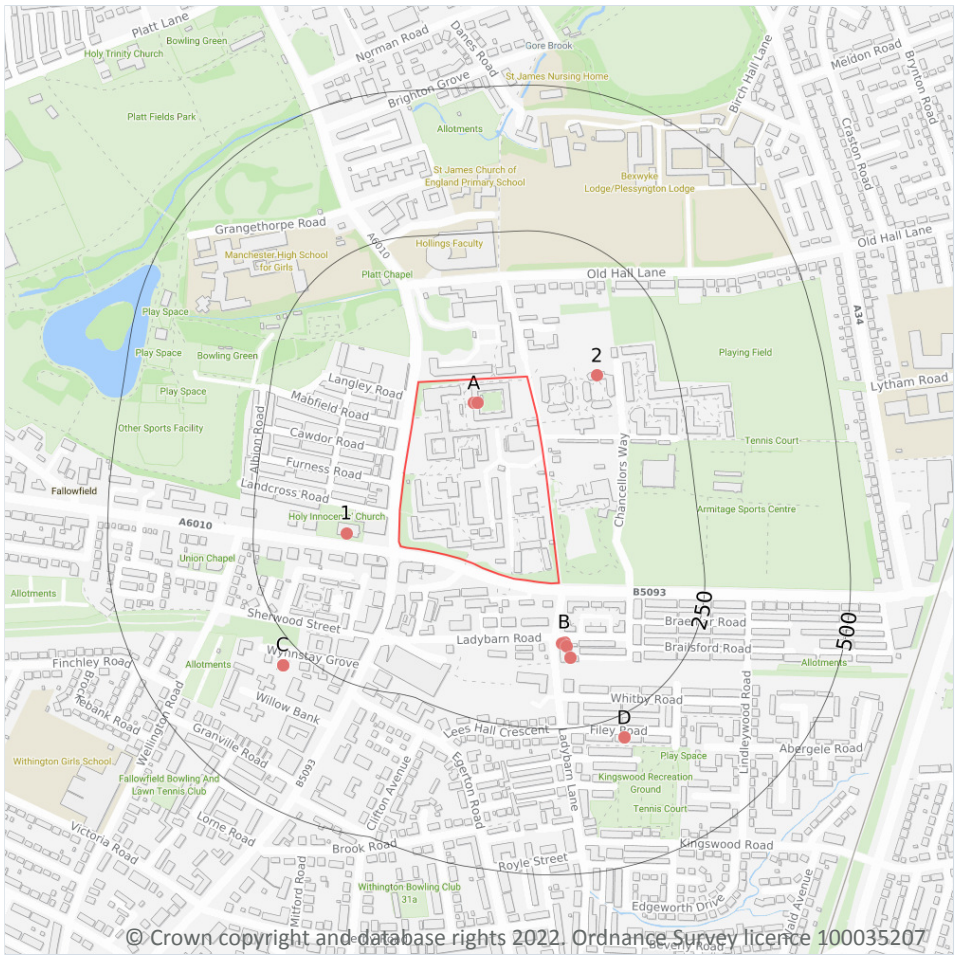
Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
D	23m S	Garage	1957	27111
D	23m S	Garage	1971	21119
D	24m S	Garage	1957	27111
E	229m S	Garage	1957	27185
E	229m S	Garage	1971	27185
E	229m S	Garage	1957	23288
N	266m SW	Garage	1984	24819
N	266m SW	Garage	1978	24819
N	267m SW	Garage	1958	23100
N	284m SW	Garage	1957	20786
N	284m SW	Garage	1957	22902
U	409m S	Garage	1994	22117
U	409m S	Garage	1957	22064
U	410m S	Garage	1981	27200
U	410m S	Garage	1988	27200
U	415m S	Garage	1957	26644
U	415m S	Garage	1971	26644
W	440m S	Garage	1981	25661
W	440m S	Garage	1996	21068
W	440m S	Garage	1995	25661
W	440m S	Garage	1994	25661
W	440m S	Garage	1988	25661
W	454m S	Garage	1957	20832
W	458m S	Garage	1957	27829
W	458m S	Garage	1971	24054
W	460m S	Garage	1957	27829
W	460m S	Garage	1987	25661
W	461m S	Garage	1979	27126

ID	Location	Land Use	Date	Group ID
W	461m S	Garage	1979	27126
W	461m S	Garage	1982	27126
W	461m S	Garage	1992	23760
Y	475m S	Garage	1984	25367
Y	475m S	Garage	1978	25367
Y	475m S	Garage	1958	21149
6	496m S	Garage	1957	26920

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	32

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 30**

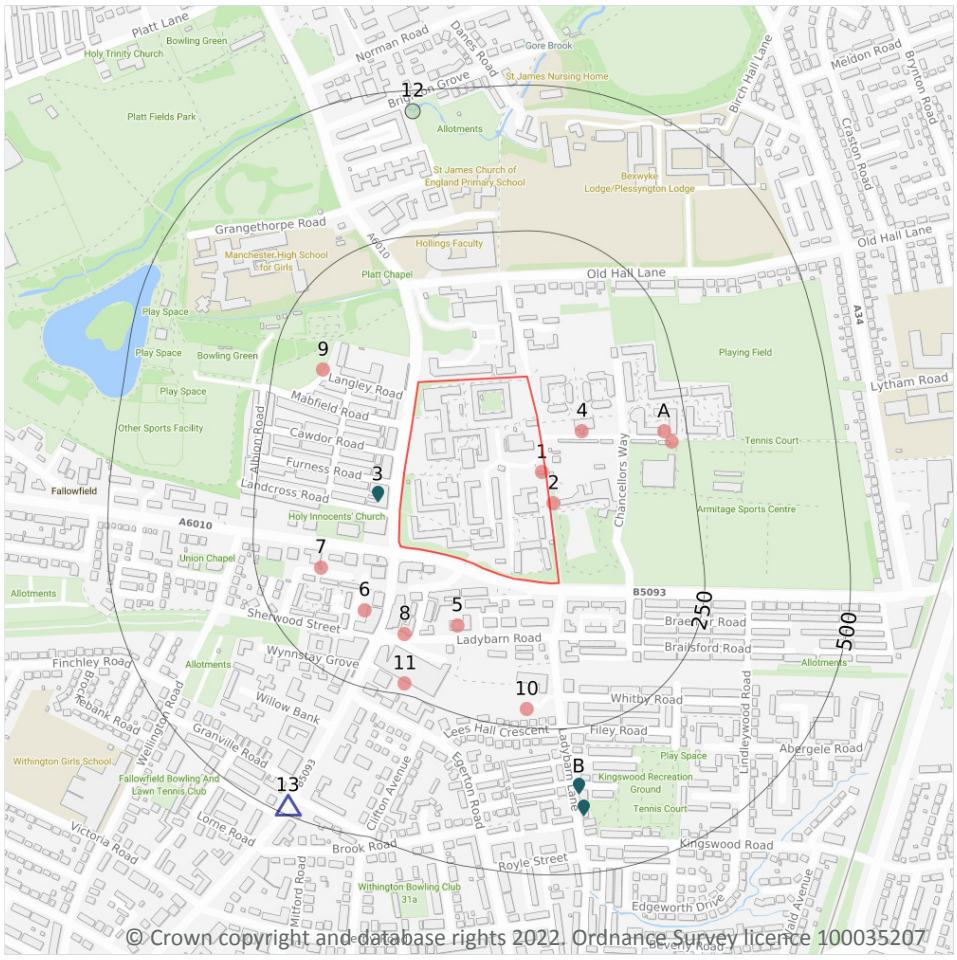
ID	Location	Site	Reference	Category	Sub-Category	Description
A	**On site**	**Owens Park, 293 Wilmslow Road, Manchester, M14 6HD**	**WEX167796**	**Treating waste exemption**	**Not on a farm**	**Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising**
A	**On site**	**The Limes, Whitworth Lane, Manchester, M14 6HD**	**WEX167914**	**Storing waste exemption**	**Not on a farm**	**Storage of waste in a secure place**
A	**On site**	**The Limes, Whitworth Lane, Fallowfield, M14 6HD**	**WEX006050**	**Storing waste exemption**	**Not on a farm**	**Storage of waste in a secure place**
A	**On site**	**Owens Park, 293 Wilmslow Rd, Manchester, M14 6HD**	**WEX006499**	**Treating waste exemption**	**Not on a farm**	**Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising**
1	91m W	2, WILBRAHAM ROAD, MANCHESTER, M14 6JZ	WEX090685	Disposing of waste exemption	Not on a farm	Burning waste in the open
B	103m S	Ladybarn Lane Chemist, 3 Ladybarn Lane, Manchester, M14 6NQ	WEX251938	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
B	103m S	Ladybarn Lane Chemist, 3 Ladybarn Lane, Manchester, M14 6NQ	WEX293089	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
B	104m S	5 Ladybarn Lane Manchester Manchester M14 6NQ	EPR/XF0406VJ/A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting and de-naturing of controlled drugs for disposal
B	110m S	Ladybarn Lane Chemist 5 Ladybarn Lane M14 6NQ	EPR/ME5383YW/A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting and de-naturing of controlled drugs for disposal
2	116m E	Land Off Chancellors Way, Fallowfield Campus, Manchester, M14 6YZ	WEX100775	Using waste exemption	Not on a farm	Use of waste in construction
B	131m S	Ladybarn Lane Chemist, 3 Ladybarn Lane, Manchester, M14 6NQ	WEX156982	Treating waste exemption	Not on a Farm	Sorting and de-naturing of controlled drugs for disposal
B	131m S	Ladybarn Lane Chemist, 3 Ladybarn Lane, Manchester, M14 6NQ	WEX110527	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
C	288m SW	-	WEX266956	Storing waste exemption	Not on a farm	Storage of waste in a secure place

ID	Location	Site	Reference	Category	Sub-Category	Description
C	288m SW	-	WEX266956	Storing waste exemption	Not on a farm	Storage of waste in secure containers
C	288m SW	-	WEX266956	Disposing of waste exemption	Not on a farm	Disposal by incineration
C	288m SW	-	WEX266956	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX278954	Storing waste exemption	Not on a farm	Storage of waste in a secure place
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX278954	Storing waste exemption	Not on a farm	Storage of waste in secure containers
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX278954	Disposing of waste exemption	Not on a farm	Disposal by incineration
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX278954	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX137223	Disposing of waste exemption	Not on a farm	Disposal by incineration
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX137223	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX137223	Storing waste exemption	Not on a farm	Storage of waste in secure containers
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX137223	Storing waste exemption	Not on a farm	Storage of waste in a secure place
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX125378	Disposing of waste exemption	Not on a farm	Disposal by incineration
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX125378	Storing waste exemption	Not on a farm	Storage of waste in secure containers
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX125378	Storing waste exemption	Not on a farm	Storage of waste in a secure place
C	288m SW	5, WYNNSTAY GROVE, MANCHESTER, M14 6XG	WEX125378	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
D	289m SE	28, FILEY ROAD, MANCHESTER, M14 6GQ	WEX284373	Disposing of waste exemption	Not on a farm	Burning waste in the open

ID	Location	Site	Reference	Category	Sub-Category	Description
D	289m SE	28, FILEY ROAD, MANCHESTER, M14 6GQ	WEX284373	Disposing of waste exemption	Not on a farm	Disposal by incineration
D	289m SE	28, FILEY ROAD, MANCHESTER, M14 6GQ	WEX144217	Disposing of waste exemption	Not on a farm	Disposal by incineration
D	289m SE	28, FILEY ROAD, MANCHESTER, M14 6GQ	WEX144217	Disposing of waste exemption	Not on a farm	Burning waste in the open

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m	12

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Company	Address	Activity	Category
1	**On site**	**Electricity Sub Station**	**Greater Manchester, M14**	**Electrical Features**	**Infrastructure and Facilities**
2	7m E	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
4	72m E	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
5	107m SW	HSS Hire Service Group Ltd	Harburg House 11, Ladybarn Road, Manchester, Greater Manchester, M14 6WN	Construction and Tool Hire	Hire Services
6	126m SW	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
7	141m W	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
8	147m S	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
9	165m W	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
A	210m E	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
10	219m S	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
A	222m E	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities
11	231m S	Electricity Sub Station	Greater Manchester, M14	Electrical Features	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m **1**

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Company	Address	LPG	Status
13	485m SW	SHELL	385, Wilmslow Road, Fallowfield, Manchester, Greater Manchester, M14 6AH	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	3

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Address	Details	
3	41m W	Mr Bubbles, 246 Wilmslow Road, Fallowfield, Manchester, M14 6LD	Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
B	350m S	S. Marshall Motor Engineers, 65-67 Ladybarn Lane, Fallowfield, M14 6YL	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

ID	Location	Address	Details	
B	388m S	Regalead Ltd, 65-67 Ladybarn Lane, Fallowfield M14 6YL	Process: Waste Oil Burner 0.4 MW Status: New Legislation Applies Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	0

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	1

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Details	
12	465m N	Incident Date: 12/04/2013 Incident Identification: 1101954 Pollutant: Inorganic Chemicals/Products Pollutant Description: Other Inorganic Chemical or Product	Water Impact: Category 2 (Significant) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

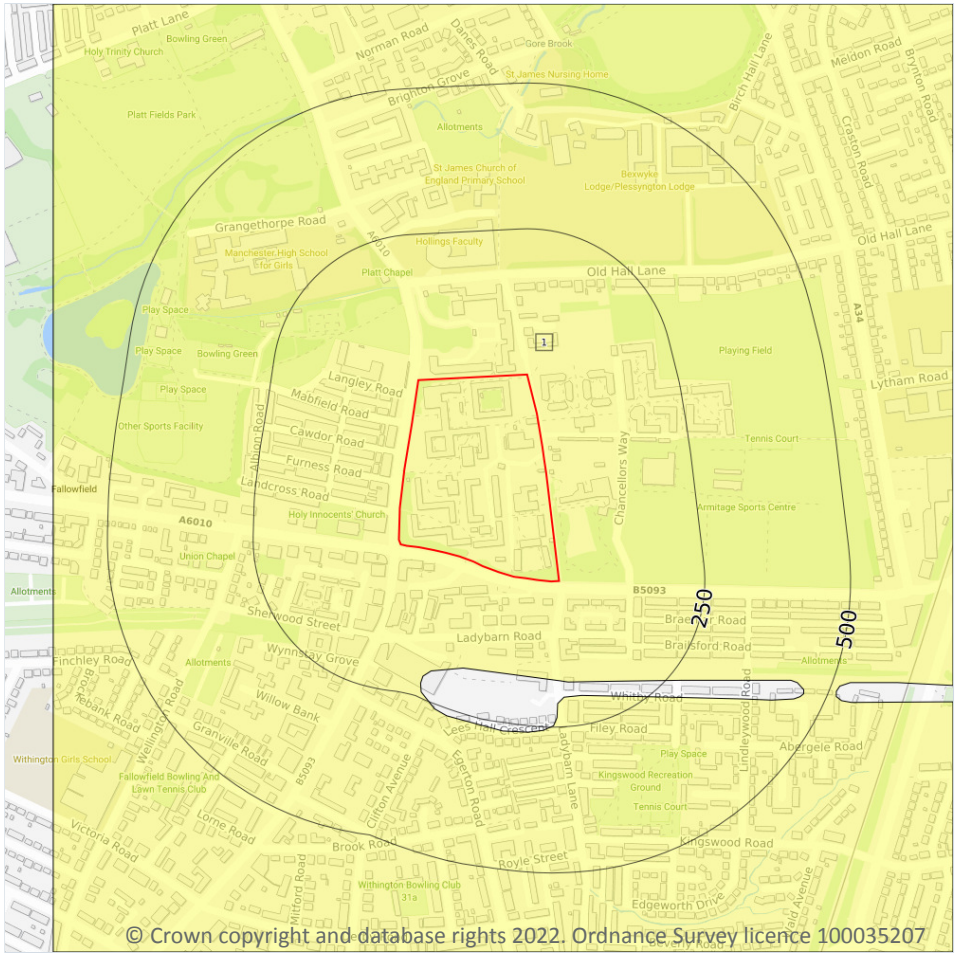
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



5.1 Superficial aquifer

Records within 500m	1

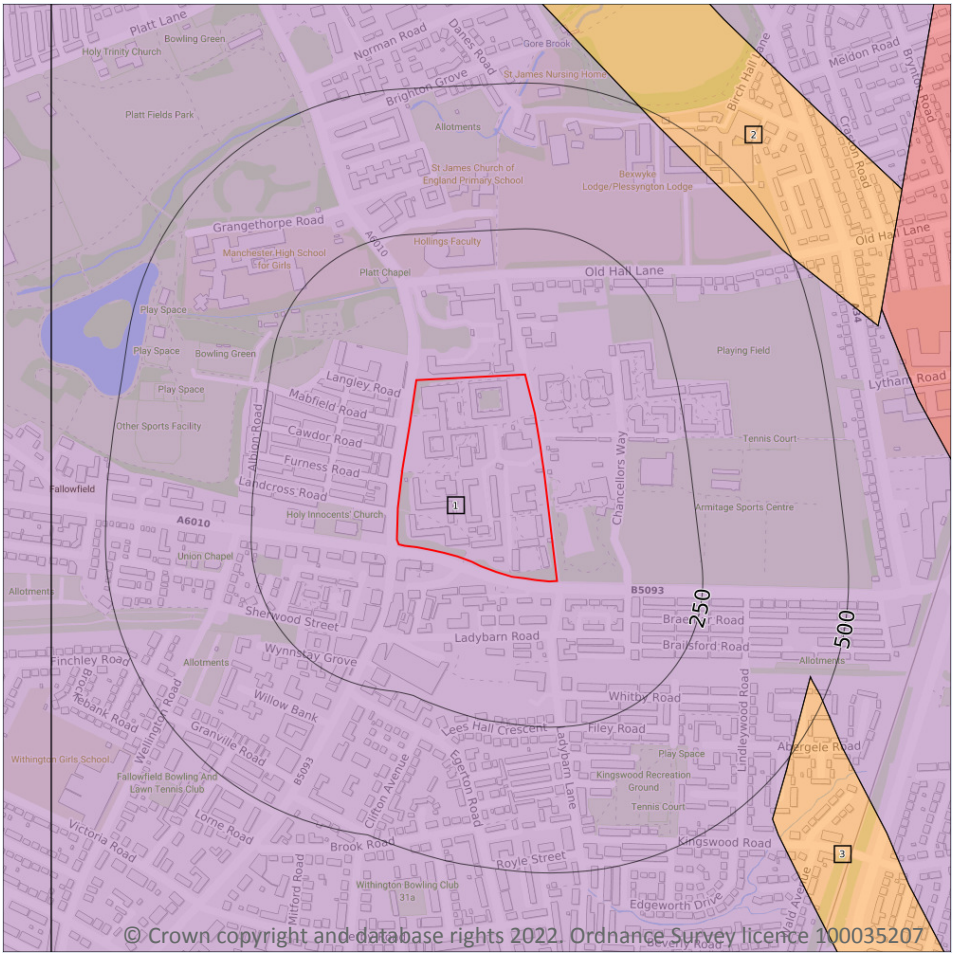
Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 42**

ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	3

Aquifer status of groundwater held within bedrock geology.

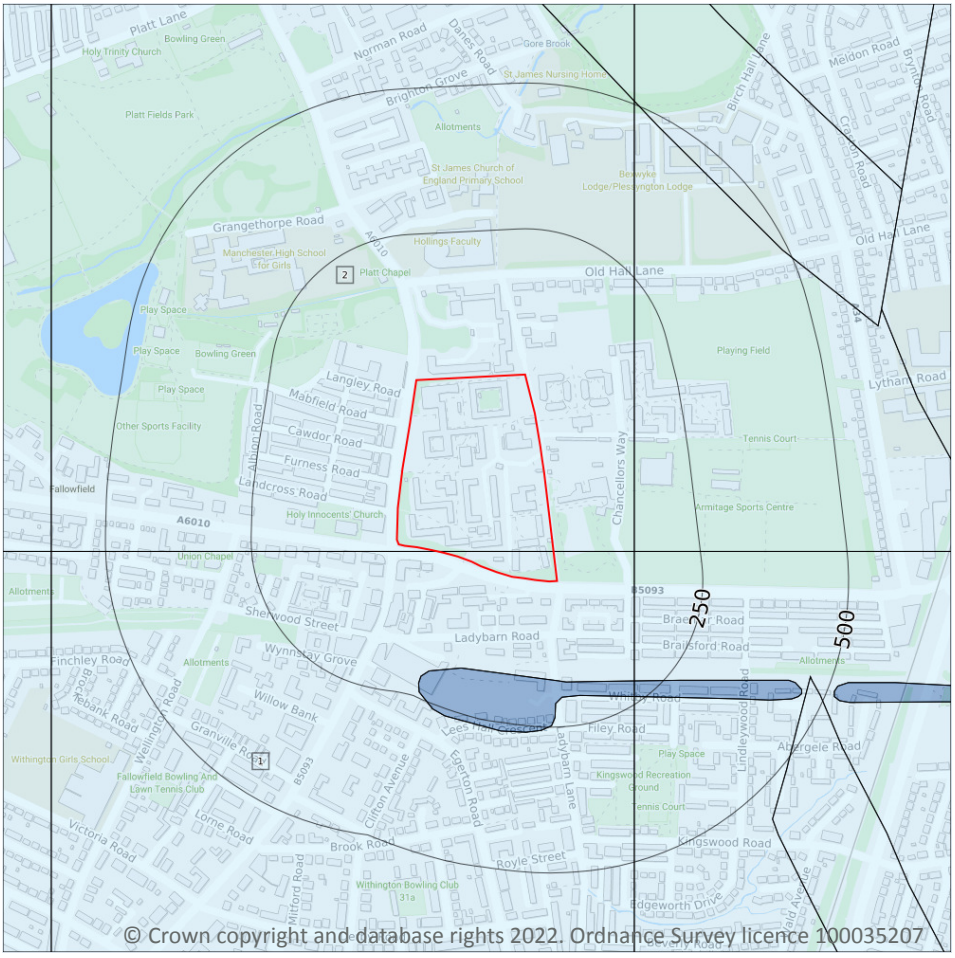
Features are displayed on the Bedrock aquifer map on **page 43**

ID	Location	Designation	Description
1	**On site**	**Principal**	**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. Generally principal aquifers were previously major aquifers**
2	463m NE	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers

ID	Location	Designation	Description
3	465m E	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability

- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability

- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information

- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 45**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Mixed
2	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

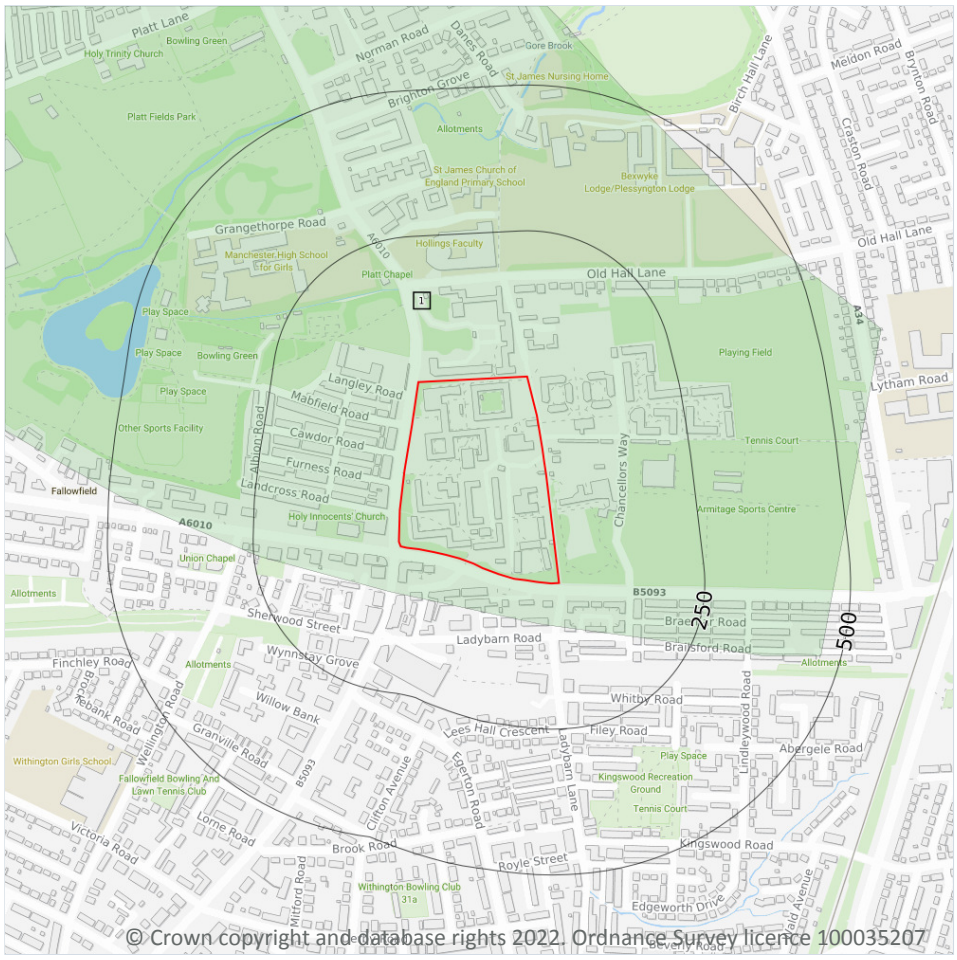
5.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	1

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 47**

ID	Location	Details	
-	1407m SE	Status: Historical Licence No: 2569013021 Details: Laundry Use Direct Source: Ground Water - North West Region Point: BURNAGE LANE, LEVENSHULME, MANCHESTER Data Type: Point Name: OCS GROUP UK LTD T/A CANNON Easting: 386720 Northing: 392830	Annual Volume (m^3): 91000 Max Daily Volume (m^3): 350 Original Application No: - Original Start Date: 19/03/2004 Expiry Date: 31/03/2014 Issue No: 2 Version Start Date: 17/01/2008 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**0**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	**0**

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	**1**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

Features are displayed on the Abstractions and Source Protection Zones map on **page 47**

ID	Location	Type	Description
1	**On site**	**3**	**Total catchment**

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



6.1 Water Network (OS MasterMap)

Records within 250m	2

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 50**

ID	Location	Type of water feature	Ground level	Permanence	Name
4	62m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Fallowfield Brook

ID	Location	Type of water feature	Ground level	Permanence	Name
A	162m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**1**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 50**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	**1**

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 50**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	**On site**	**River**	**Platt Brook (Source to Fallowfield Bk)**	**GB112069061060**	**Bollin Dean Mersey Upper**	**Mersey Upper**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	**1**

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of

the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 50**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
9	409m N	River	Platt Brook (Source to Fallowfield Bk)	GB112069061060	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	**1**

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 50**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	**On site**	**Manchester and East Cheshire Permo-Triassic Sandstone Aquifers**	**GB41201G101100**	**Poor**	**Poor**	**Poor**	**2019**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

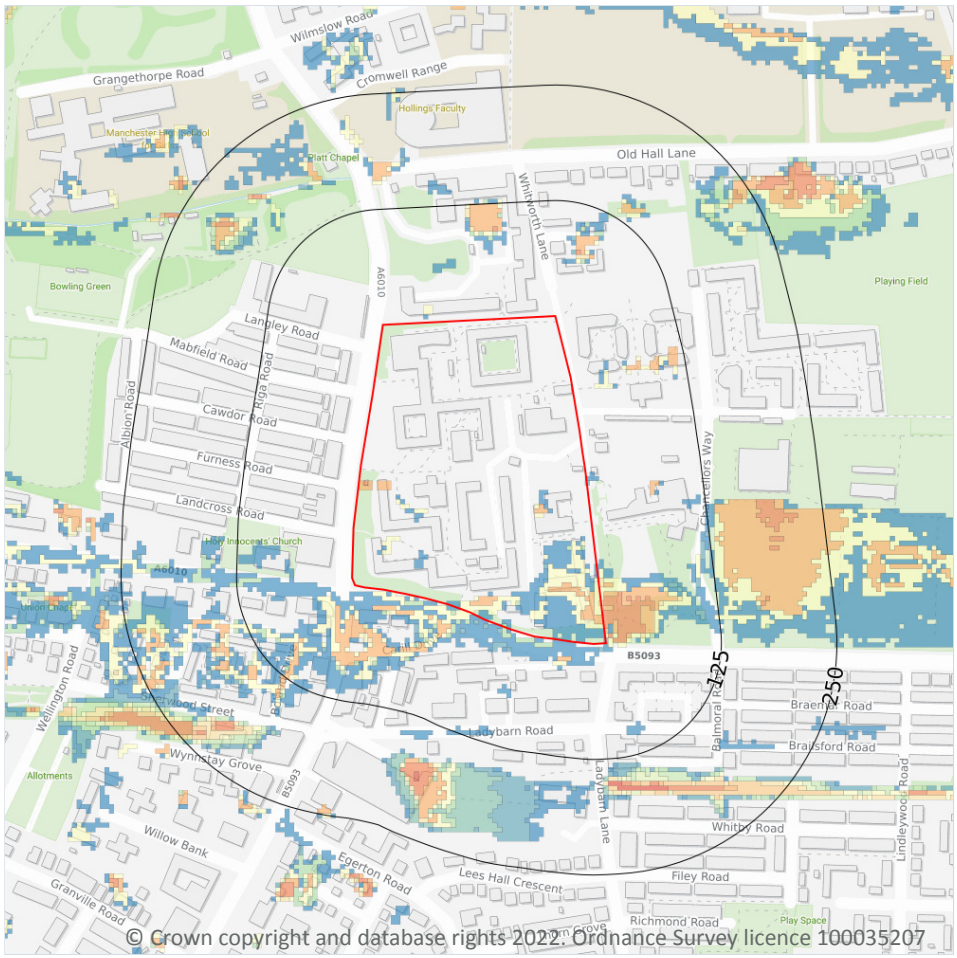
7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline

Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.3m - 1.0m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 56**

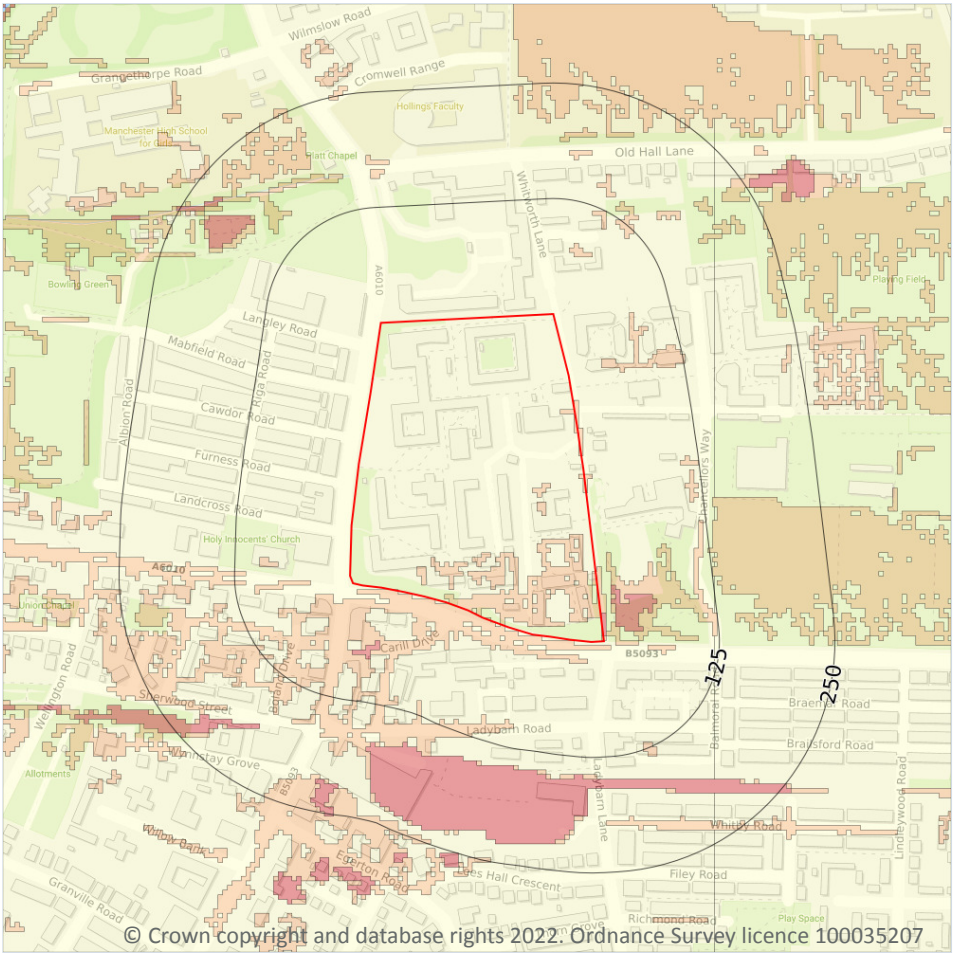
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on

a site. The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.3m and 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.3m and 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

Highest risk on site	**High**
Highest risk within 50m	**High**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 58**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 63**

ID	Location	Type of developments requiring consultation
1	On site	**Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 4000m². Combustion - General combustion processes >50mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.**

This data is sourced from Natural England.

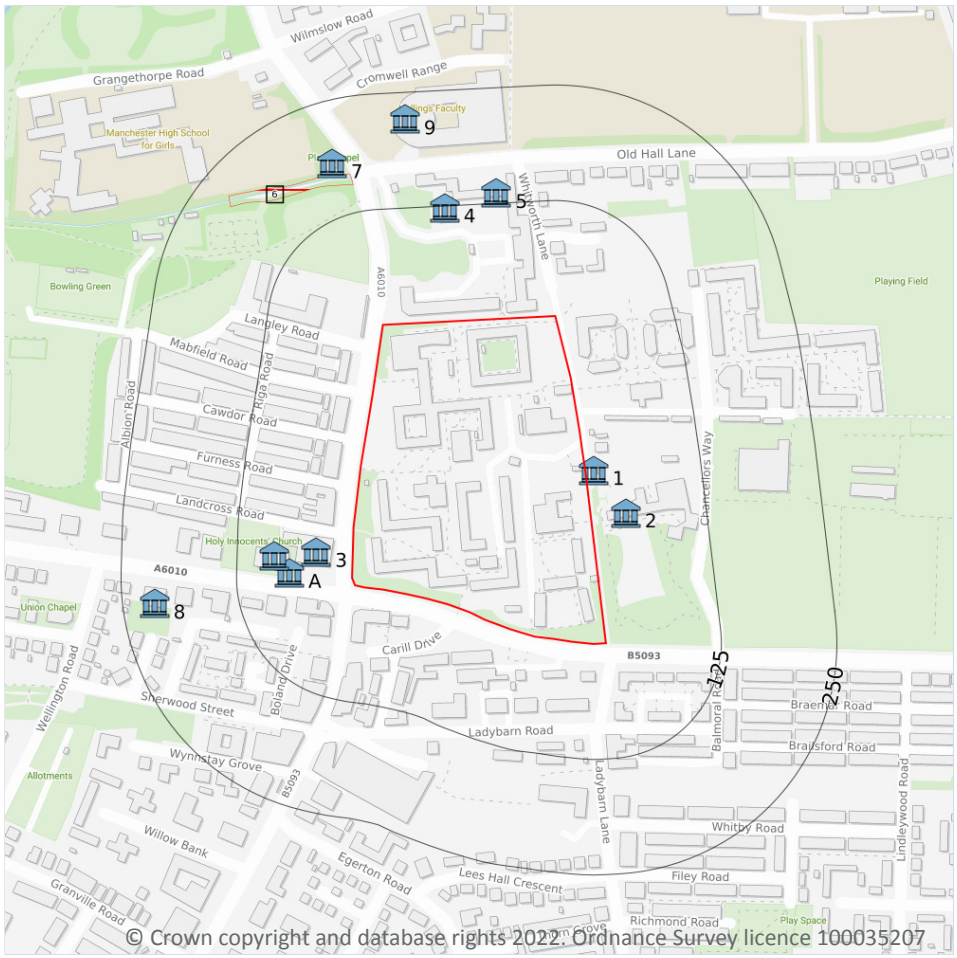
10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	10

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 65**

ID	Location	Name	Grade	Reference Number	Listed date
1	9m E	Lodge of The Firs, With Attached Gateway, Fallowfield, Manchester, M14	II	1254834	03/10/1974
2	38m E	The Firs and Attached Annex, Fallowfield, Manchester, M14	II	1270605	03/10/1974
3	40m W	Queen of Hearts Public House, Fallowfield, Manchester, M14	II	1254889	06/06/1994
A	68m W	Fallowfield War Memorial, Fallowfield, Manchester, M14	II	1433240	23/03/2016
A	85m W	Church of The Holy innocents and St James, Fallowfield, Manchester, M14	II	1270568	03/10/1974

ID	Location	Name	Grade	Reference Number	Listed date
4	123m N	Behrens Hall, Fallowfield, Manchester, M14	II	1246273	20/06/1988
5	136m N	Ashburne Hall (Lees, Mary Worthington, Ward and Central Block), including The Alice Barlow Memorial Gates and Ashburne Hall Lodge, Fallowfield, Manchester, M14	II	1401670	08/06/2012
7	183m N	Unitarian Chapel (Platt Chapel), Fallowfield, Manchester, M14	II	1270509	03/10/1974
8	216m W	Synagogue, Fallowfield, Manchester, M14	II	1254890	03/10/1974
9	221m N	Hollings Building At Manchester Metropolitan University, Rusholme, Manchester, M14	II	1119722	24/04/1998

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	**0**

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	**1**

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

Features are displayed on the Visual and cultural designations map on **page 65**

ID	Location	Ancient monument name	Reference number
6	155m N	Section of an early medieval boundary ditch known as the Nico Ditch in Platt Fields 480m SSE of Platt Hall	1015132

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

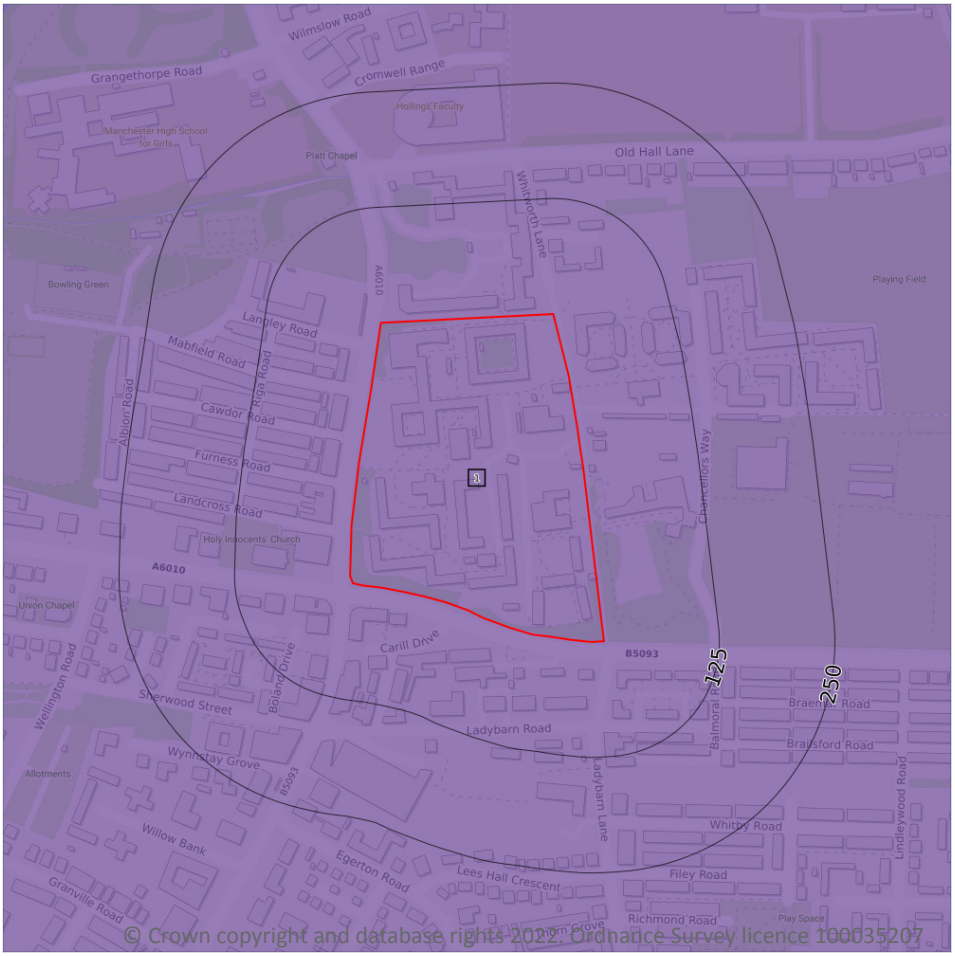
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 69**

ID	Location	Classification	Description
1	**On site**	**Urban**	-

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

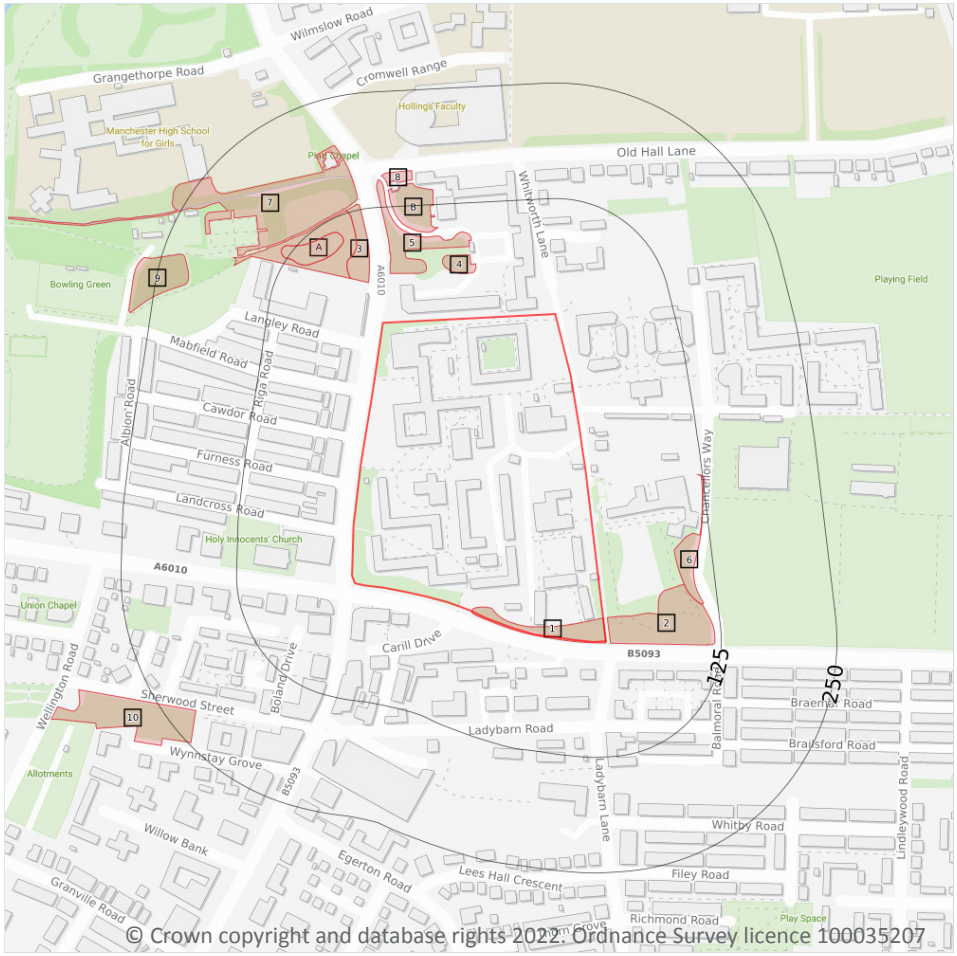
12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks
Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m **14**

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 71**

ID	Location	Main Habitat	Other habitats
1	**On site**	**Deciduous woodland**	**Main habitat: DWOOD (INV > 50%)**
2	5m E	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	46m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	49m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
5	52m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	60m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	85m E	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	92m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	95m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	112m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
7	128m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
8	147m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
9	216m W	Traditional orchard	Overruled by Traditional Orchards HAP Inventory dataset
10	221m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	**0**

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	**0**

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

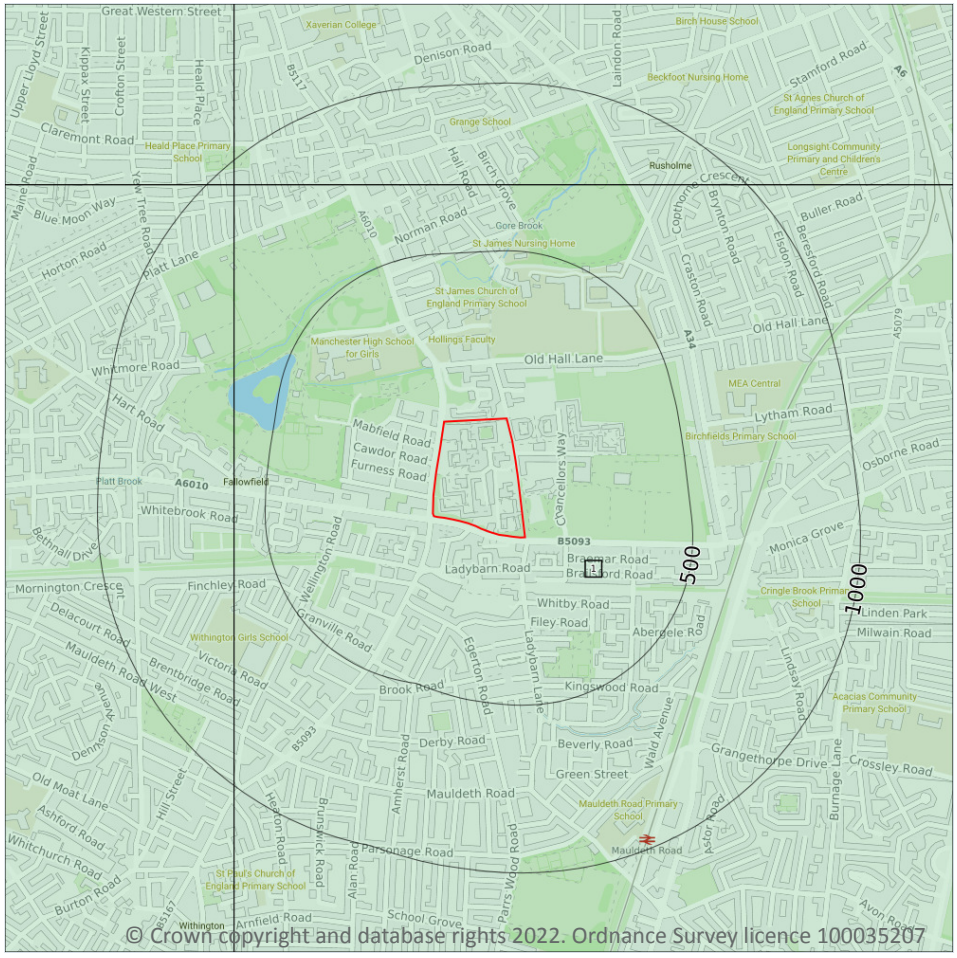
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m	1

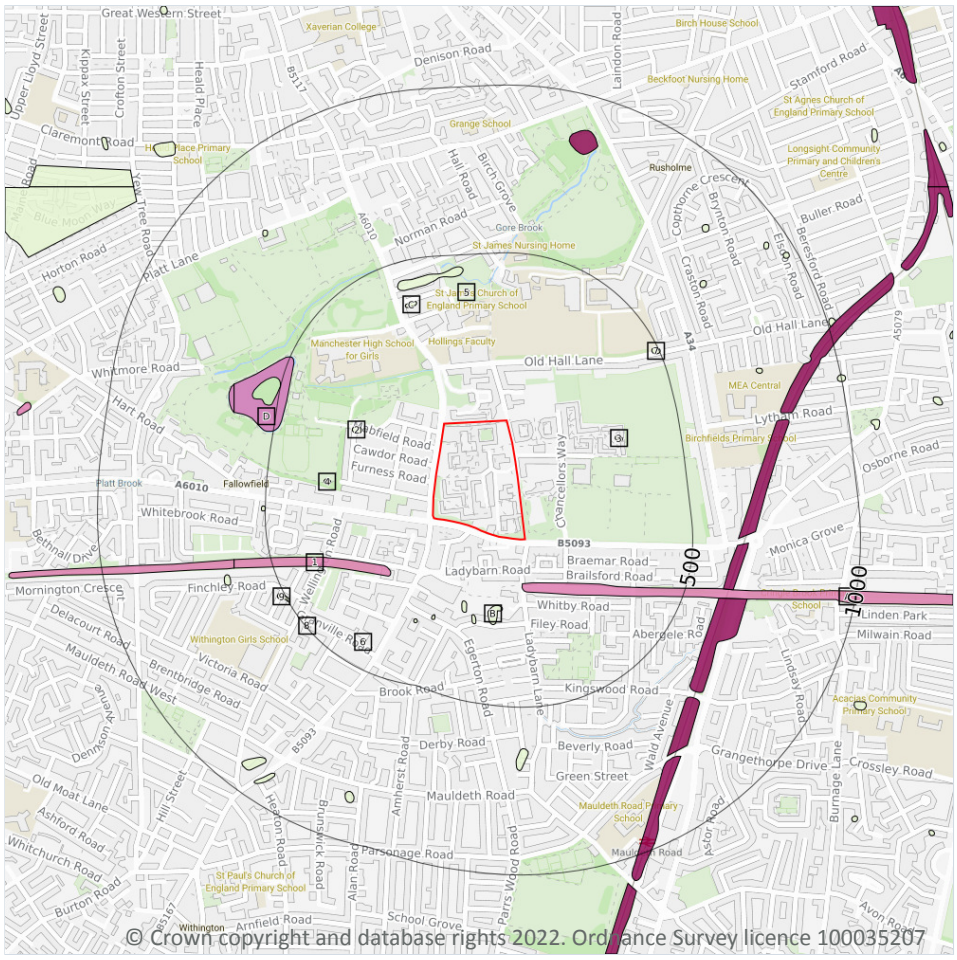
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 74**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**SJ89SE**

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	18

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

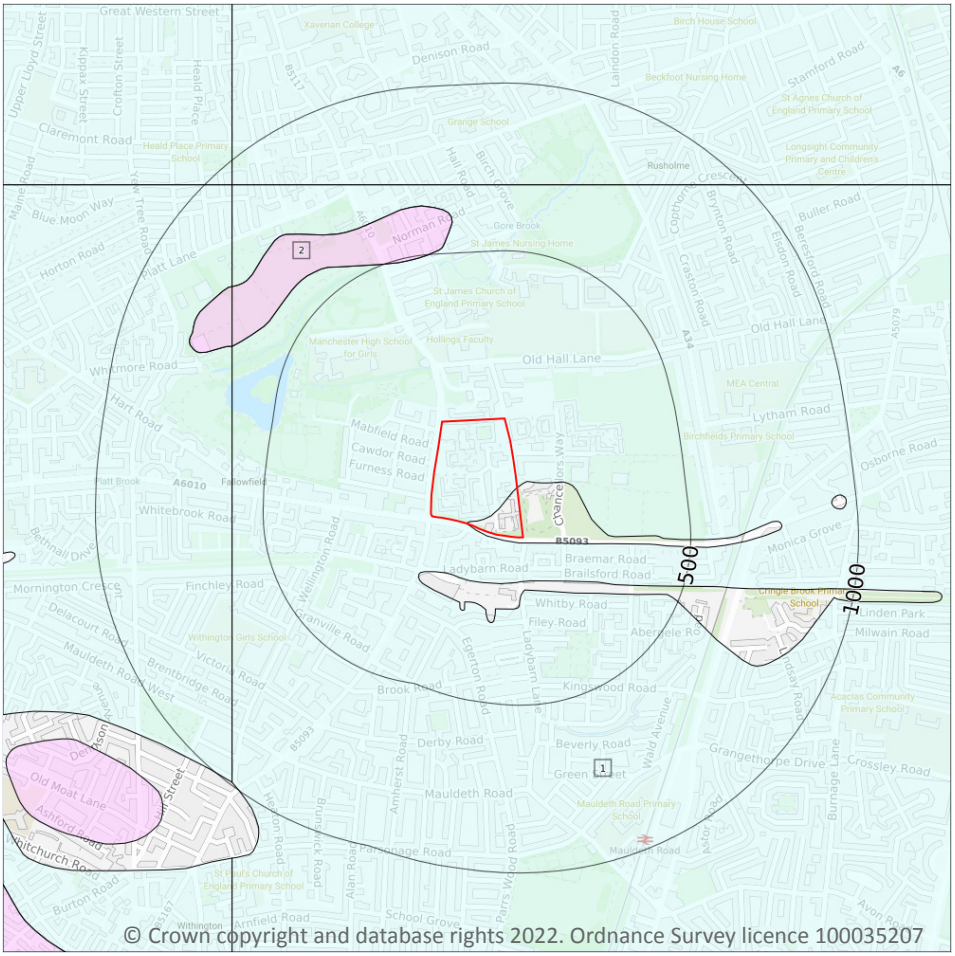
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 75**

ID	Location	LEX Code	Description	Rock description
A	131m S	WGR-VOID	Worked Ground (Undivided)	Void
1	202m SW	WGR-VOID	Worked Ground (Undivided)	Void
B	203m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
B	214m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit

ID	Location	LEX Code	Description	Rock description
2	241m W	WMGR-ARTDP	Infilled Ground	Artificial Deposit
B	245m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
B	283m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
B	305m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit
3	305m E	WMGR-ARTDP	Infilled Ground	Artificial Deposit
4	309m W	WMGR-ARTDP	Infilled Ground	Artificial Deposit
C	362m N	WMGR-ARTDP	Infilled Ground	Artificial Deposit
5	380m N	WMGR-ARTDP	Infilled Ground	Artificial Deposit
C	414m N	WMGR-ARTDP	Infilled Ground	Artificial Deposit
6	416m SW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
D	473m W	WGR-VOID	Worked Ground (Undivided)	Void
7	480m NE	WMGR-ARTDP	Infilled Ground	Artificial Deposit
8	486m SW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
9	494m SW	WMGR-ARTDP	Infilled Ground	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **2**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 77**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**Till, Devensian - Diamicton**	**Diamicton**
2	490m N	GFICD-XSV	Glaciofluvial Ice Contact Deposits, Devensian - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

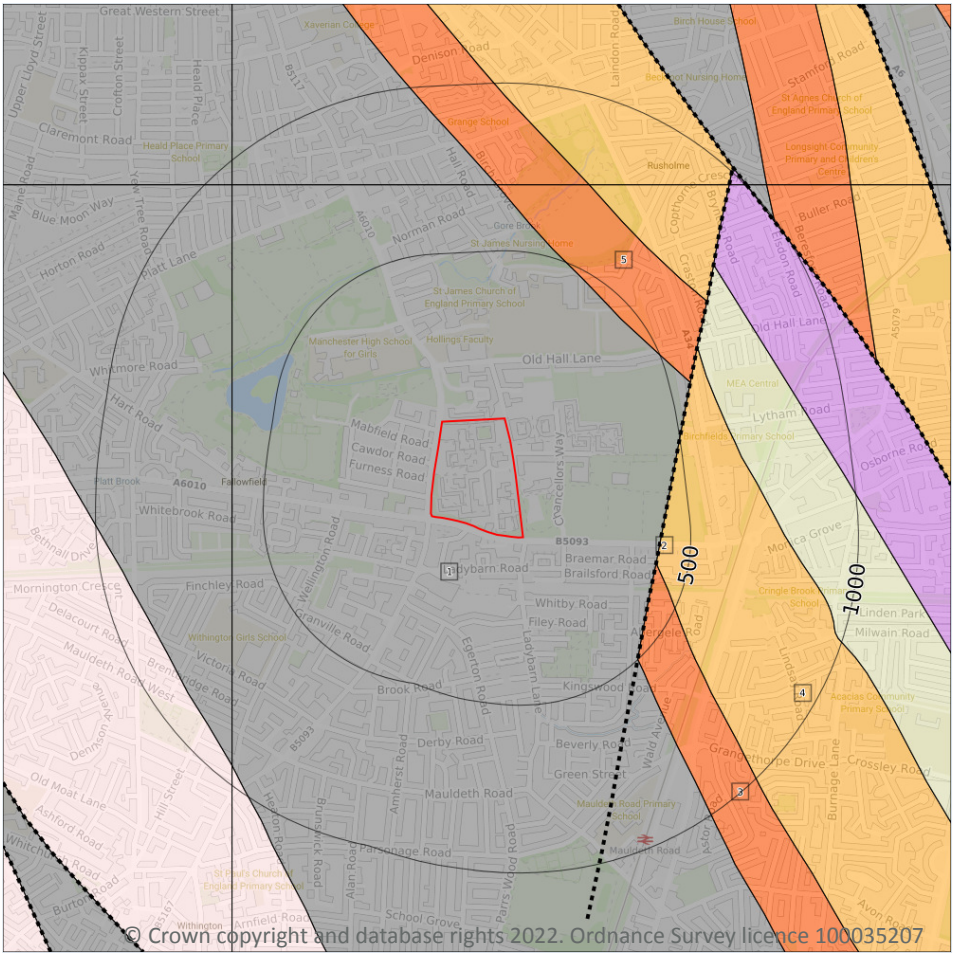
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **4**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**CPB-SDST**	**Chester Pebble Beds Formation - Sandstone**	**Early Triassic Epoch**
3	404m E	MM-MDST	Manchester Marls Formation - Mudstone	Late Permian Epoch [Obsolete name]
4	404m E	CS-SDST	Collyhurst Sandstone Formation - Sandstone	Cisuralian Epoch

ID	Location	LEX Code	Description	Rock age
5	456m NE	MM-MDST	Manchester Marls Formation - Mudstone	Late Permian Epoch [Obsolete name]

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	**1**

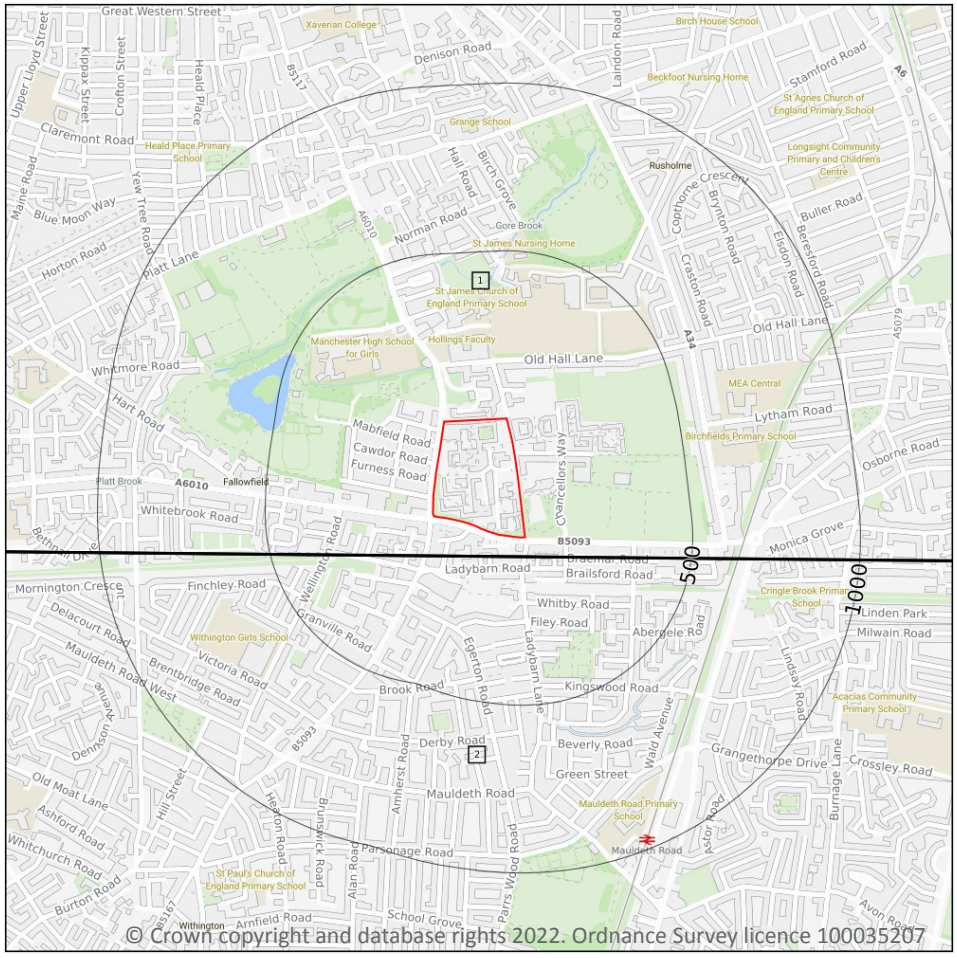
Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79**

ID	Location	Category	Description
2	404m E	FAULT	Normal fault, inferred; crossmarks on downthrow side

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	2

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 81**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**No coverage**	**EW085_manchester_v4**
2	57m S	No coverage	Full	Full	Full	EW098_stockport_v4

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

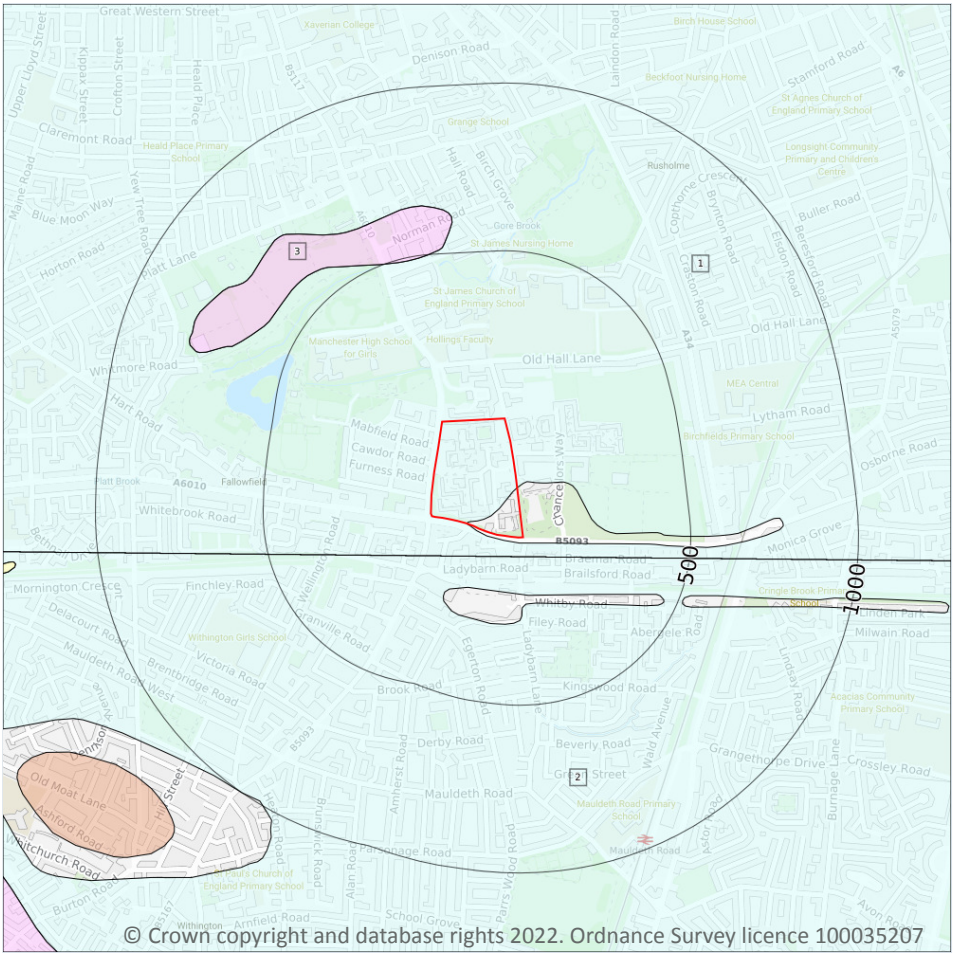
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **3**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 83**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**TILLD-DMTN**	**TILL, DEVENSIAN**	**DIAMICTON**
2	58m S	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
3	490m N	GFICD-XSV	GLACIOFLUVIAL ICE CONTACT DEPOSITS, DEVENSIAN	SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**High**	**Low**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

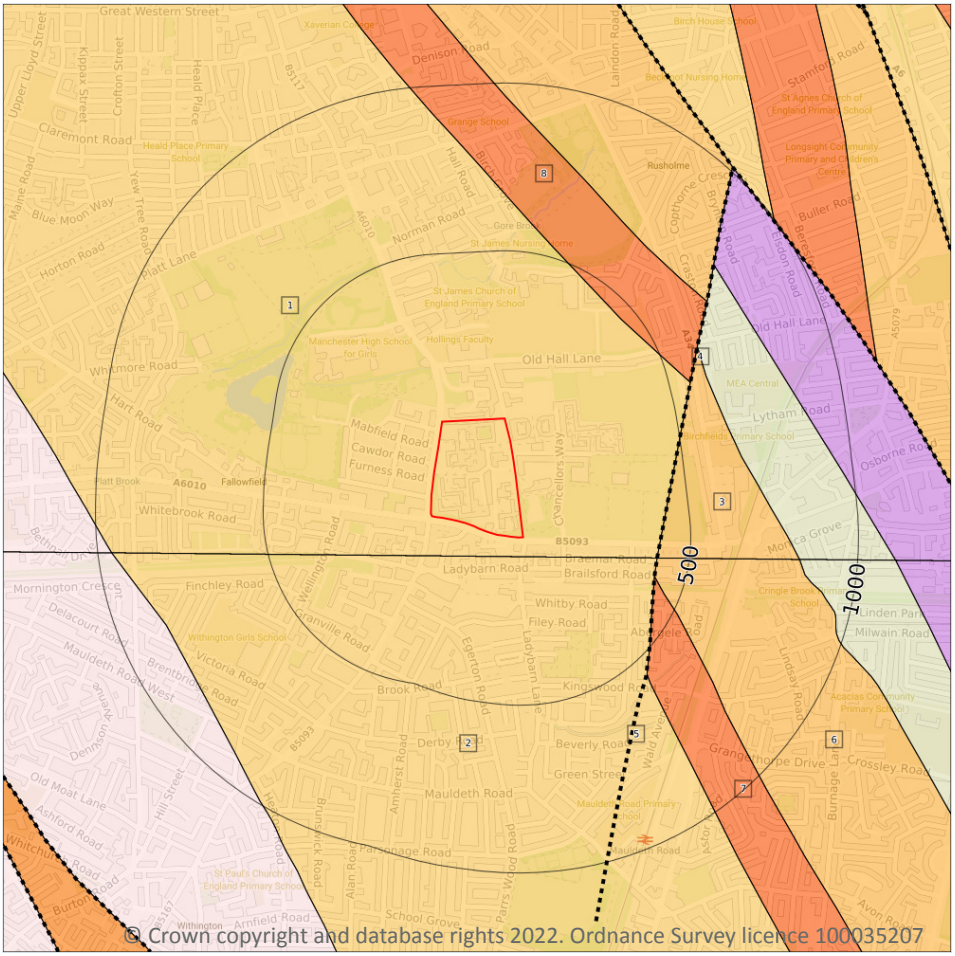
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	6

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 85**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**CHES-SDST**	**CHESTER FORMATION - SANDSTONE**	**OLENEKIAN**
2	58m S	CHES-SDST	CHESTER FORMATION - SANDSTONE	OLENEKIAN
3	404m E	CS-SDST	COLLYHURST SANDSTONE FORMATION - SANDSTONE	-
6	404m E	CS-SDST	COLLYHURST SANDSTONE FORMATION - SANDSTONE	-

ID	Location	LEX Code	Description	Rock age
7	409m E	MM-MDST	MANCHESTER MARLS FORMATION - MUDSTONE	-
8	456m NE	MM-MDST	MANCHESTER MARLS FORMATION - MUDSTONE	-

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	**1**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**High**	**Moderate**

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	**2**

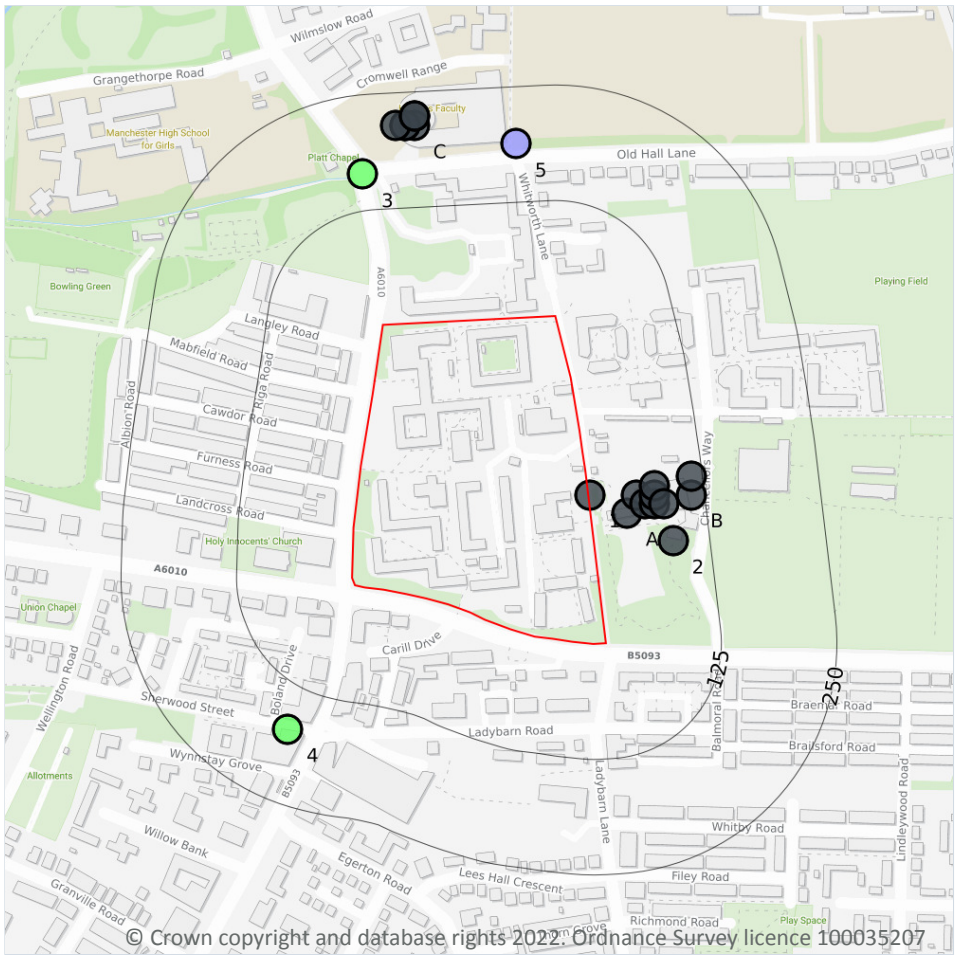
Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 85**

ID	Location	Category	Description
4	404m E	FAULT	Fault, inferred
5	404m E	FAULT	Fault, inferred

This data is sourced from the British Geological Survey.

16 Boreholes



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

16.1 BGS Boreholes

Records within 250m	20

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

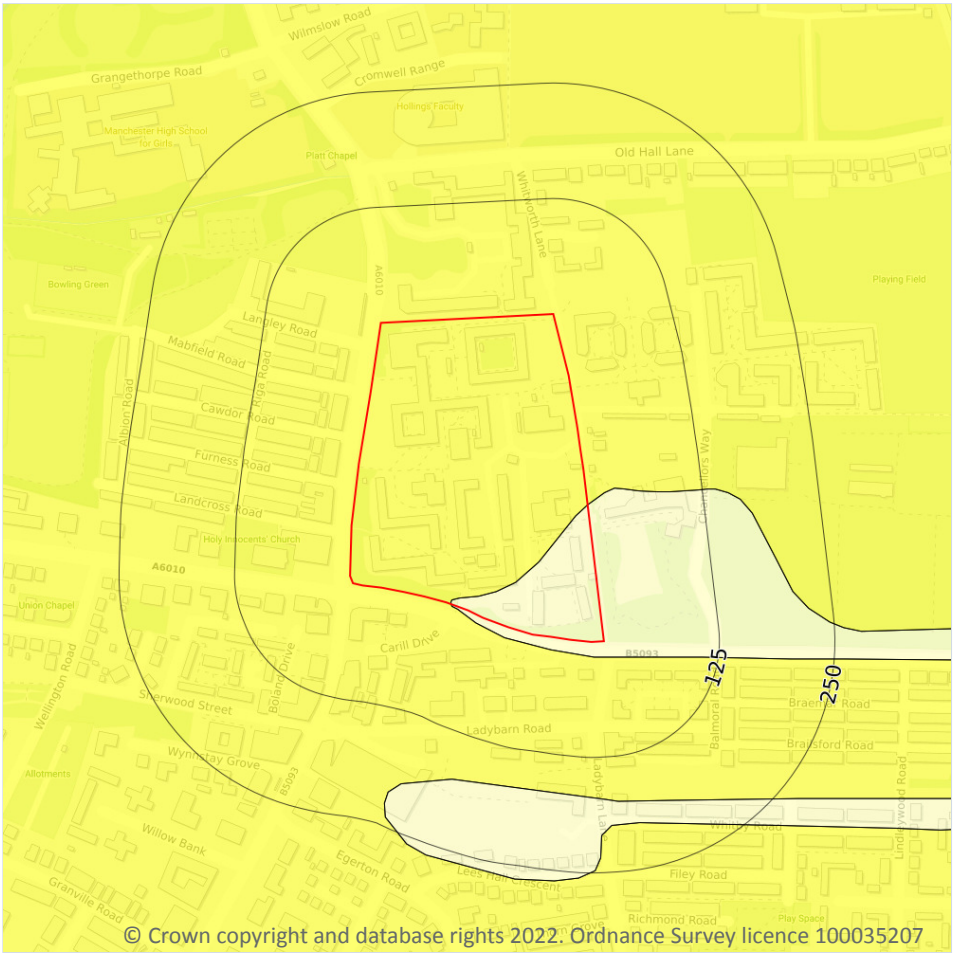
Features are displayed on the Boreholes map on **page 87**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	2m E	385850 394110	THE FIRS FALLOWFIELD TP 1	-	Y	N/A
A	39m E	385890 394090	THE FIRS FALLOWFIELD TP 2	-	Y	N/A

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	51m E	385900 394110	THE FIRS FALLOWFIELD TP 3	-	Y	N/A
A	60m E	385910 394100	THE FIRS FALLOWFIELD 4	-	Y	N/A
A	70m E	385920 394100	THE FIRS FALLOWFIELD TP 4	-	Y	N/A
A	71m E	385920 394110	THE FIRS FALLOWFIELD TP 7	-	Y	N/A
A	72m E	385920 394120	THE FIRS FALLOWFIELD TP 8	-	Y	N/A
A	80m E	385930 394100	THE FIRS FALLOWFIELD 3	-	Y	N/A
2	85m E	385940 394060	THE FIRS FALLOWFIELD 2	-	Y	N/A
B	111m E	385960 394110	THE FIRS FALLOWFIELD TP 6	-	Y	N/A
B	113m E	385960 394130	THE FIRS FALLOWFIELD TP 5	-	Y	N/A
3	165m N	385604 394457	MANCHESTER CORP. FALLOWFIELD 33	13.11	N	865687
4	172m SW	385523 393856	MANCHESTER CORP. FALLOWFIELD 30	11.28	N	865686
5	189m N	385770 394490	CHORLTON BROOK TP 111	0.8	N	866146
C	214m N	385660 394510	MANCHESTER METROPOLITIAN UNIVERSITY HOLLINGS LIBRARY TP 3	-	Y	N/A
C	215m N	385650 394510	MANCHESTER METROPOLITIAN UNIVERSITY HOLLINGS LIBRARY TP 1	-	Y	N/A
C	215m N	385650 394510	MANCHESTER METROPOLITIAN UNIVERSITY HOLLINGS LIBRARY TP 2	-	Y	N/A
C	215m N	385640 394510	MANCHESTER METROPOLITIAN UNIVERSITY HOLLINGS LIBRARY A	-	Y	N/A
C	224m N	385660 394520	MANCHESTER METROPOLITIAN UNIVERSITY HOLLINGS LIBRARY D	-	Y	N/A
C	224m N	385660 394520	MANCHESTER METROPOLITIAN UNIVERSITY HOLLINGS LIBRARY C	-	Y	N/A

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	2

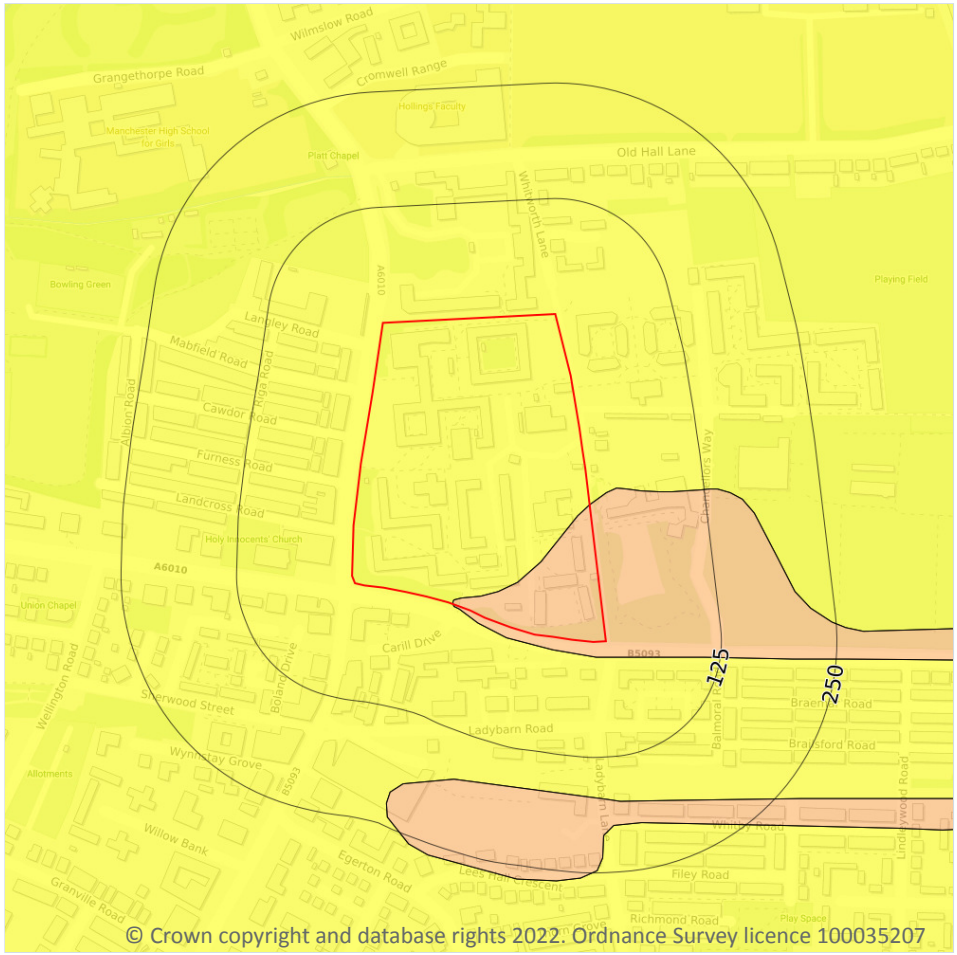
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 89**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Very low**	**Ground conditions predominantly low plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

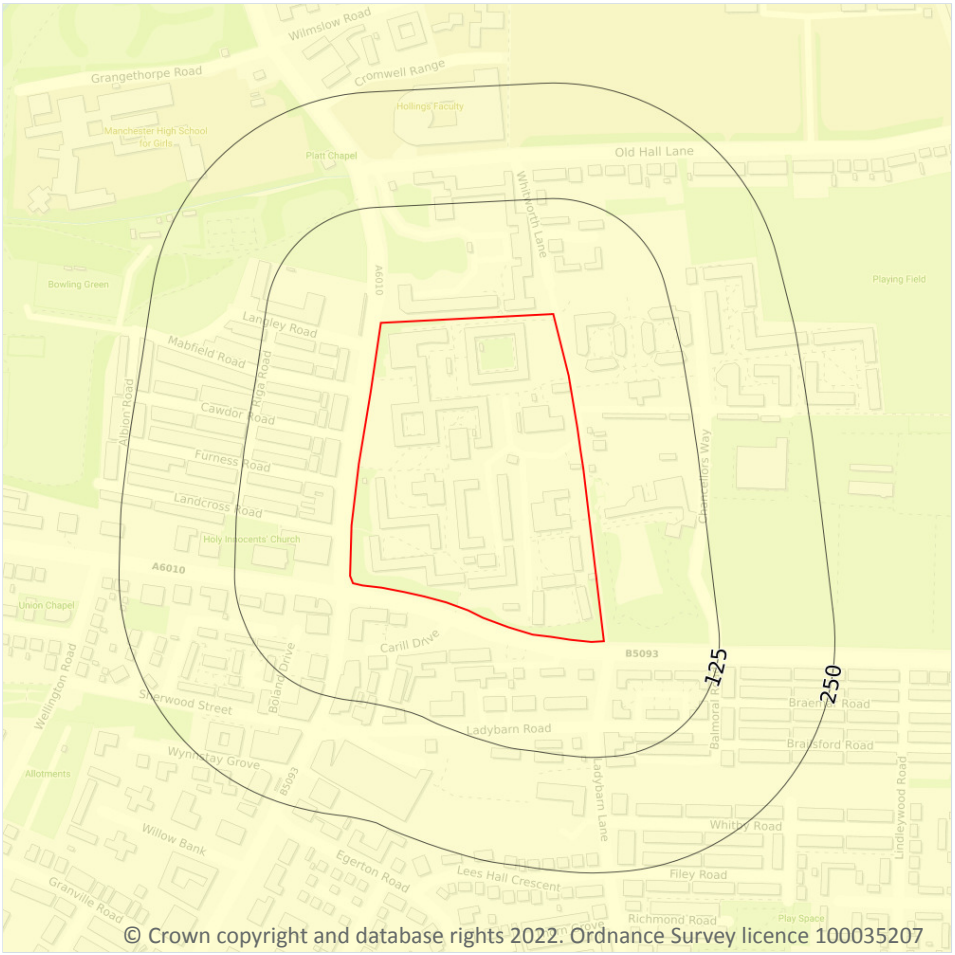
Features are displayed on the Natural ground subsidence - Running sands map on **page 90**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
On site	**Low**	**Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	1

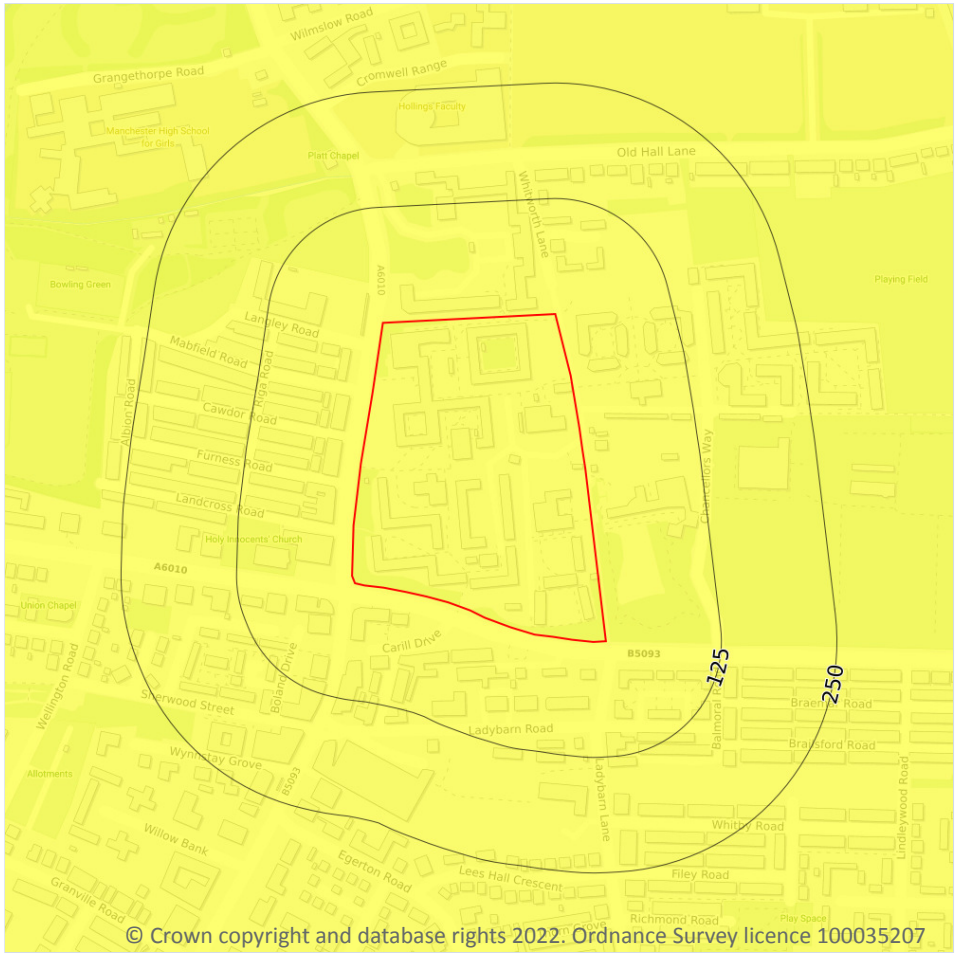
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 92**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

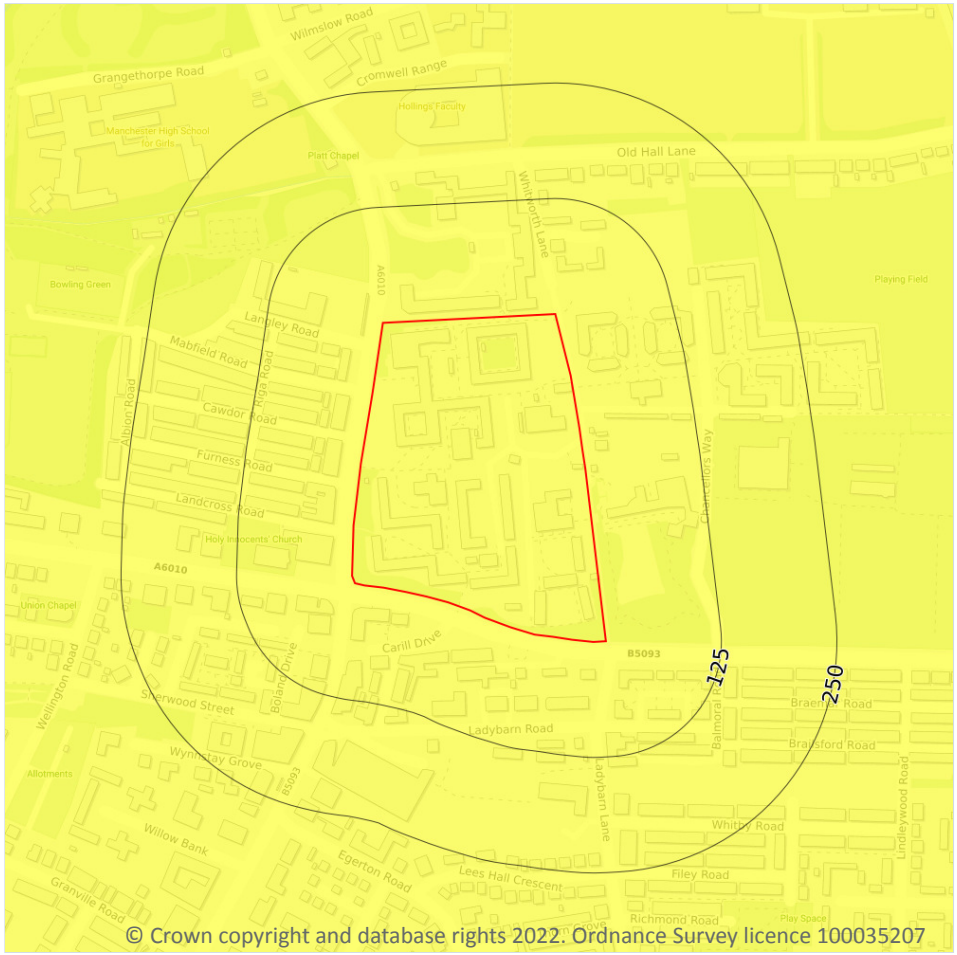
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 93**

Location	Hazard rating	Details
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

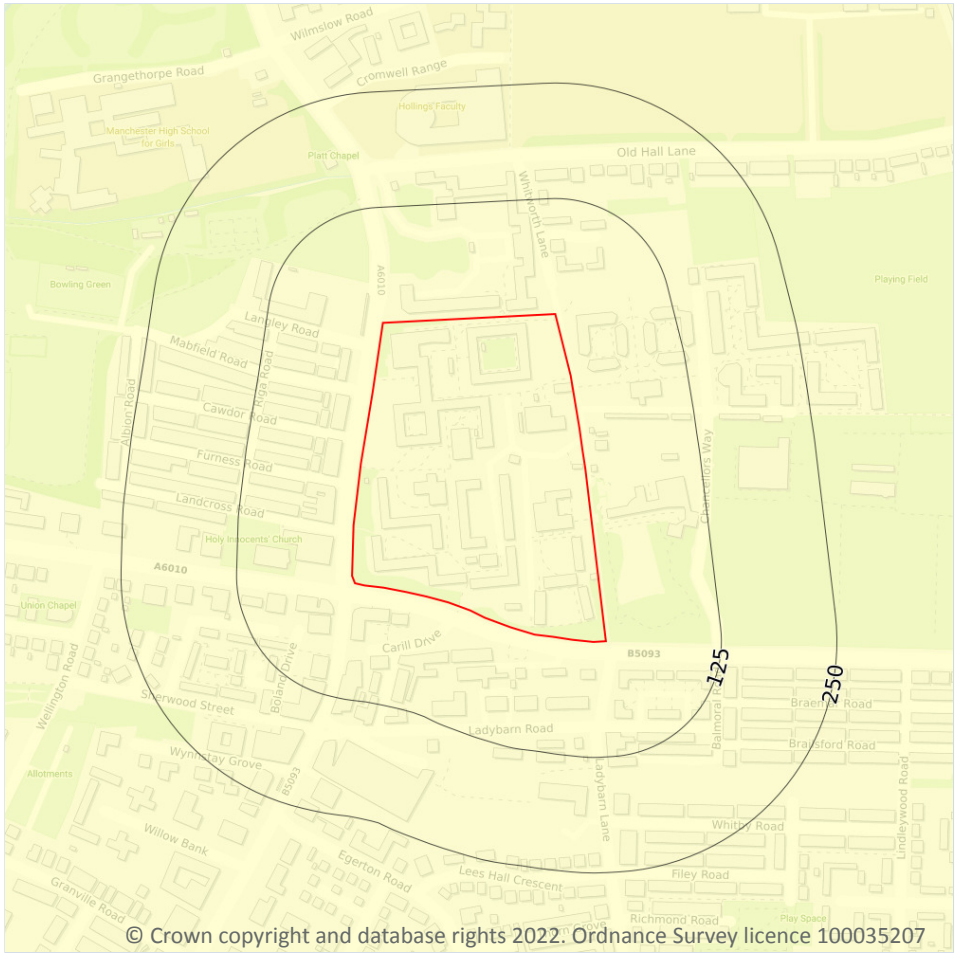
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 94**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

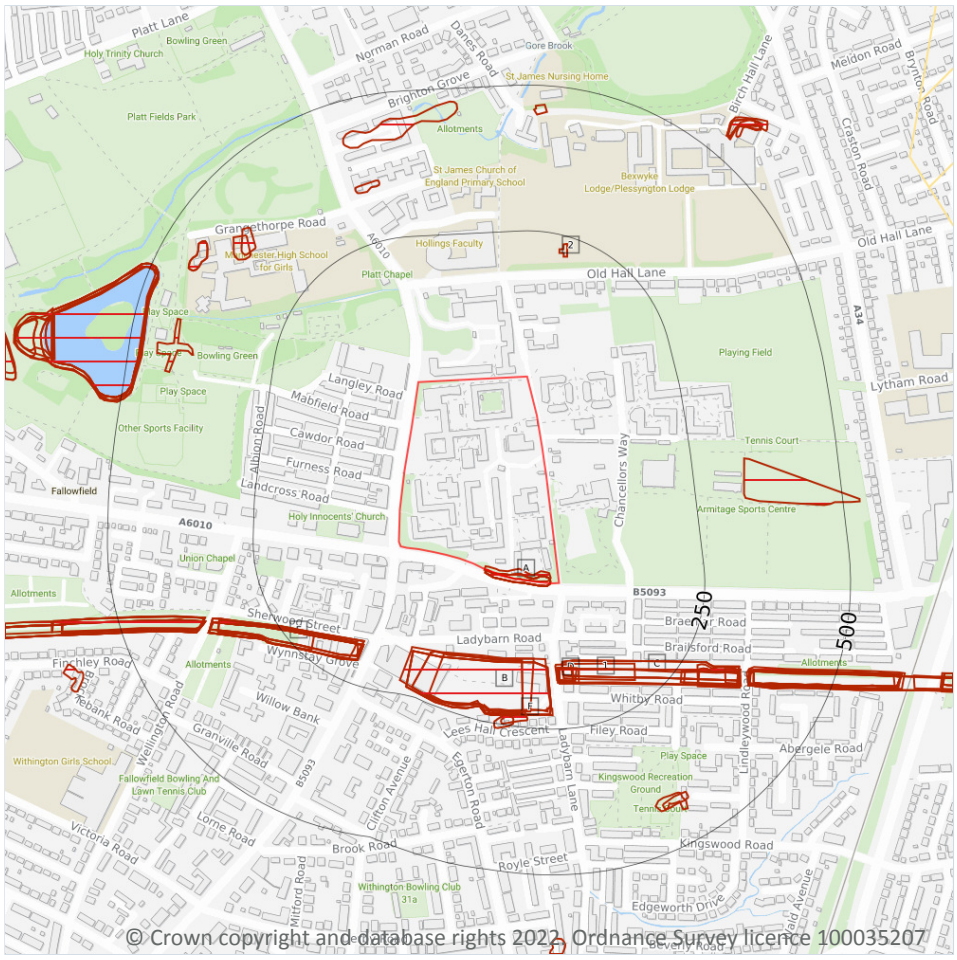
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 95**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



© Crown copyright and database rights 2022, Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities

Non Coal Mining

- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	39

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 97**

ID	Location	Land Use	Year of mapping	Mapping scale
A	**On site**	**Unspecified Heap**	**1955**	**1:10560**
A	**On site**	**Unspecified Heap**	**1938**	**1:10560**
A	**On site**	**Unspecified Heap**	**1934**	**1:10560**
A	**On site**	**Unspecified Heap**	**1916**	**1:10560**
A	**On site**	**Unspecified Heap**	**1905**	**1:10560**
A	**On site**	**Unspecified Heap**	**1923**	**1:10560**
B	130m S	Cuttings	1955	1:10560
B	131m S	Cuttings	1965	1:10560
C	135m S	Cuttings	1974	1:10000
C	135m S	Cuttings	1983	1:10000
C	135m S	Cuttings	1989	1:10000
B	136m S	Cuttings	1983	1:10000
B	136m S	Cuttings	1989	1:10000
B	138m S	Cuttings	1938	1:10560
B	138m S	Cuttings	1934	1:10560
B	138m S	Cuttings	1892	1:10560
1	140m S	Cuttings	1965	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
D	140m S	Cuttings	1955	1:10560
D	145m S	Cuttings	1916	1:10560
C	147m S	Cuttings	1905	1:10560
D	147m S	Cuttings	1923	1:10560
D	147m S	Cuttings	1938	1:10560
D	147m S	Cuttings	1934	1:10560
C	147m S	Cuttings	1892	1:10560
E	174m S	Cuttings	1955	1:10560
E	174m S	Cuttings	1965	1:10560
E	174m S	Cuttings	1974	1:10000
E	180m SW	Cuttings	1983	1:10000
E	181m S	Cuttings	1923	1:10560
E	181m S	Cuttings	1938	1:10560
E	181m S	Cuttings	1934	1:10560
E	181m S	Cuttings	1905	1:10560
E	181m S	Cuttings	1892	1:10560
E	184m SW	Cuttings	1916	1:10560
E	211m SW	Cuttings	1989	1:10000
F	214m S	Unspecified Ground Workings	1923	1:10560
2	215m N	Brick Kiln	1851	1:10560
F	223m S	Pond	1851	1:10560
F	232m S	Unspecified Pit	1905	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	2

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 97**

ID	Location	Name	Commodity	Class	Likelihood
11	757m NE	Not available	Vein Mineral	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
-	996m NE	Not available	Vein Mineral	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	1

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

Location	Details
On site	**Whilst outside of an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) may have information such as mining plans and maps held within their archive that have occurred within 1km of this property. Please note, the plans held by JPB may also relate to non-mining records. Further details and a quote for services (if appropriate) can be obtained by emailing this report to enquiries.gs@jpb.co.uk.**

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

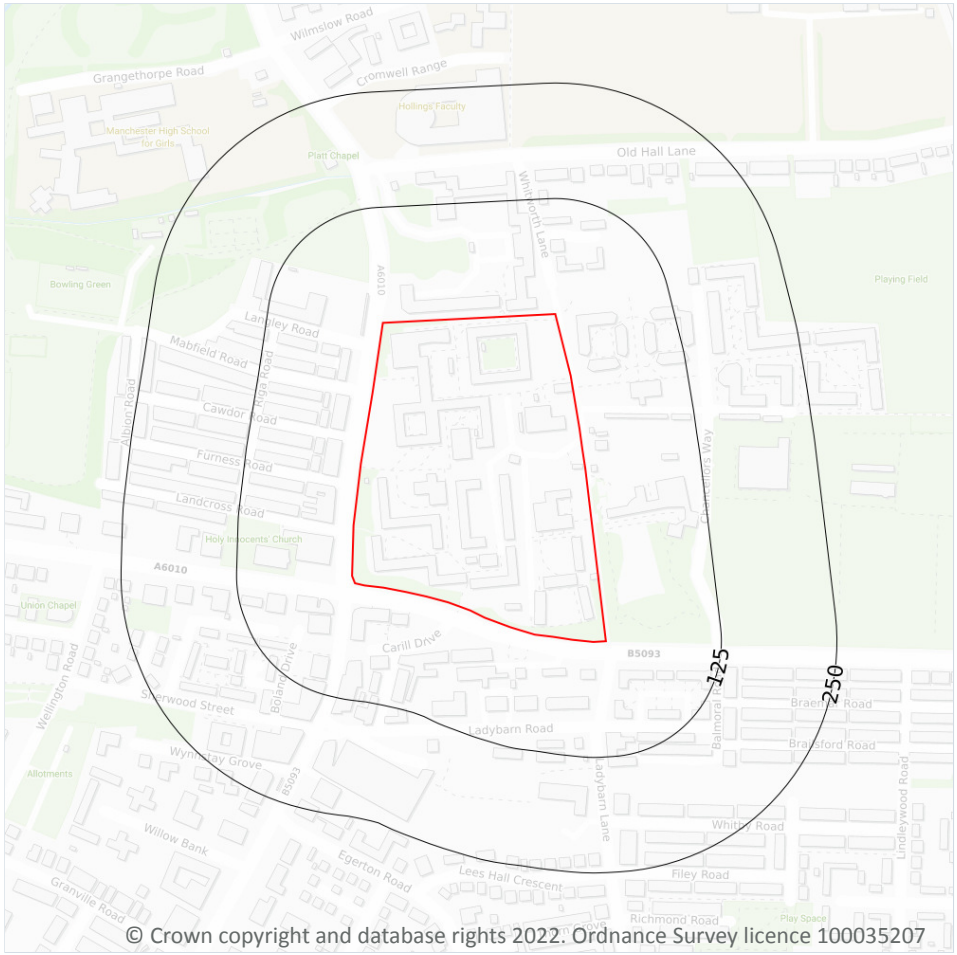
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



© Crown copyright and database rights 2022. Ordnance Survey licence 100035207

Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 103**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None****

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	2

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**30 - 45 mg/kg**
On site	**15 - 25 mg/kg**	**No data**	**100 - 200 mg/kg**	**60 - 120 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**30 - 45 mg/kg**

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

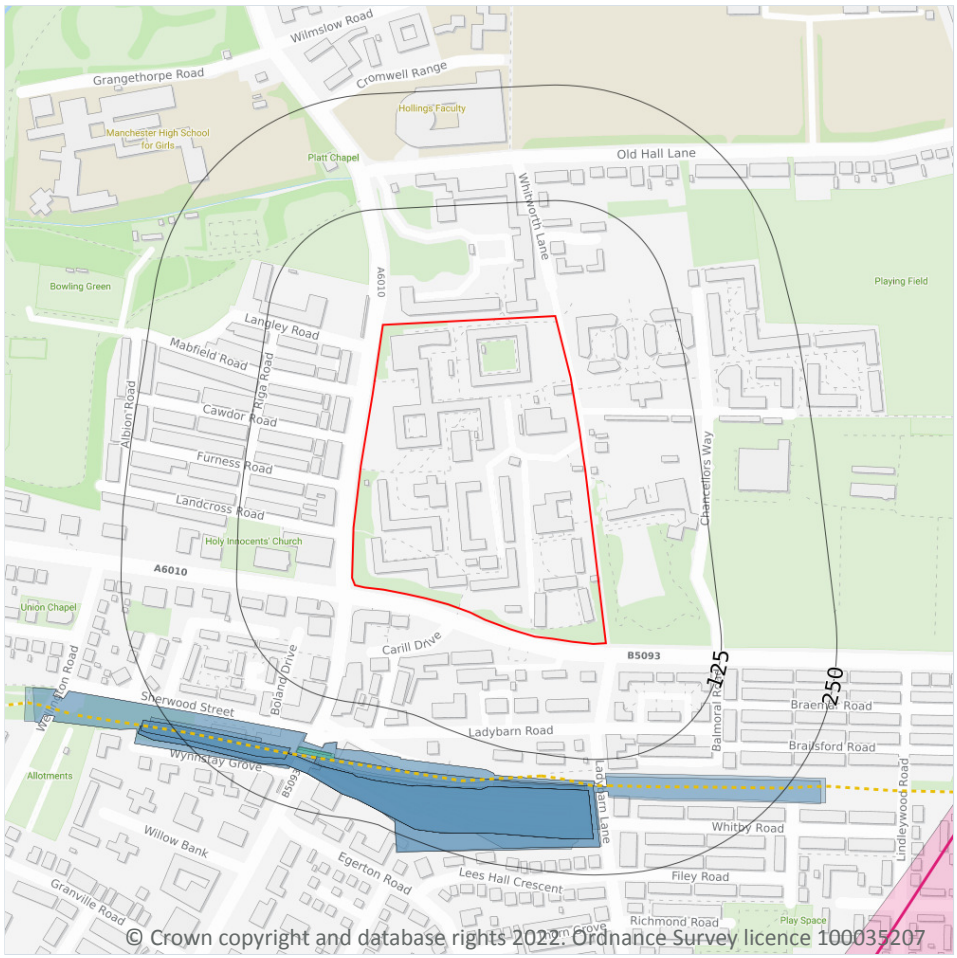
20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



Site Outline

Search buffers in metres (m)

- Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 1 Worksites
- Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	26

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 105**

Location	Land Use	Year of mapping	Mapping scale
140m S	Railway	1892	-
144m S	Railway	1907	-
151m S	Railway Sidings	1955	10560
153m S	Railway Sidings	1974	10000
153m S	Railway Sidings	1965	10560
154m S	Railway Sidings	1957	2500
155m S	Railway Sidings	1957	1250
155m S	Railway Sidings	1971	1250
159m S	Railway Sidings	1938	10560
159m S	Railway Sidings	1934	10560
159m S	Railway Sidings	1916	10560
159m S	Railway Sidings	1905	10560
159m S	Railway Sidings	1892	10560
159m S	Railway Sidings	1923	10560
183m S	Tunnel	1981	1250
183m S	Tunnel	1988	1250
183m S	Tunnel	1957	2500

Location	Land Use	Year of mapping	Mapping scale
183m S	Tunnel	1957	1250
183m S	Tunnel	1971	1250
184m S	Tunnel	1996	1250
184m S	Tunnel	1995	1250
184m S	Tunnel	1994	1250
190m S	Railway Sidings	1974	10000
190m S	Railway Sidings	1955	10560
190m S	Railway Sidings	1965	10560
202m SW	Railway Sidings	1957	1250

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	**0**

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	**3**

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

Features are displayed on the Railway infrastructure and projects map on **page 105**

Location	Description
148m S	Abandoned
149m S	Dismantled
154m S	Abandoned

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	1

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

Features are displayed on the Railway infrastructure and projects map on **page 105**

Location	Track Type	Speed (mph)	Speed (km/h)	Status
429m SE	Tunnel	143mph	230kph	Current preferred consultation route

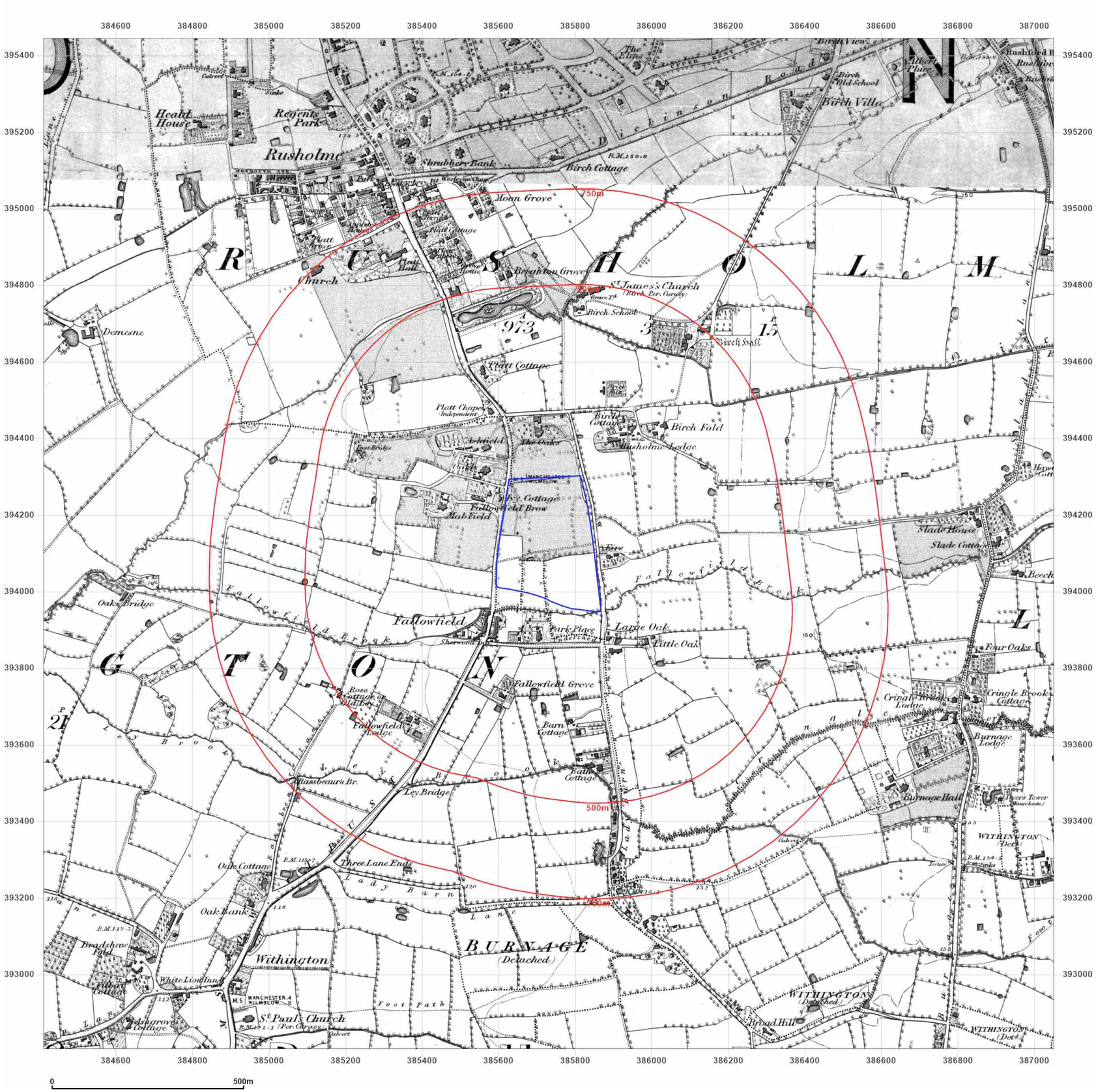
This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/.



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: County Series

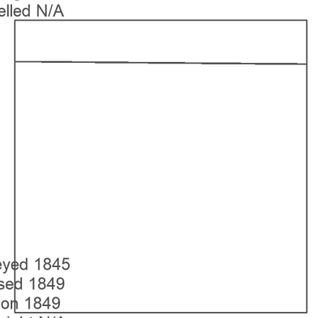
Map date: **1848-1849**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1845
Revised N/A
Edition 1848
Copyright N/A
Levelled N/A



Surveyed 1845
Revised 1849
Edition 1849
Copyright N/A
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: County Series

Map date: **1890-1892**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1890
Revised 1890
Edition 1890
Copyright N/A
Levelled N/A

Surveyed 1892
Revised 1892
Edition 1892
Copyright N/A
Levelled N/A

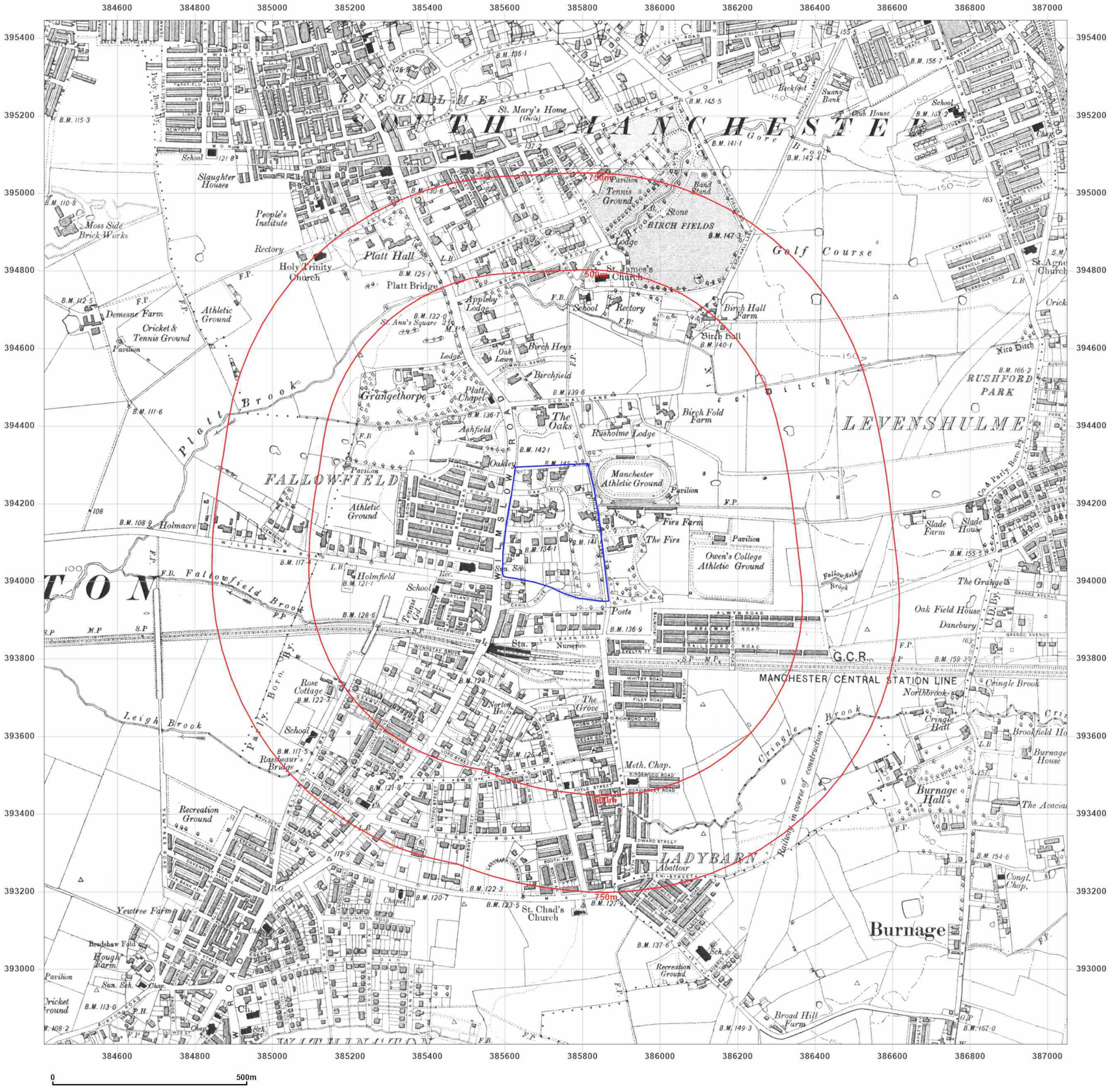
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: County Series

Map date: **1905**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1844
Revised 1905
Edition 1905
Copyright N/A
Levelled N/A

Surveyed 1844
Revised 1905
Edition 1905
Copyright N/A
Levelled N/A

Surveyed 1892
Revised 1905
Edition 1905
Copyright N/A
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1844
Revised 1916
Edition 1923
Copyright N/A
Levelled 1915

Surveyed 1844
Revised 1915
Edition 1923
Copyright N/A
Levelled 1915

Surveyed 1844
Revised 1916
Edition 1923
Copyright N/A
Levelled 1915

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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





Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

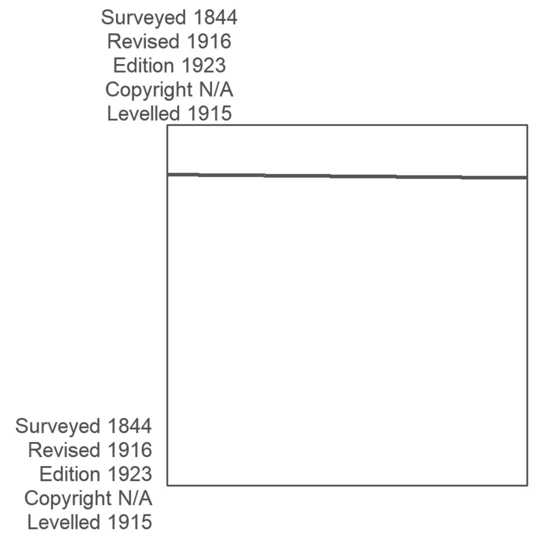
Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S



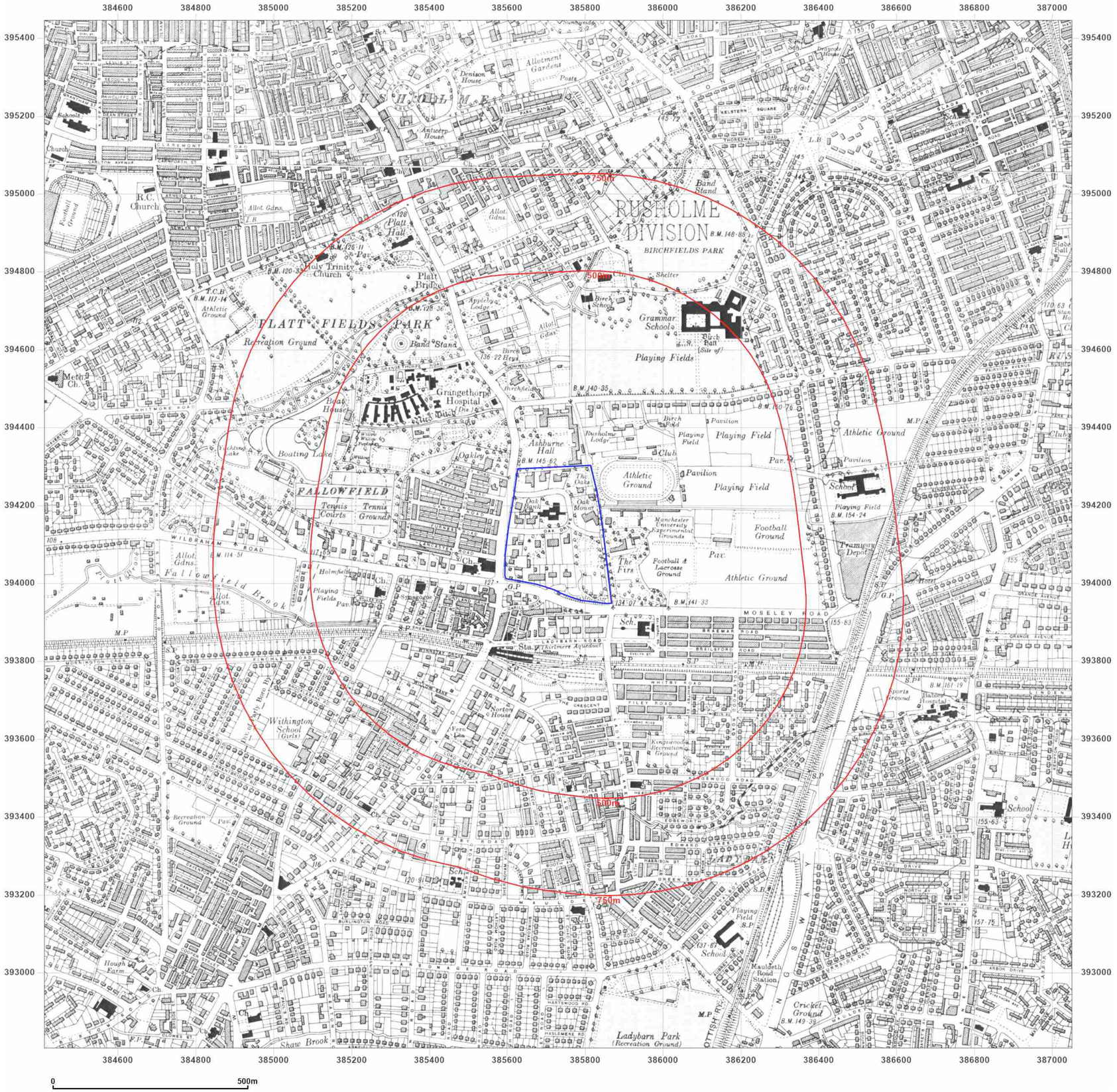
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: County Series

Map date: **1932-1934**

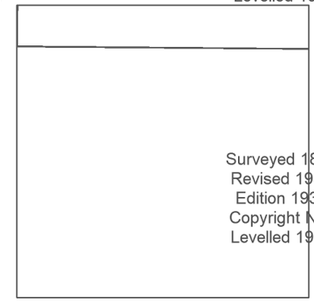
Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1844
Revised 1932
Edition 1932
Copyright N/A
Levelled 1927

Surveyed 1844
Revised 1934
Edition 1934
Copyright N/A
Levelled 1927



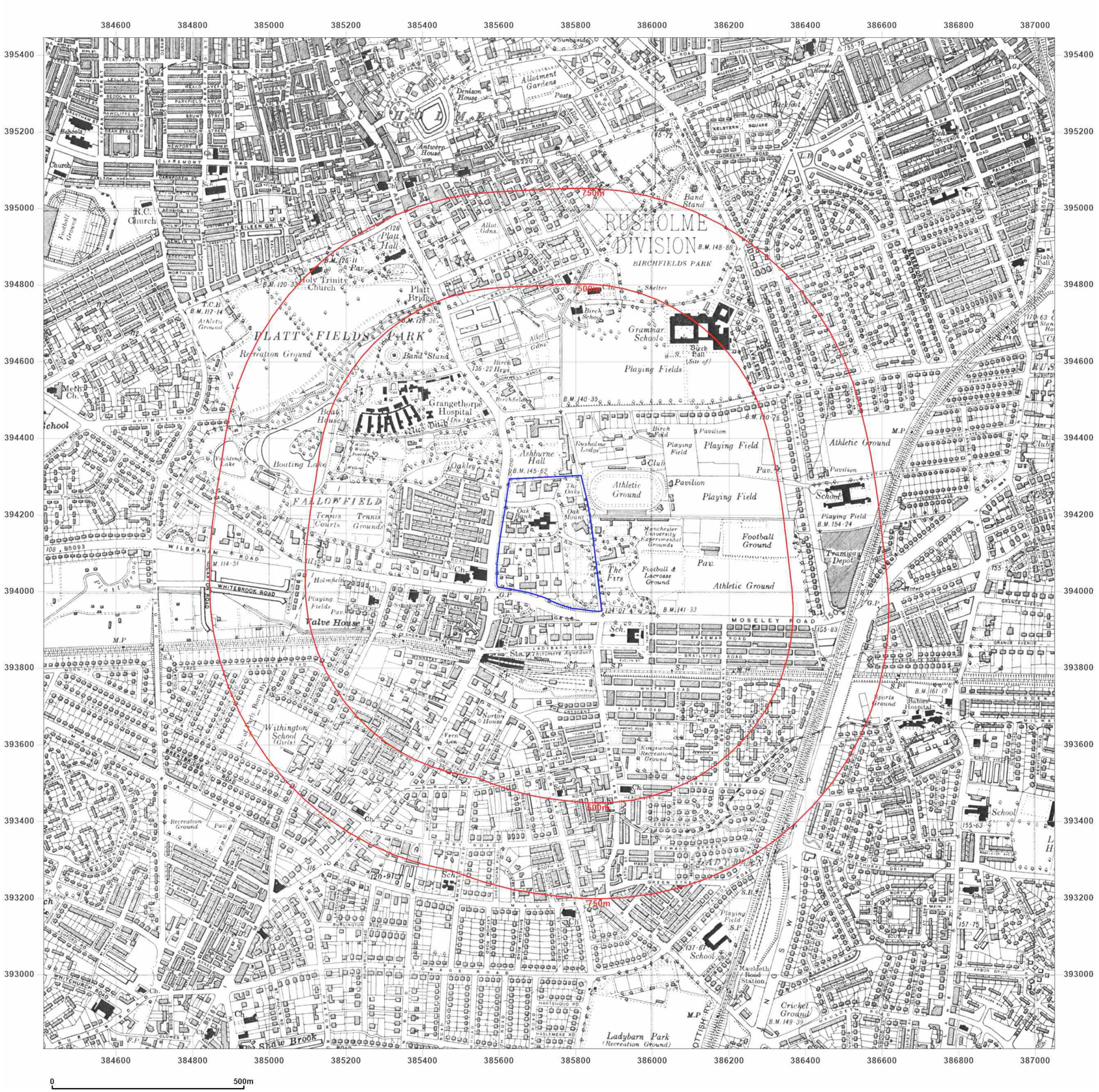
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: County Series

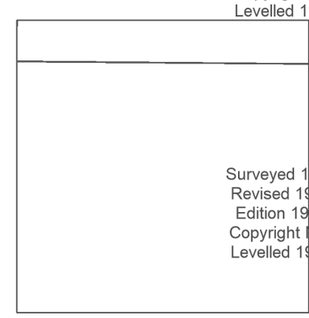
Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1844
Revised 1938
Edition 1938
Copyright N/A
Levelled 1927



Surveyed 1844
Revised 1938
Edition 1938
Copyright N/A
Levelled 1927

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: Provisional

Map date: **1955-1956**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1956
Levelled N/A

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1956
Levelled N/A

Surveyed N/A
Revised 1955
Edition N/A
Copyright 1955
Levelled N/A

Surveyed N/A
Revised 1955
Edition N/A
Copyright 1955
Levelled N/A

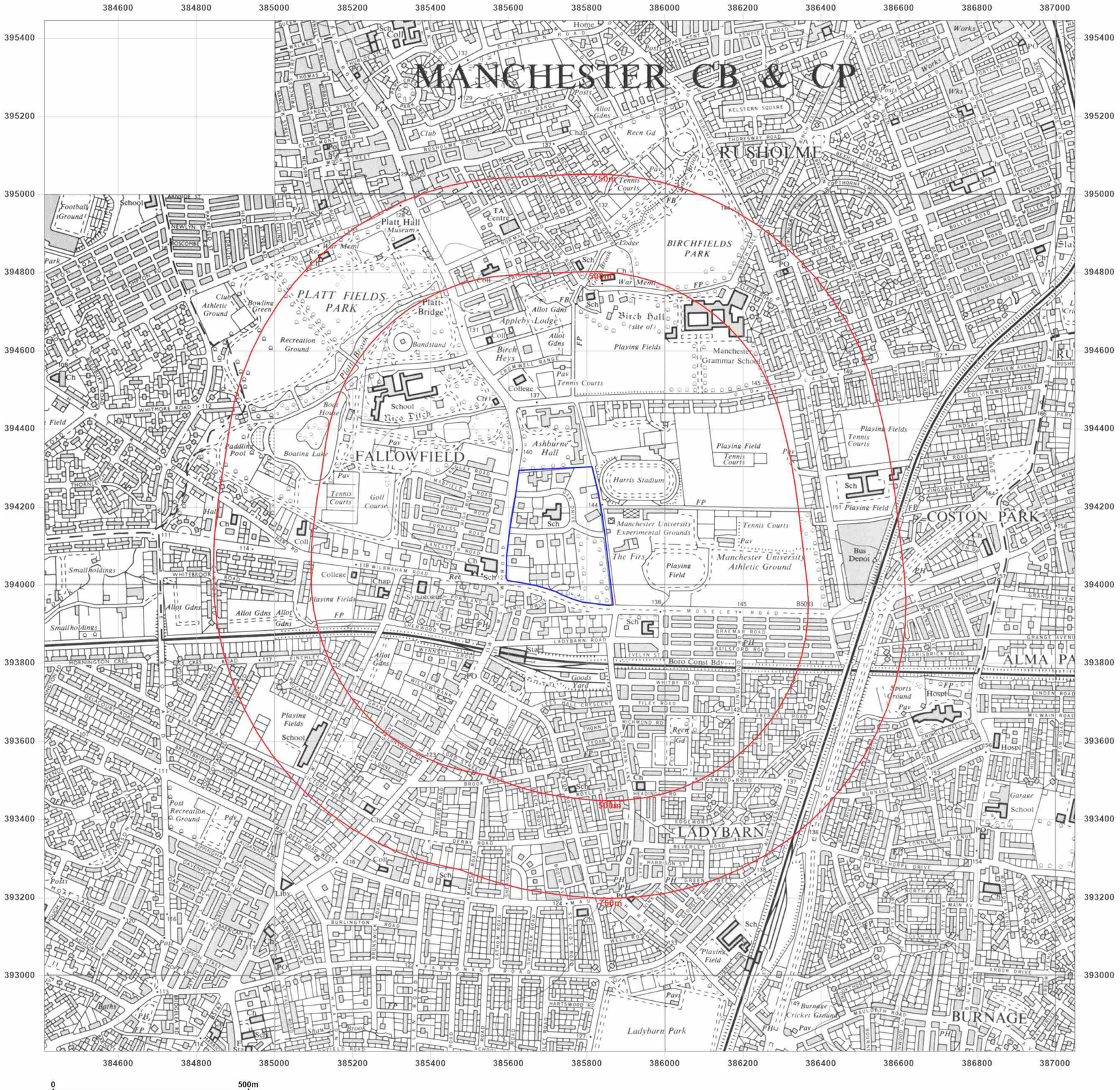
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: Provisional

Map date: **1965-1968**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1968
Revised 1968
Edition N/A
Copyright 1968
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1966
Levelled N/A

Surveyed 1965
Revised 1965
Edition N/A
Copyright 1965
Levelled N/A

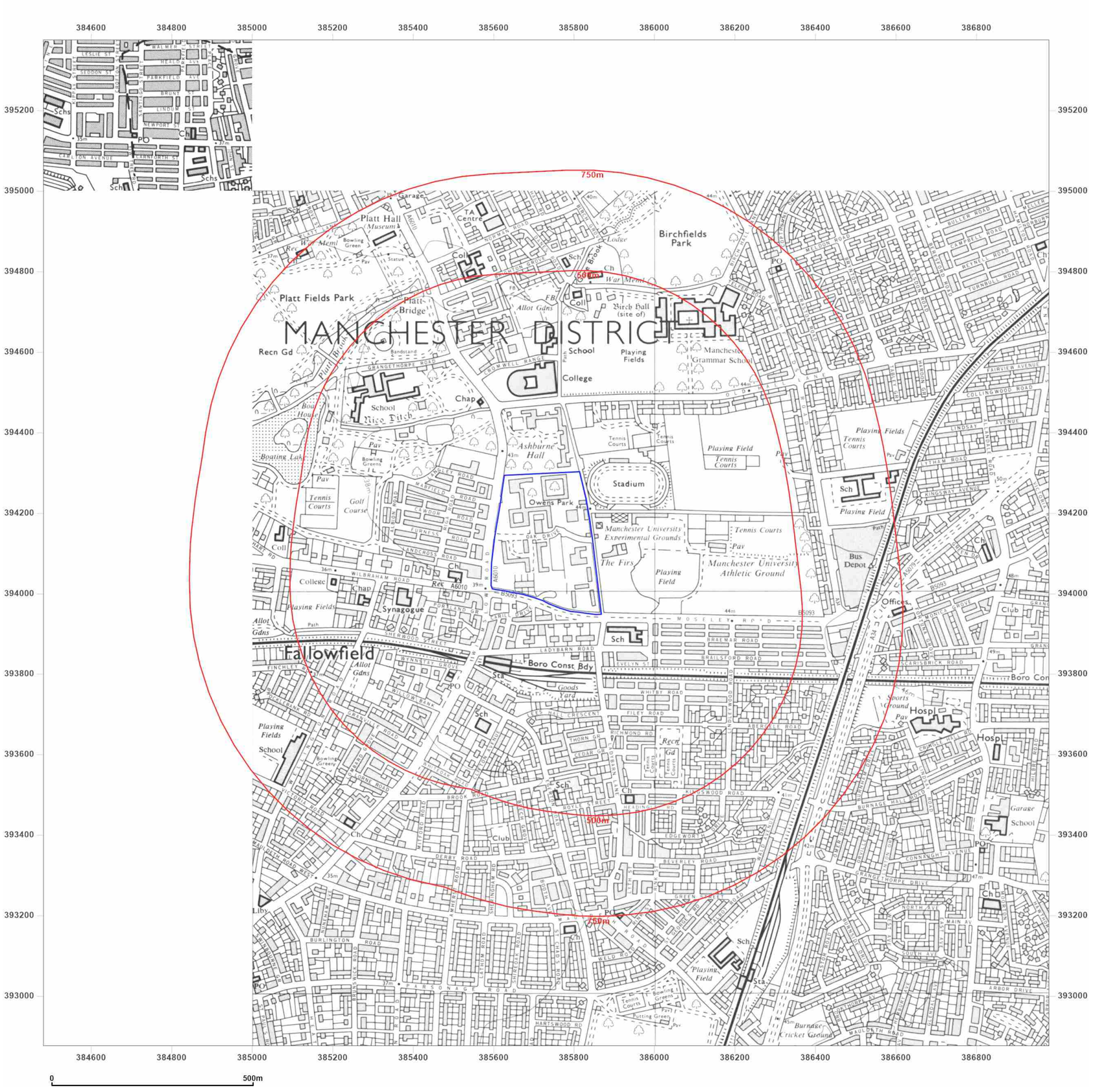
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: National Grid

Map date: **1972-1976**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1971
Revised 1972
Edition N/A
Copyright 1972
Levelled 1972

Surveyed 1974
Revised 1975
Edition N/A
Copyright 1976
Levelled 1964

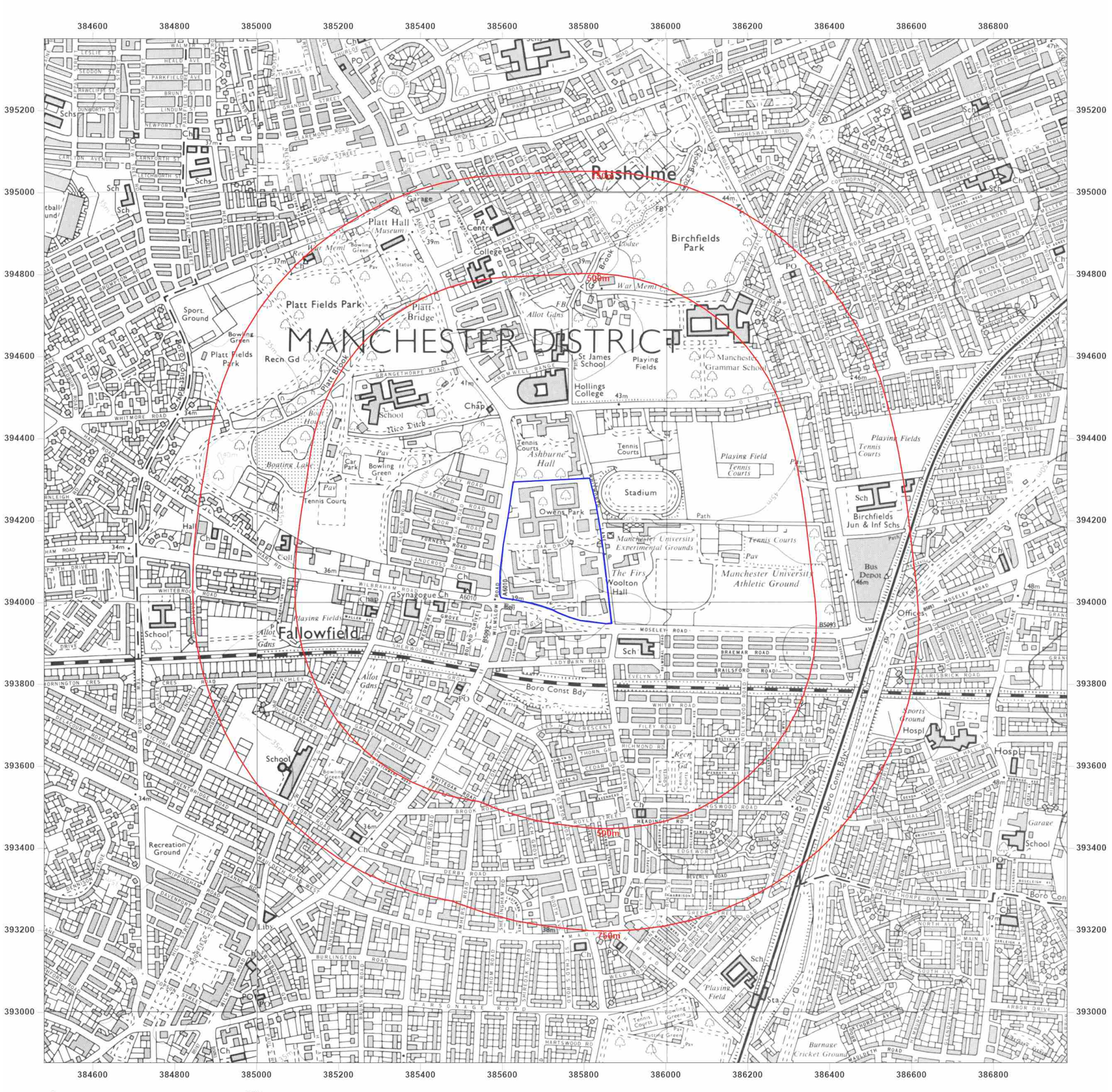
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: National Grid

Map date: **1980-1983**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1976
Revised 1980
Edition N/A
Copyright 1980
Levelled 1976

Surveyed 1976
Revised 1980
Edition N/A
Copyright 1981
Levelled 1976

Surveyed 1977
Revised 1981
Edition N/A
Copyright 1981
Levelled 1976

Surveyed 1981
Revised 1983
Edition N/A
Copyright 1983
Levelled 1981

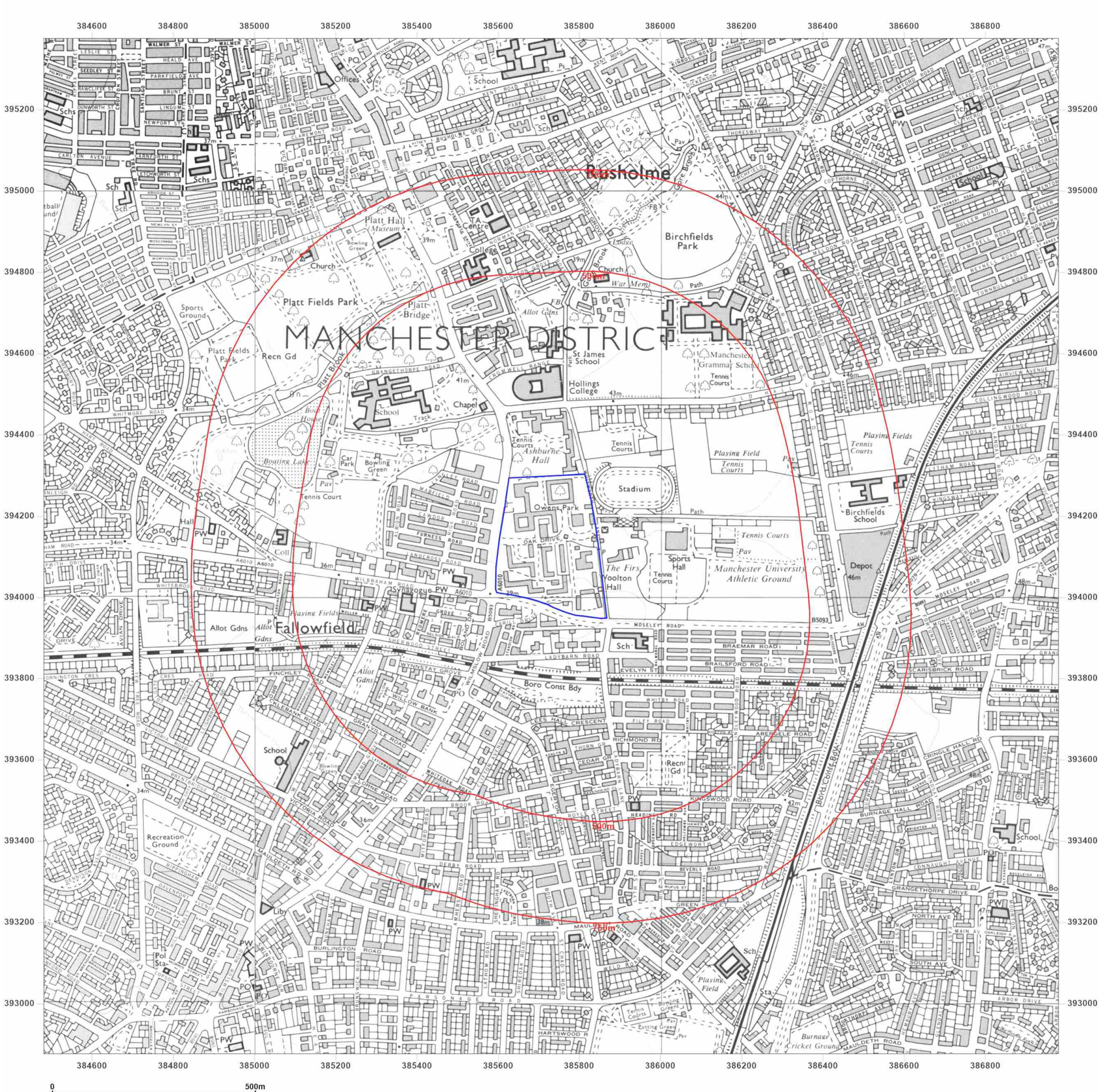
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: National Grid

Map date: **1985-1989**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1983
Revised 1985
Edition N/A
Copyright 1985
Levelled 1981

Surveyed 1985
Revised 1985
Edition N/A
Copyright 1985
Levelled 1981

Surveyed 1985
Revised 1988
Edition N/A
Copyright 1988
Levelled 1981

Surveyed 1986
Revised 1989
Edition N/A
Copyright 1989
Levelled 1981

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2001

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2010

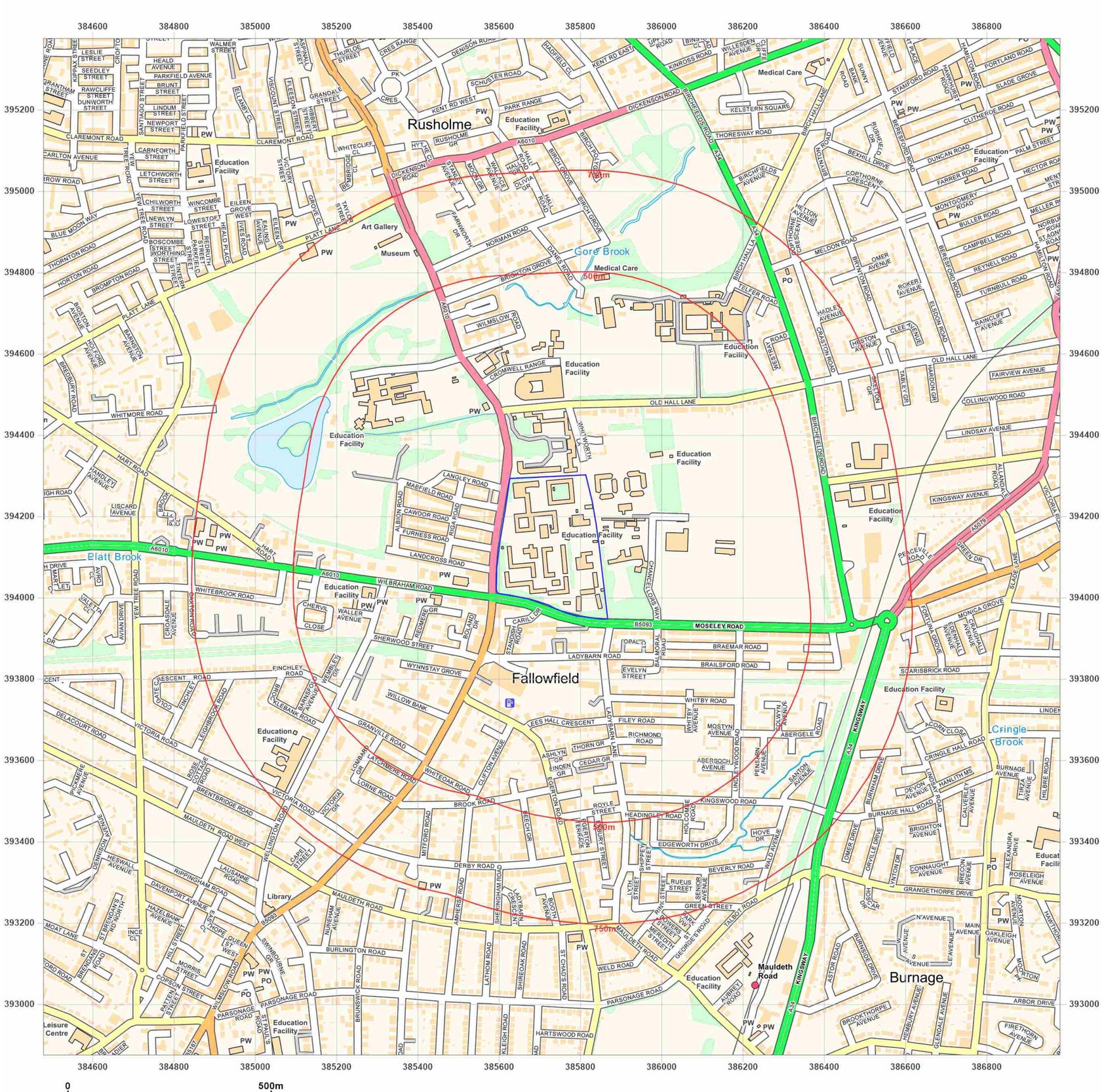
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800
Grid Ref: 385730, 394125

Map Name: National Grid

Map date: **2022**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2022

Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1956-1957**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1956 Revised 1956 Edition N/A Copyright 1956 Levelled 1948	Surveyed 1956 Revised 1956 Edition N/A Copyright 1956 Levelled 1927
Surveyed 1957 Revised 1957 Edition N/A Copyright 1957 Levelled 1948	Surveyed 1957 Revised 1957 Edition N/A Copyright 1957 Levelled 1948

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1967-1971**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1958

Surveyed 1957
Revised 1970
Edition N/A
Copyright 1971
Levelled 1958

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1978-1981**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1958
Revised 1980
Edition N/A
Copyright 1980
Levelled 1958

Surveyed N/A Revised N/A Edition N/A Copyright 1978 Levelled 1958	Surveyed N/A Revised N/A Edition N/A Copyright 1981 Levelled 1958

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1984-1988**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1958
Revised 1988
Edition N/A
Copyright 1988
Levelled 1958

Surveyed 1958 Revised 1984 Edition N/A Copyright 1984 Levelled 1958	Surveyed 1958 Revised 1988 Edition N/A Copyright 1988 Levelled 1958

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1992**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A	Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A
Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A	Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A

Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1992-1995**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A	Surveyed 1994 Revised 1994 Edition N/A Copyright 1994 Levelled N/A
Surveyed 1995 Revised 1995 Edition N/A Copyright 1995 Levelled N/A	Surveyed 1994 Revised 1994 Edition N/A Copyright 1994 Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1994
Revised 1994
Edition N/A
Copyright 1994
Levelled N/A

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

Surveyed 1994
Revised 1994
Edition N/A
Copyright 1994
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

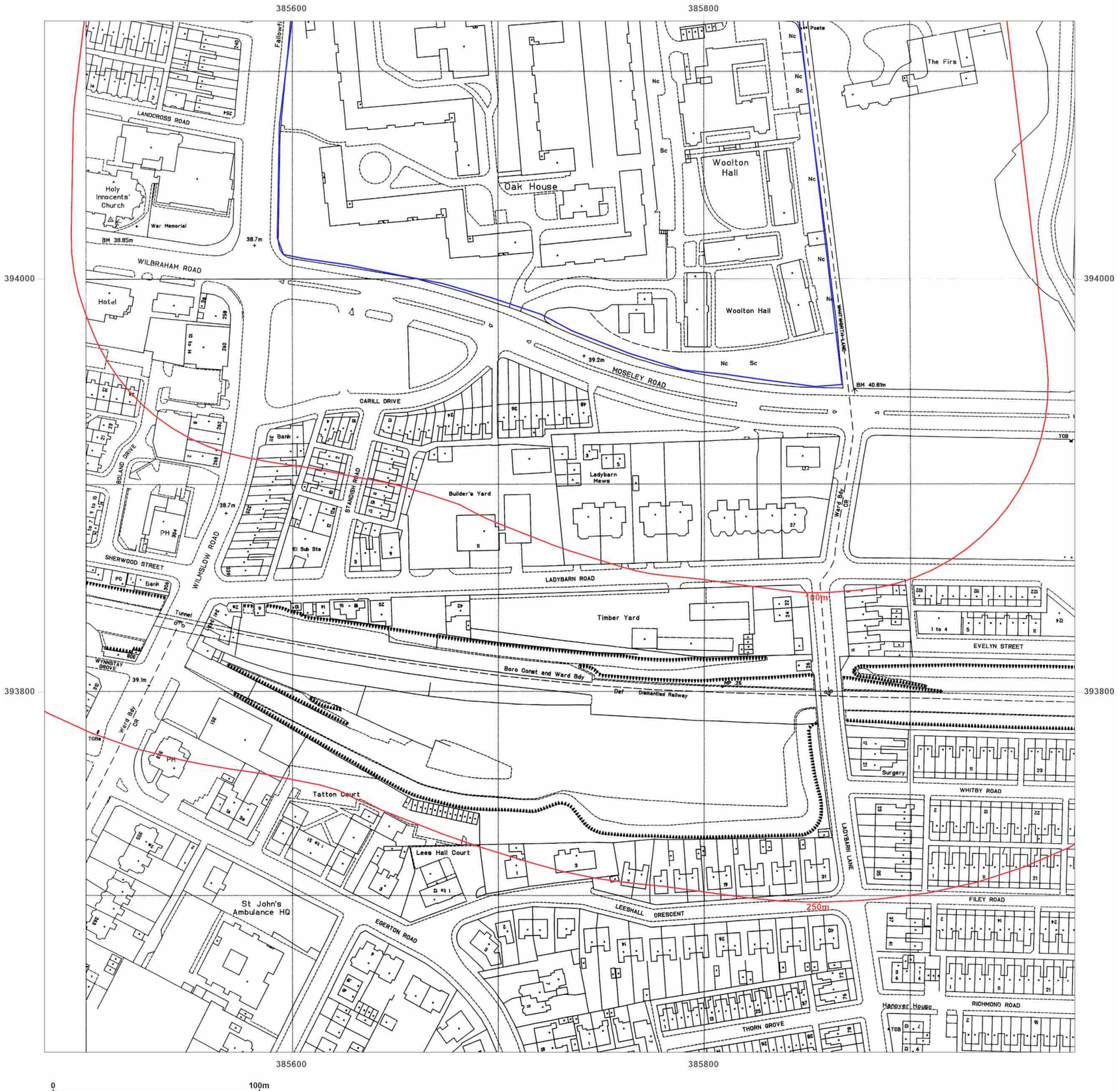
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_1
Grid Ref: 385730, 393875

Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_2
Grid Ref: 385730, 394375

Map Name: National Grid

Map date: **1956**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1956
Levelled 1927

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1956
Levelled 1927

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1956
Levelled 1948

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1956
Levelled 1927

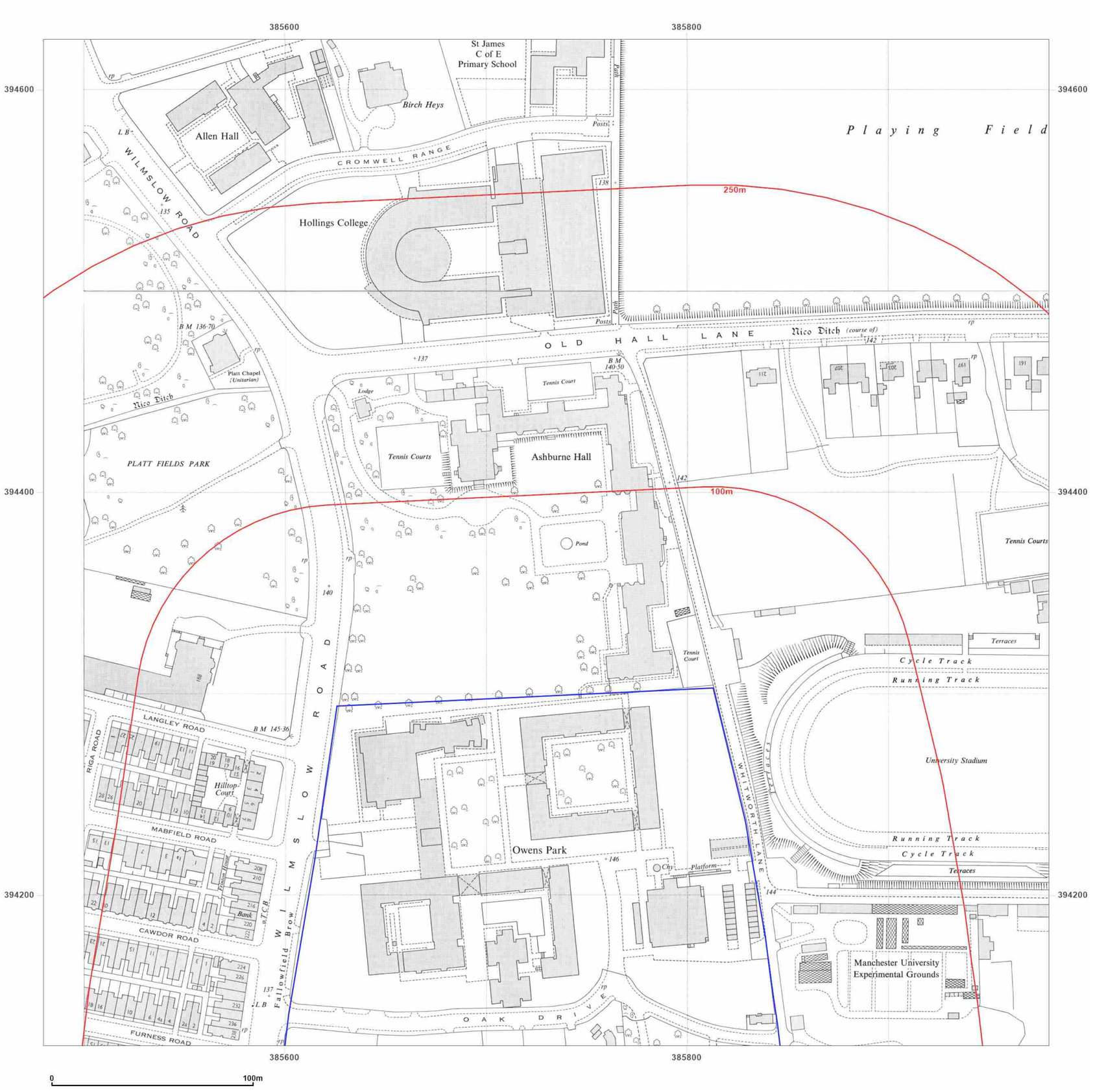
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_2
Grid Ref: 385730, 394375

Map Name: National Grid

Map date: **1967**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1956
Revised 1966
Edition N/A
Copyright 1967
Levelled 1958

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1958

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_2
Grid Ref: 385730, 394375

Map Name: National Grid

Map date: **1983-1988**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1983
Levelled 1958

Surveyed 1958
Revised 1988
Edition N/A
Copyright 1988
Levelled 1958

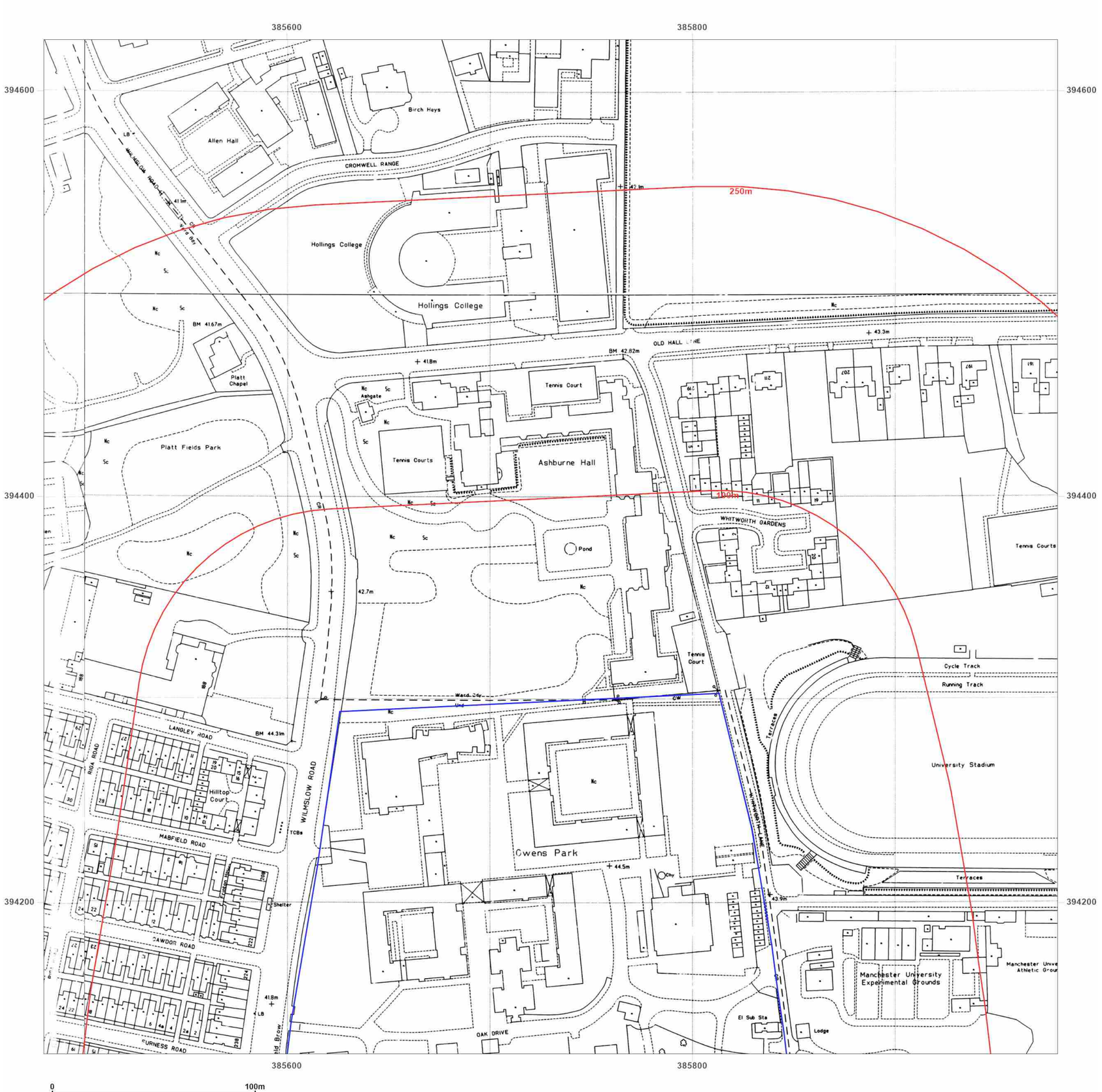
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_2
Grid Ref: 385730, 394375

Map Name: National Grid

Map date: **1992**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_2
Grid Ref: 385730, 394375

Map Name: National Grid

Map date: **1992-1994**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A	Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A
Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A	Surveyed 1994 Revised 1994 Edition N/A Copyright 1994 Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_2
Grid Ref: 385730, 394375

Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1994
Revised 1994
Edition N/A
Copyright 1994
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_2
Grid Ref: 385730, 394375

Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_1250_1_2
Grid Ref: 385730, 394375

Map Name: National Grid

Map date: **1995**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
S

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

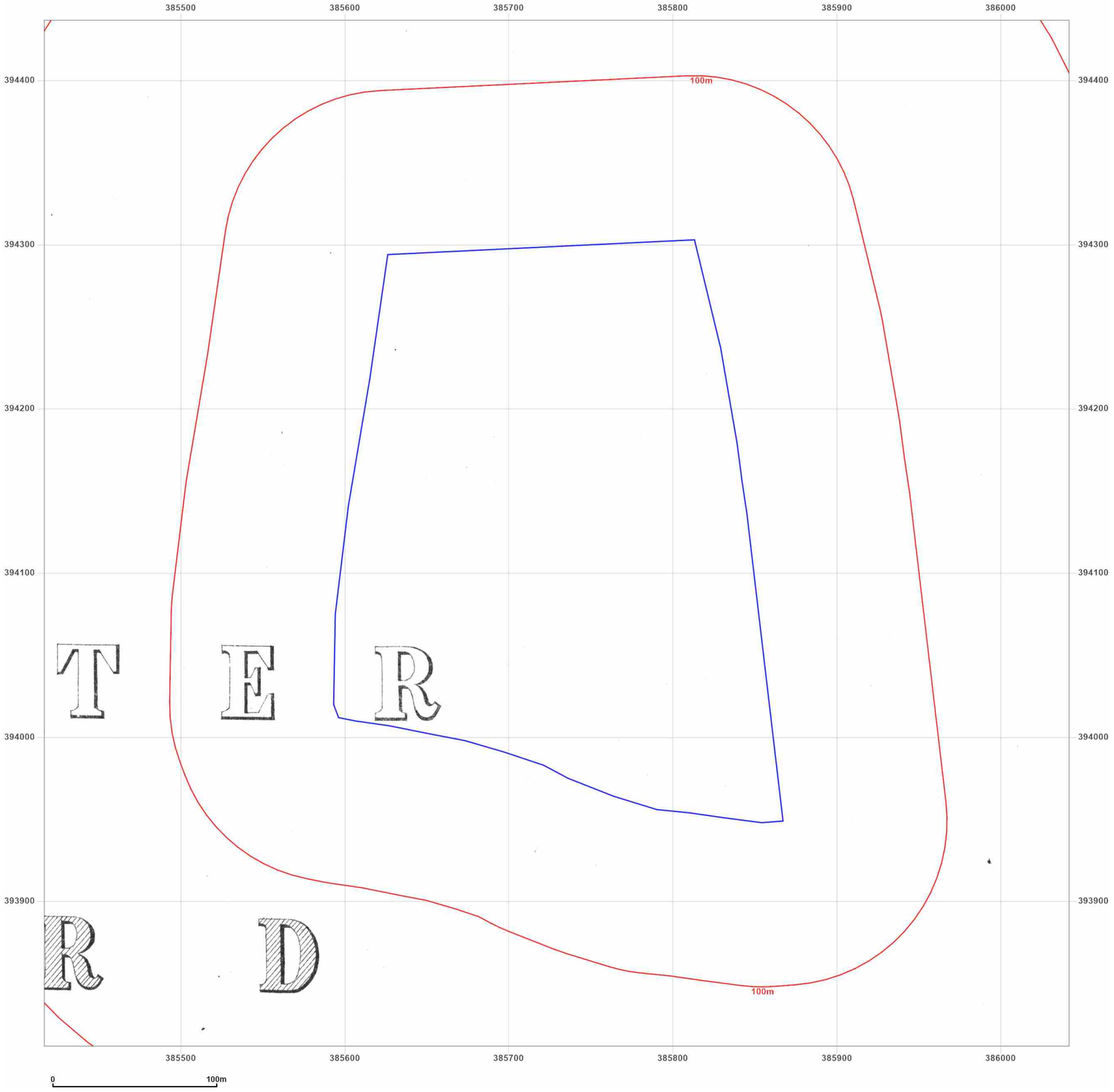
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_2500
Grid Ref: 385729, 394124

Map Name: County Series

Map date: **1881**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1881
Revised N/A
Edition 1881
Copyright N/A
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_2500
Grid Ref: 385729, 394124

Map Name: County Series

Map date: **1893**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1893
Revised N/A
Edition 1893
Copyright N/A
Levelled N/A

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_2500
Grid Ref: 385729, 394124

Map Name: County Series

Map date: **1907**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1891
Revised 1905
Edition 1907
Copyright N/A
Levelled N/A

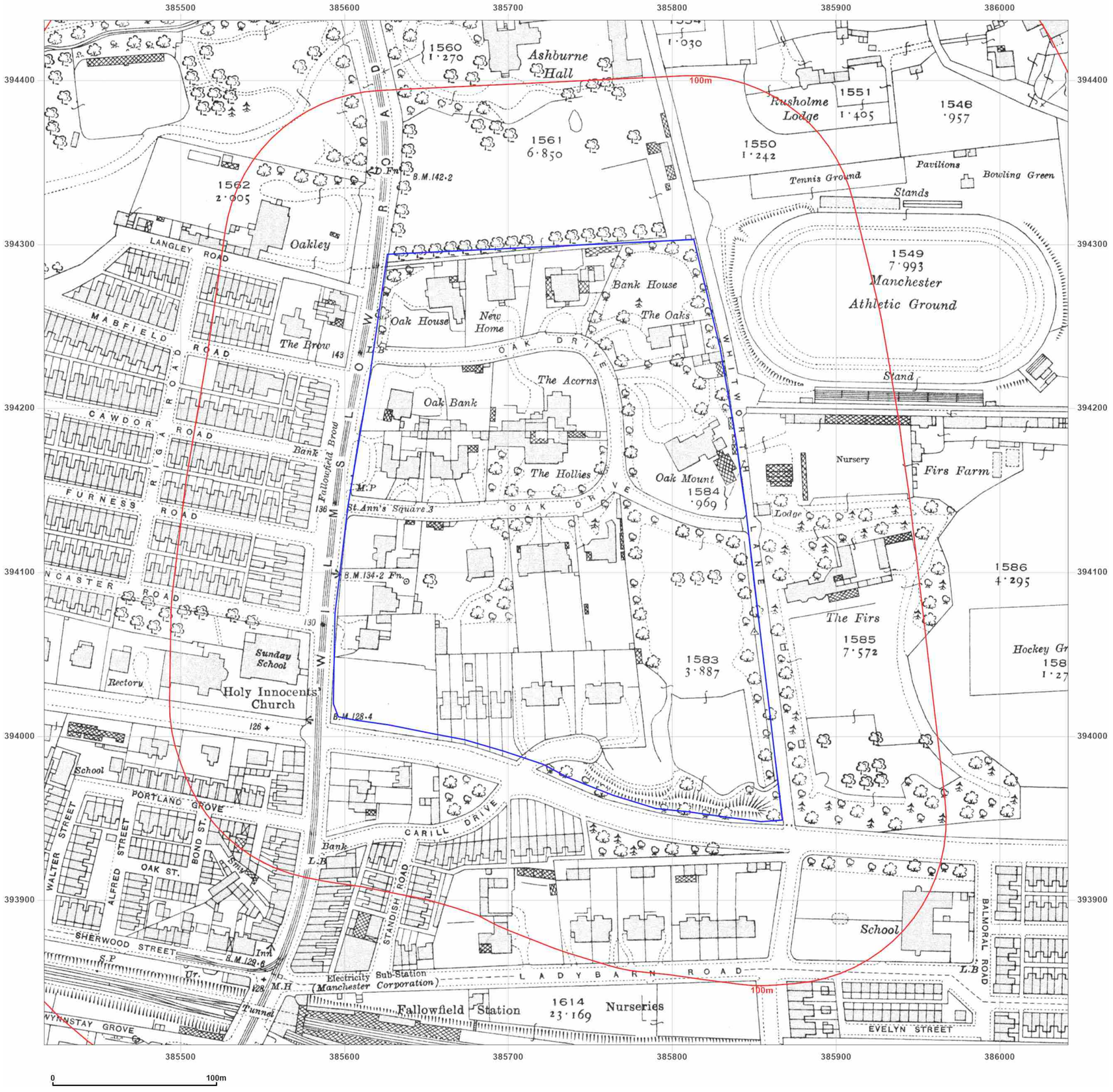
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_2500
Grid Ref: 385729, 394124

Map Name: County Series

Map date: **1922**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1922
Revised 1916
Edition 1922
Copyright N/A
Levelled 1915

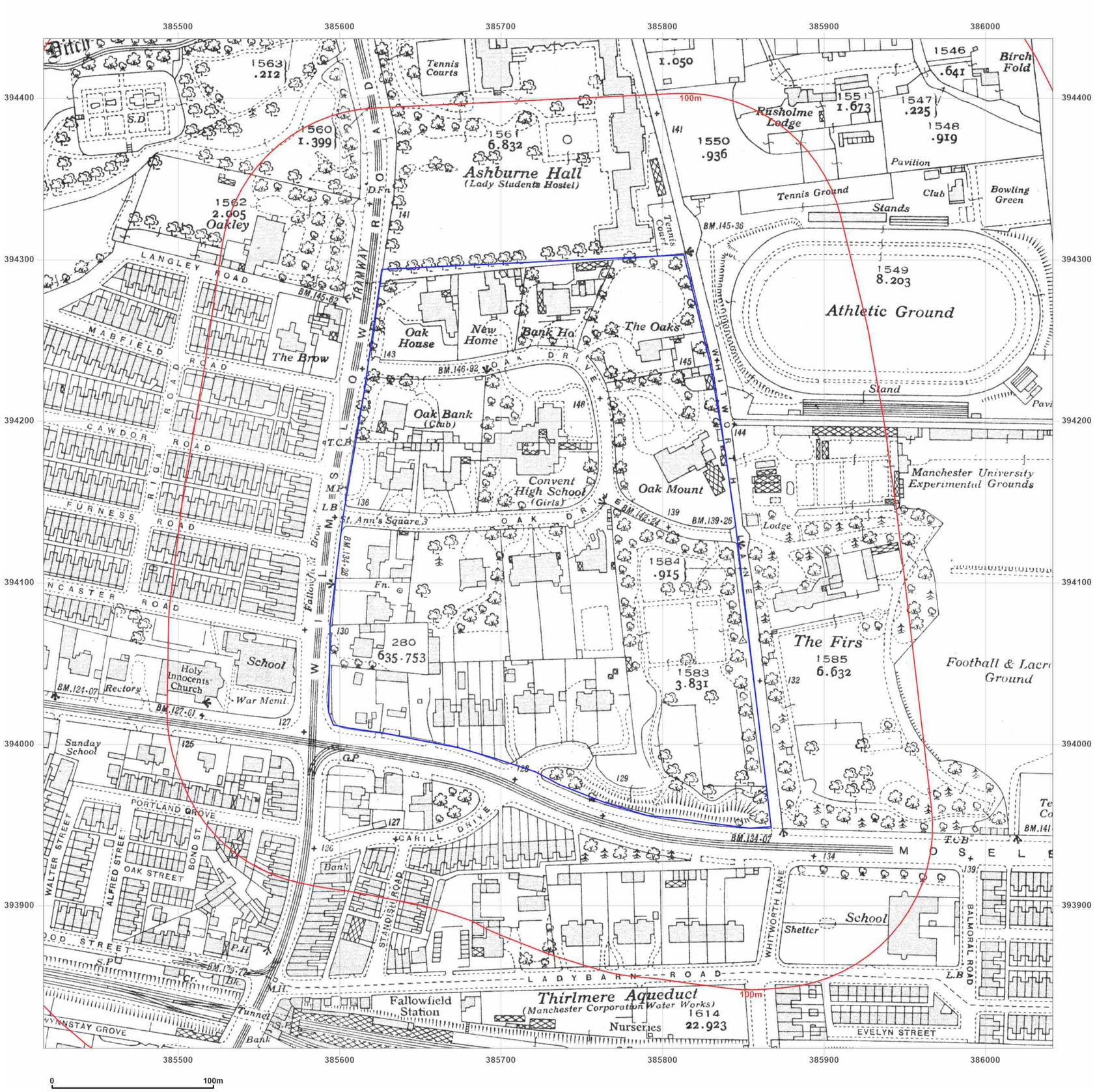
Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_2500
Grid Ref: 385729, 394124

Map Name: County Series

Map date: **1934**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1873
Revised 1934
Edition N/A
Copyright N/A
Levelled 1927

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_2500
Grid Ref: 385729, 394124

Map Name: National Grid

Map date: **1957-1958**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1957
Levelled 1948

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1957
Levelled 1949

Surveyed 1957
Revised 1957
Edition N/A
Copyright 1958
Levelled 1948

Surveyed 1956
Revised 1956
Edition N/A
Copyright 1957
Levelled 1949

Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_2500
Grid Ref: 385729, 394124

Map Name: National Grid

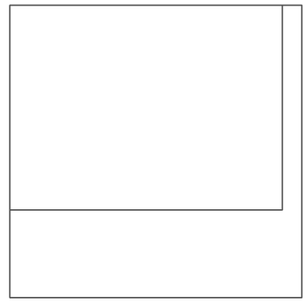
Map date: **1968**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1966
Revised 1966
Edition N/A
Copyright 1968
Levelled 1958



Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_Landline_1_1
Grid Ref: 385730, 393975

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

N
W E
S

2003

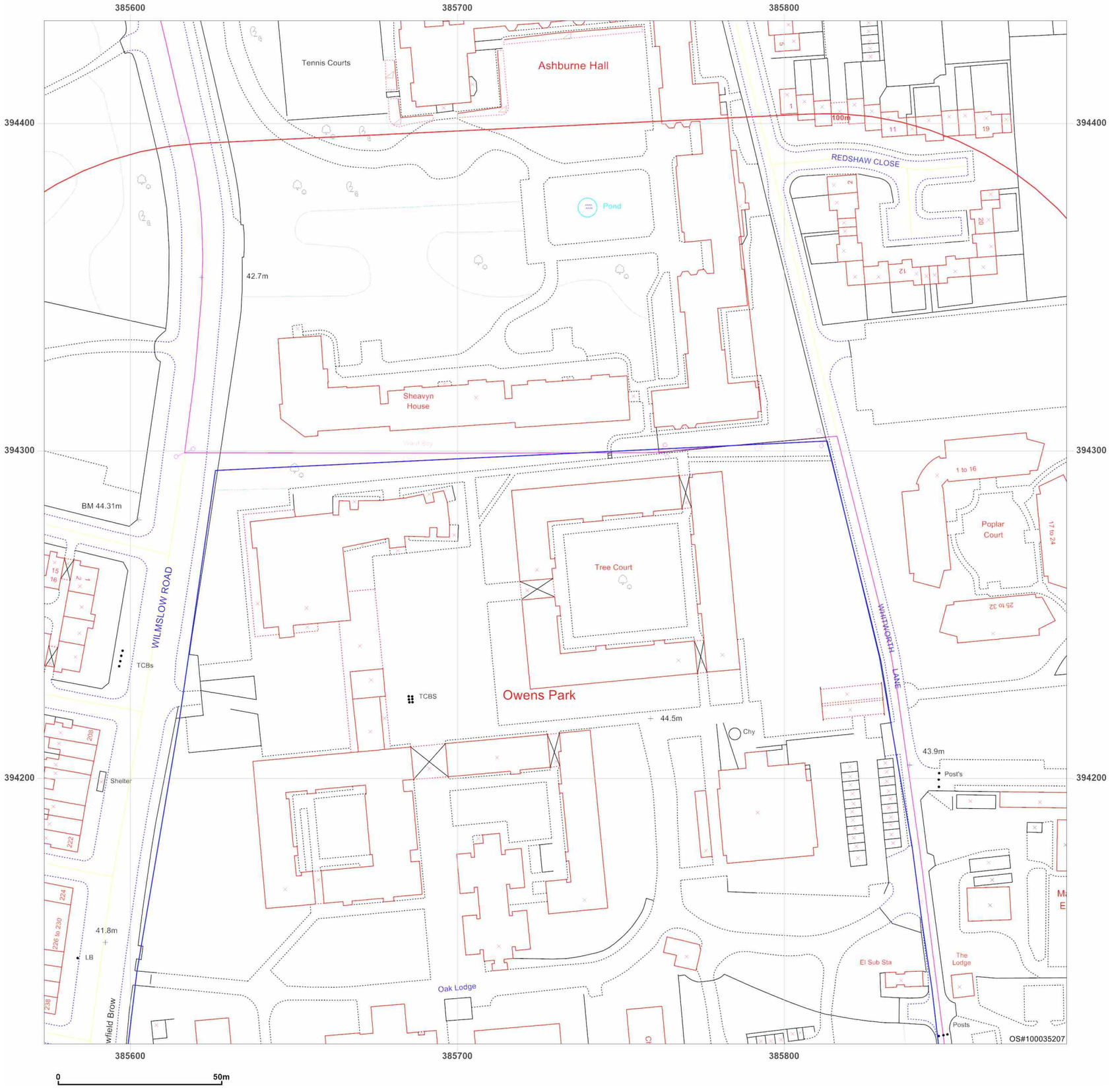
Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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



Groundsure INSIGHTS

Site Details:

385731, 394144

Client Ref: 0053454_Fallowfield
Report Ref: GS-8830800_Landline_1_2
Grid Ref: 385730, 394275

Map Name: LandLine

Map date: **2003**

Scale: 1:1,250

Printed at: 1:1,250

N
W E
S

2003

Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 16 June 2022

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

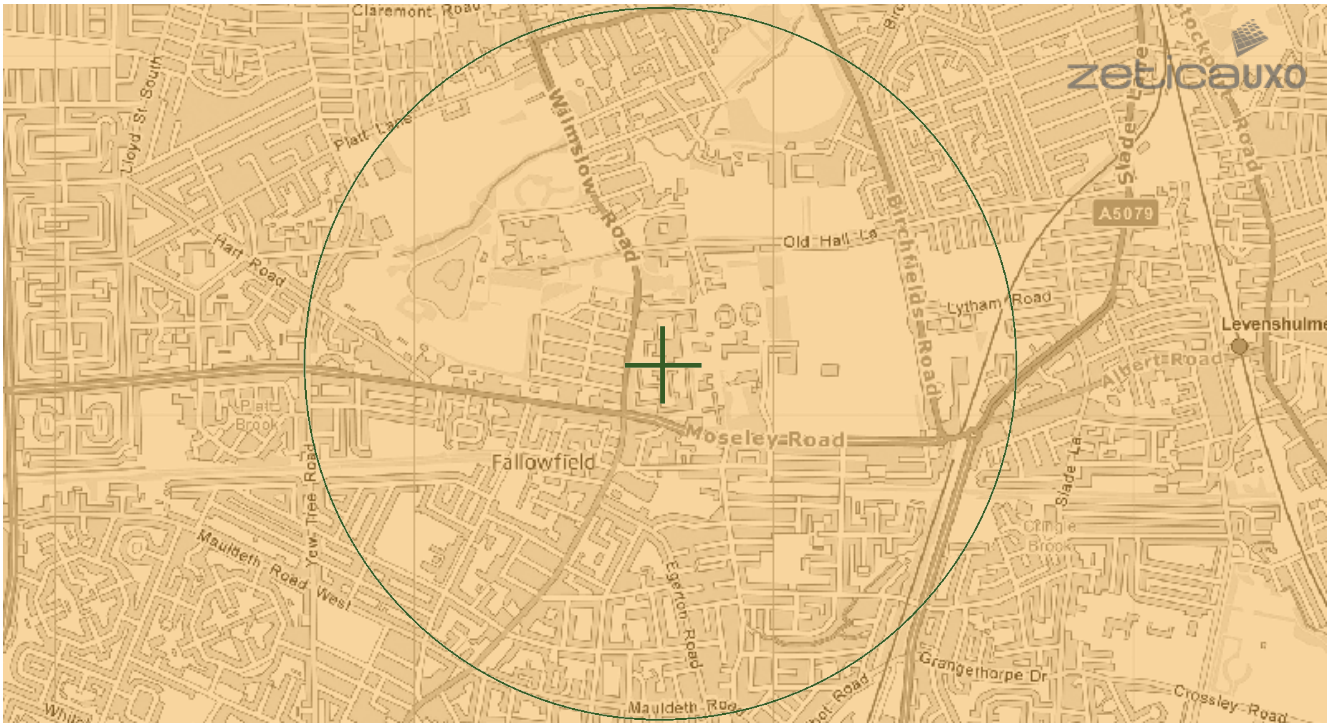
Appendix C UXO Risk Map and PDSA

Copyright © 1976 - 2023 Buro Happold. All rights reserved

UNEXPLODED BOMB RISK MAP

SITE LOCATION

Map Centre: 385696,394144



LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

miltary	**industry**	**UXO find**
transport	**dock**	**Luftwaffe targets**
utilities	**Bombing decoy**	**other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: **(https://zeticauxo.com/downloads-and-resources/risk-maps/)**

Zetica cannot guarantee the accuracy or completeness of the information or data used and cannot accept any liability for any use of the maps. These maps can be used as part of a technical report or similar publication, subject to acknowledgment. The copyright remains with Zetica Ltd.

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

Pre-Desk Study Assessment

Site:	Fallowfield, Greater Manchester
Client:	Buro Happold
Contact:	Louise Richards
Date:	20th June 2023
Pre-WWI Military Activity on or Affecting the Site	None identified.
WWI Military Activity on or Affecting the Site	None identified.
WWI Strategic Targets (within 5km of Site)	The following strategic targets were located in the vicinity of the Site: ■ Salford Docks and the Manchester Ship Canal. ■ Transport infrastructure and public utilities. ■ Industries important to the war effort, including munitions factories, aircraft manufacturing, and chemical and engineering works. ■ Alexandra Park Aerodrome and Heaton Chapel Aerodrome. ■ Military barracks, camps, and training areas. ■ Anti-Aircraft (AA) guns.
WWI Bombing	None identified on the Site.
Interwar Military Activity on or Affecting the Site	None identified.
WWII Military Activity on or Affecting the Site	None identified.
WWII Strategic Targets (within 5km of Site)	The following strategic targets were located in the vicinity of the Site: ■ Salford Docks and the Manchester Ship Canal. ■ Transport infrastructure and public utilities. ■ Industries important to the war effort, including engineering works. ■ Military barracks, camps, depots, and training areas. ■ AA and anti-invasion defences.
WWII Bombing Decoys (within 5km of Site)	None.
WWII Bombing	During WWII, the Site was located in the County Borough (CB) of Manchester which officially recorded 737No. High Explosive (HE) bombs, with a bombing density of 27.0 bombs per 405 hectares (ha). The Manchester and Salford area was heavily bombed between the 22nd and 24th December 1940 (the 'Manchester Blitz'). Over 400No. HE bombs, and more than 30,000 Incendiary Bombs (IBs) fell across the region. Bombing was concentrated on Manchester city centre, approximately 4.3km from the Site. Readily available records have been found to indicate that several HE bombs fell in close proximity to the Site.
Post-WWII Military Activity on or Affecting the Site	None identified.

Recommendation	It is recommended that a detailed desk study is commissioned to assess, and potentially zone, the Unexploded Ordnance (UXO) hazard level on the Site.
Further information	For information about Zetica's detailed UXO desk studies and other UXO services, please visit our website: www.zeticauxo.com. Details and downloadable resources covering the most common sources of UXO hazard affecting sites in the UK can be found **here**. If you have any further queries, please don't hesitate to get in contact with us at uxo@zetica.com or 01993 886 682.

This summary is based on a cursory review of readily available records. Caution is advised if you plan to action work based on this summary.

It should be noted that where a potentially significant source of UXO hazard has been identified on the Site, the requirement for a detailed desk study and risk assessment has been confirmed and no further research will be undertaken at this stage. It is possible that further in-depth research as part of a detailed UXO desk study and risk assessment may identify other potential sources of UXO hazard on the Site.

Louise Richards
Buro Happold Limited
3 Wellington Place
Leeds
LS1 4AP
UK

T: +44 (0)113 204 2200
F: +44 (0)870 787 4144
Email: louise.richards@burohappold.com