

Newhouse Academy, Heywood

Phase 2 Ground Investigation Report

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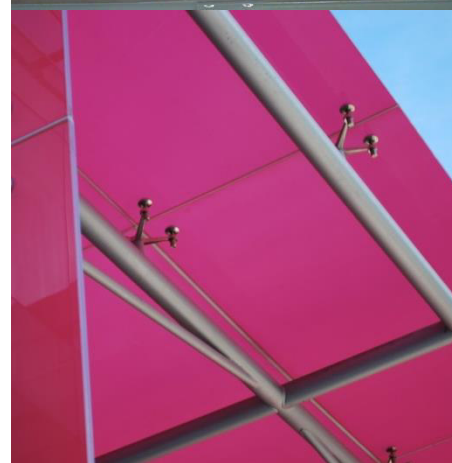
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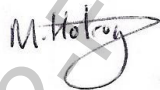
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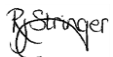
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Executive Summary

Appointment	In May 2022 Curtins were instructed by Morgan Sindall to undertake a (staged) Phase 2 Ground Investigation of land at Newhouse Academy, off Newhouse Road, Heywood, OL10 2NT. The first stage was undertaken during the May half term break. The second stage was undertaken during the summer holidays in July/August 2022. A third phase was undertaken in October 2022. The site is centred at national grid reference 385690, 409490 and covers an area of approximately 0.40Ha. Development proposals for the partial redevelopment of the site include the construction of a new 2-3 storey school building, including teaching and sports facilities, followed by the demolition of some of the existing buildings.
Current Site Status	The investigation area, and location for the proposed new school buildings, is located within the Newhouse Academy site. The proposed development is to be constructed directly west and south of the existing school building, within an area currently occupied by a hardstanding playground and grassed soft landscaping. The area is relatively level, through in the south the topography gently undulates, sloping generally to the south. The main school car park is located west of the development area, with the existing school to the north and east. Playing fields are located south of the development area.
Preliminary Site Assessment	Earliest mapping (1840's) shows the site as undeveloped land, until the 1960s when the Siddal Moor School was constructed on and east of the site. The south of the site was occupied by playing fields. By 2016, the north of the site was occupied by hardstanding playground. The site anticipated to be underlain by a thin layer of Made Ground, Glacial Till (diamicton) and bedrock of the Pennine Lower Coal Measures Formation (PLCM). The Glacial Till is classified as a Secondary Aquifer – Undifferentiated, while the PLCM is a Secondary A Aquifer. The site is not located within a Source Protection Zone (SPZ). The nearest surface water feature appears to be the Whittle Brook, located >500m south of the site.
Fieldworks Undertaken	The investigation includes 3 No. Geobore-S rotary boreholes, including dynamic sampling to rockhead, with rotary cored and rotary open hole progression to 30.00m bgl. 14 No. CPT tests were undertaken in October 2022. Soil samples were obtained for chemical and geotechnical analysis. Rock core samples were obtained for geotechnical analysis. Dual gas and groundwater level monitoring wells were installed within the borehole. Three return monitoring visits have been undertaken.
Encountered Ground Conditions	Ground conditions comprise Made Ground (0.90m to 3.00m thickness) underlain by cohesive (0.45m to 1.20m thickness) and granular (1.50m to 4.10m thickness) Glacial Till and mudstone of the Pennine Lower Coal Measures Formation (PLCMF) from 3.80m to 5.00m bgl. No coal deposits were recorded. Made Ground comprises dark brown very gravelly very sandy clay, and soft light grey very silty slightly sandy gravelly clay. Anthropogenic fragments include brick and concrete. Cohesive Glacial Till comprises firm light brown silty, sandy, gravelly clay with mudstone and sandstone fragments, underlain by granular Glacial Till of brown, light brown or grey sandy gravel. Locally soft dark greyish brown slightly sandy gravelly clay was recorded. Granular Glacial Till comprises loose light brown or dark brown clayey gravelly fine and medium sand, or light brown very clayey sandy gravel, with fragments of mudstone and sandstone. The PLCMF comprises extremely weak to medium strong grey mudstone, locally weathered and recovered as sandy gravelly clay or sandy silty gravel. Hydrostatic head level within the bedrock appears to be in the region of 2.62 to 3.43m bgl. Variability beyond the findings of this report may be apparent.
Environmental Laboratory Testing	Four Made Ground soil samples and one natural soil sample were obtained. With respect to the most conservative 'Residential without home grown produce' thresholds, no exceedances of contamination GACs were recorded in any of the soil samples tested. By extension, no exceedances were recorded against 'Commercial' thresholds. Both soil samples were screened for asbestos. No suspected asbestos containing materials (ACMs) were identified within any of the exploratory hole logs or laboratory screening. The risk to site end users from soils is therefore considered to be Low. Post-demolition testing will be required beneath the existing school building to determine risks to end users in soft landscaped areas. This is likely to be undertaken following construction of the new school.
Ground Gas Assessment	Six return monitoring visits have been undertaken to date. The maximum recorded concentration of carbon dioxide (CO₂) was 4.5% v/v, recorded in RC01(S) on the sixth monitoring visit. Methane (CH₄) was recorded below the instrument's detection limit throughout the monitoring period. The greatest positive peak air flow rates were recorded in RC02 (D) and RC03 (S) on the fifth monitoring visit, at 6.0 l/hr and 2.6 l/hr respectively. The greatest negative air flow rate was recorded in RC02(S) on the second monitoring visit, recording a value of -40.8 l/hr. All peak flow rates returned to a steady state air flow rate of <0.1 l/hr, with exception of RC02(S) on the first visit where a steady state air flow rate of -0.4 l/hr was recorded. Evaluation of the 'worst case' scenario (highest gas flow and highest gas concentration within a single stratum) records a maximum Q_{hg} of 0.0045 l/hr for carbon dioxide within shallow Made Ground and Glacial Till, and 0.0017 l/hr for carbon dioxide within the deeper Pennine Lower Coal Measures Formation. The worst case Q_{hg} calculated from the available dataset therefore indicates a CS1 classification on site. No gas protection measures are required for the proposed development.

Coal Mining Risk Assessment	There are no recorded of coal seams having been worked beneath the site at depths less than 30m bgl. Probable workings were recorded in Coal Authority Mapping east of the site. Three rotary boreholes undertaken within the site did not record any coal seams, broken ground or voids. The risk for possible presence of shallow coal mining features beneath the remainder of the development site is considered to be Low. There are no records of coal seams having been worked beneath the site at depths greater than 30m bgl in the information which has been obtained for review. It is unlikely that deep coal workings are present beneath the site. Furthermore where any voids are present at such depths these are unlikely to propagate to the surface. As such, it is considered that the risk presented from deep coal mining hazards is Very Low. No evidence of historic opencast mining on site has been identified, with a Very Low risk from associated hazards. No abnormal concentrations of monitored ground gases (CH₄, CO₂, O₂, CO or H₂S) throughout the progression of any of the boreholes. It is considered the risk presented from mine gases to site end users and construction workers from mine gas emissions is Low. Risks associated with spontaneous combustion and coal mining geology are Low.
Geotechnical Assessment and Recommendations	Estimated building loads, provided by the structural engineer, at the time of writing indicate vertical pile loads of up to 965kN are anticipated. Consideration has also been given to construction of traditional shallow foundations. Foundation loads of up to 150 kPa may be anticipated. The shallow ground conditions, firm clay underlain by sand and gravel, are unlikely to be suitable to provide a founding stratum for the proposed school buildings, without ground improvement. A piled foundation solution would transfer structural loads to the underlying mudstone of the Pennine Lower Coal Measures Formation. It is important that the piling contractor has experience piling in similar conditions and it is advised that early engagement with the suitably qualified and experienced piling contractor is considered. It is recommended that specialist piling contractors are contracted as to the suitability and carrying capacity of the piles in the ground conditions pertaining to the site. Vibro Menard have advised that Vibro Stone Columns may be used to improve the shallow ground conditions, to allow a bearing capacity of 150 kPa beneath the foundations. Based on observations onsite together with the results of laboratory tests, it is recommended that consideration is given to a suspended ground floor slab, bearing on pile caps supported by a network of beams, or constructed onto ground improved by vibro stone columns, where soft or deleterious materials are removed. Laboratory testing indicates concrete should be designed to meet the criteria of the following concrete classifications: • Made Ground – DS-1, AC-1 • Glacial Till – DS-1, AC-4z • Pennine Lower Coal Measures Formation – DS-1, AC-1. Shallow perched water may be controlled through closed wall side support and pumping from sumps. Side support for safety purposes should be provided to all excavations which appear unstable, including where groundwater is encountered, and those more than 1.20m deep. Excavations shallower than 1.20m deep, requiring personnel access, will require closed side support.
Recommendations	Based on the findings of the ground investigation, the following recommendations are made: 1) Post-demolition investigation including soil chemical analysis and GQRA should be undertaken in areas beneath the existing building footprint. 2) A remediation strategy will not be required prior to construction of the new school building. The findings of post-demolition investigations will determine the requirement for remedial action beneath the existing school building. 3) Vibro Stone Columns may be used to improve shallow ground conditions to facilitate the use of shallow foundations. Vibro Menard have confirmed that an allowable bearing pressure of 150 kPa may be achieved on the improved ground. 4) Ground bearing slabs may be constructed on the improved ground. 5) It is recommended that construction workers are provided with appropriate PPE and sanitary facilities, with reference to the environmental testing results presented herein and within Appendix D. 6) Should unexpected contamination be observed during construction advice should be obtained from a Geo-environmental Engineer.

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- Appendix C - Exploratory Hole Logs
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- Appendix E - Geotechnical Analysis Results
- Appendix F - Ground Gas and Groundwater Monitoring Results
- Appendix G - GAC Screening Thresholds
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1.0 Introduction

1.1 Project Background

In May 2022 Curtins were instructed by Morgan Sindall to undertake a Phase 2 Ground Investigation and Coal Mining Risk Assessment of land at the Newhouse Academy, off Newhouse Road, Heywood, OL10 2NT. The site is centred at the approximate National Grid Reference 385690, 409490. A site location plan is presented on *Figure 2.1*.

Development proposals for the partial redevelopment of the site include the construction of a new 2-3 storey school building, including teaching and sports facilities, followed by the demolition of some of the existing buildings.

Relevant development proposals are included within *Appendix A* for review.

1.1.1 Previous Reports

A Phase 1 Desk Study was previously issued by Wardell Armstrong for the wider school site, in May 2021 (1), providing an initial assessment of the site accounting for potential for ground and groundwater contamination accounting for historic land use, potential geotechnical hazards associated with ground conditions pertaining to the development site.

1.2 Scope of Services

A scope for the intrusive ground investigation was developed with the following aims:

- i) Determine the ground conditions and undertake contamination and geotechnical assessments to inform designs for the proposed new school building.

Specifically, the Phase 2 Ground Investigation Report is intended to:

- a) Determine the risk of the proposed end-user being adversely impacted by potential contamination in shallow site soils that may be present on the site due to its known current, recent and historical use;
- b) Determine if there is a risk to the end-user from soil gases including methane, carbon dioxide, carbon monoxide and hydrogen sulphide;
- c) Characterise site wide natural soils and rock;
- d) Determine the presence of coal seams and/or workings beneath the site;
- e) Recommendations for the design of foundations and building ground floor slabs; and
- f) Recommendations for the specification of sub-structure concrete.

Detailed flood risk assessment, ecology, archaeological studies and waste classification for off-site disposal are outside of the scope of this report.

At request of the client, the ground investigation was undertaken in two phases, due to potential disruption to school students during the GCSE examination period. The first phase was undertaken in May/June 2022 and the second phase of investigation was undertaken in July/August 2022. A third phase of CPT testing was undertaken in October 2022 to determine suitability for shallow ground improvement to facilitate a shallow foundation solution.

2.0 Preliminary Site Assessment Summary

An Envirocheck Report (2) was procured to inform a preliminary site assessment. A summary of the detailed findings of the report, including current site setting, history, geology and hydrogeology/hydrology is presented within this Section with reference to additional information sources.

2.1 Current Setting

The investigation area, and location for the proposed new school buildings, is located within the Newhouse Academy site. The proposed development is to be constructed directly west and south of the existing school building, within an area currently occupied by a hardstanding playground and grassed soft landscaping.

The area is relatively level, through in the south the topography gently undulates, sloping generally to the south.

The site location and boundary are illustrated in *Figure 2.1*.



Figure 2.1 – Site Location (Red) and Development Location Plan (Red).
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The main school car park is located west of the development area, with the existing school to the north and east. Playing fields are located south of the development area.

The wider land use comprises residential dwellings to the east and west, industrial units to the south and playing fields to the north.

2.2 Previous Site Use

Earliest mapping (1840's) shows the site as undeveloped fields until the 1960s when Siddal Moor / Heywood High School were constructed in the north of the site. By 2016, the north of the site is occupied by hardstanding, as a playground.

2.3 Published Geology

A study of the freely available British Geological Survey (BGS) mapping information, including BGS 1:50,000 map 85, solid and superficial, for Manchester (3) and BGS recorded boreholes (4) indicate the following geological succession beneath the site:

- Superficial Soils: Glacial Till (Diamicton)
- Bedrock: Pennine Lower Coal Measures Formation (Mudstone, siltstone, sandstone and coal), typically dipping to the west.

2.3.1 Made Ground Deposits

BGS mapping records do not indicate the presence of Made Ground on site, however the borehole records indicate a limited thickness is likely to be present underlying the site.

2.3.2 Superficial Deposits

Superficial deposits are recorded as Glacial Till (Diamicton), comprising poorly sorted clay, sand and gravel.

2.3.3 Bedrock Deposits

The site is underlain by the Pennine Lower Coal Measures Formation, typically comprising interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.

2.3.4 BGS Recorded Borehole Logs

A summary of nearby BGS recorded boreholes logs are available for the site and are summarised in *Table 2.3.4*.

Table 2.3.4 – Summary of BGS Recorded Borehole Logs

Record Reference	Location (NGR)	Details (bottom to top of strata/details/thickness of strata)	
SD80NE142	North-east (386020, 409820)	0.00m to 3.80m bgl 3.80m to 7.30m bgl 7.30m to 9.60m bgl 9.60m to 9.90m bgl 9.90m to >11.00m bgl	Made Ground (3.80m) Stiff grey silt CLAY with siltstone (completely weathered siltstone). (3.50m) Grey highly weathered SILTSTONE with occasional completely weathered bands (2.30m) Black highly weathered COAL. (0.30m) Grey highly weathered SILTSTONE (>1.10m) 11.00m bgl Borehole complete
SD80NE219	North-east (386120, 409620)	0.00m to 1.20m bgl 1.20m to 4.20m bgl 4.20m to >6.65m bgl	Made Ground (1.20m) Firm mottled brown/grey slightly sandy CLAY with mudstone gravel. (3.00m) Grey highly weathered mudstone (>2.45m) 6.65m bgl Borehole complete

2.3.5 Mining

Curtins have reviewed Coal Authority interactive mapping (5) for the area and procured a Consultants Mining Report (6) to inform a coal mining risk assessment.

- The site is located within a Coal Mining Reporting Area, but not within a development high risk area
- The existing school buildings, east of the proposed location of the new school building, are partially located within a development high risk area due to probable shallow coal mine workings associated with the Arley coal seam.
- The site is not within the zone of likely physical influence of underground coal workings at shallow depth;
- No spine roadways are at shallow depth of within 10m of the site boundary;
- No recorded coal mine entries are located within 100m of the site boundary;
- A fault is located c. 250m southwest of the school buildings;
- The site is not within the boundary of a surface mining/opencast site from which coal was removed by surface mining/opencast methods.
- The site is not within the zone of likely physical influence of deep underground coal workings;
- There is potential for unrecorded shallow coal mine workings to the east of the site. There is potential for these to extend beneath the site, and it would be prudent to investigate further prior to construction.

The sub-crop of the Arley coal seam is located approximately 450m east of the site, dipping to the west. A second sub-crop is located approximately 300m east, however probable workings are not recorded from this seam.

Given the proximity to the area of probable shallow coal mine workings, it would be prudent to undertake rotary boreholes to 30m bgl to determine the presence of potential workings beneath the development area.

2.3.6 Radon

The site is located within a Lower Probability Radon Area (less than 1% of homes are estimated to be at or above the Action Level). No radon protective measures are necessary.

If a basement is proposed, a radon specialist should be contacted for advice.

2.4 Hydrogeology and Hydrology

The Envirocheck Report (2) data indicates that the geological sequence underlying the site has the following hydrogeological characteristics:

Table 2.4 – Hydrogeology and Hydrology Summary

Geology	Associated Hydrogeological Classification
Glacial Till	Secondary Undifferentiated Aquifer ¹
Pennine Middle Coal Measures Formation	Secondary A Aquifer ²

Notes:

1. Assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
2. permeable layers that can support local water supplies, and may form an important source of base flow to rivers

The site is not located within a Source Protection Zone (SPZ).

The no groundwater or surface water abstraction points within 500m.

The nearest surface water feature appears to be the Whittle Brook, located >500m south of the site.

2.5 Unexploded Ordnance (UXO) Risk Assessment

The likelihood of UXO being encountered on a development site is influenced by several factors including the proximity to strategic targets, the nature of the development works being undertaken and evidence of local damage in the post-war periods amongst others. To determine the likelihood of UXO being present on a site, a stepwise risk assessment process is followed. This process is outlined within CIRIA C681 Unexploded Ordnance: A Guide for the Construction Industry (7).

Risk mapping for UXO's has placed the site in a **Low**-risk area. Low-risk regions are those with a bombing density of less than 15 bombs per 1000 acres.

There was little construction within the proposed development area, which during WWII was occupied by a golf course. The school was subsequently constructed in the 1970s.

Considering the above, the risk of encountering potential UXO as part of future intrusive works is considered **Low**, and no further action is required.

If unexploded ordnance is discovered during any works, stop immediately, prevent access to the area, and inform the police. If the site boundary or location changes then the UXO risk should be reassessed.

Contractors undertaking excavations works should carry out their own UXO Risk Assessment in respect to their works.

2.6 Landfill

There are no BGS Recorded landfill sites, registered landfill sites or historic landfill sites, within 500m of the site.

2.7 Summary of Phase 1 PCSM

A summary of potential pollutant linkages at the development site are presented in Table 2.7. These potential pollutant linkages were identified as requiring further investigation to enable the safe redevelopment of the site.

Potential contaminants of concern associated with any Made Ground present include, amongst others; broad range aliphatic and aromatic hydrocarbons present within any fuel oils; inorganic compounds including heavy metals; and asbestos present in discarded building materials.

The risks presented to controlled waters (groundwater and surface water) were identified as Low and Very Low respectively due to the site not located in a SPZ, the presence of a Secondary Undifferentiated Aquifer beneath the site, and the distance to the nearest surface water receptor. Water samples are therefore considered unlikely to be required unless visual or olfactory evidence of soil contamination suggests there may be a risk to controlled waters.

Table 2.7 – Preliminary Conceptual Site Model

Source	Pathway	Receptor	Risk Rating	Action
On-site sources of potential contamination: Limited thicknesses of Made Ground associated with construction of the golf course, school and associated playground facilities.	Direct contact, ingestion, inhalation (dust and vapours)	End-user of site (Staff and pupils) & Construction Workers	Moderate/ Low	Undertake soil testing of shallow soils in the area of the site where the buildings are proposed to confirm risk assessment
	Vertical migration through the superficial deposits and bedrock (soils) May occur due to existing service corridors and physical processes including capillary action and downwards flow into the natural deposits through infiltration.	Controlled Waters (Groundwater) Superficial Soils: Glacial Till (Secondary Undifferentiated Aquifer). Bedrock: Pennine Lower Coal Measures Formation (Secondary A Aquifer) There are no potable groundwater abstraction points within 500m. The site is not within a designated Source Protection Zone.	Low	No further action required unless gross contamination identified in site soils in GI.
	Horizontal migration over and through the superficial deposits and bedrock (soils)	Controlled Waters (Surface Water) The apparent nearest surface water feature is located >500m south of the site (Whittle Brook).	Very Low	No further action required
On and off-site soils with the potential to generate ground gases: Potential for localised deposits of organic / putrescible material to be present within limited thickness of Made Ground or natural soils. Coal Measures underlying the site may be a source of ground gas generation.	Vertical and horizontal migration through underlying superficial deposits and bedrock into buildings	Site End Users (Secondary School)	Moderate/ Low	Undertake additional ground gas monitoring in the area of the site where the buildings are proposed to confirm risk assessment and gas regime.

3.0 Ground Investigation Scope of Works

Site investigation works were undertaken by Curtins in two phases, the first between 30 May and 01 June 2022 and the second between 26 July and 02 August 2022.

The scope of the ground investigation was designed in general accordance with current UK guidance including:

- LCRM (8);
- British Standard (BS) 10175:2011+A2:2017 (9);
- BS5930:2015 + A1:2020 (10);
- and BS EN1997: Part 2:2007 Eurocode 7 (11).

The scope and rationale are summarised in *Table 3.0*.

Table 3.0 – Scope and Rationale of Fieldwork Undertaken

Exploratory Hole Type		Exploratory Hole Ref.	Ground level (m AOD)	Exploratory Hole Depth (m bgl)	Rationale
Stage 1	Geobore-S Rotary Borehole	RC02	133.60	30.00	Confirm the shallow and deeper ground and groundwater conditions and supplement previous investigation; Collect soil samples for chemical analysis; Collect samples for geotechnical soil testing; Collect samples for geotechnical rock testing; and Ground gas and groundwater level monitoring.
Stage 2	Geobore-S Rotary Borehole	RC01 RC03	133.87 134.32	30.00 30.00	Confirm the shallow and deeper ground and groundwater conditions and supplement previous investigation; Collect soil samples for chemical analysis; Collect samples for geotechnical soil testing; Collect samples for geotechnical rock testing; and Ground gas and groundwater level monitoring.
Stage 3	CPT Tests	CPT101 – CPT114	-	3.30 – 5.58	Obtain parameters for shallow ground conditions.

Ground level at each exploratory hole location was estimated from ground levels recorded by Survey Operations in June 2022. The estimated levels are presented on the exploratory hole logs which can be referred to in *Appendix C*. The CPT report is included in *Appendix C*. For the location of the exploratory holes refer to Curtins drawing ref: 078065-CUR-00-XX-DR-GE-00003-V01 included in *Appendix A*.

3.1 Soil Logging and Sampling

Exploratory hole arisings were logged onsite by an Engineer from Curtins and in accordance with the requirements of BS5930 (10) No observed visual and olfactory indications of contamination were recorded. Exploratory hole logs can be referred to *Appendix C*.

3.2 Monitoring Well Installations

Dual ground gas and groundwater monitoring 50mm diameter slotted pipes were installed within the rotary boreholes (RC01-RC03). A bentonite seal was placed at the top and bottom of each of the exploratory holes, surrounding the screened sections of the pipe. A gravel surround was installed in the annulus between the sides of the borehole and the slotted sections of the pipe.

The monitoring wells were designed to assess the potential for ground gas and monitor groundwater levels. The screened sections therefore focused on the more permeable deposits where encountered, where ground gas and groundwater may be encountered.

A summary of the response zone is presented in *Table 3.2*.

Table 3.2 – Monitoring Well Response Zones

Investigation Stage	Borehole Ref.	Response Zone m bgl (m AOD)	Strata Description(s)
Stage 1	RC02 (S)	1.20 – 2.14 (132.40 – 131.46)	Made Ground and clay
	RC02 (D)	10.00 – 15.46 (123.60 – 118.14)	Mudstone
Stage 2	RC01 (S)	2.00 – 4.00 (131.87 – 129.87)	Sand
	RC01 (D)	8.00 – 13.00 (125.87 – 120.87)	Mudstone
	RC03 (S)	1.00 – 3.00 (133.32 – 130.32)	Made Ground
	RC03 (D)	5.00 – 11.00 (128.32 – 123.32)	Mudstone

A copy of the borehole logs can be referred to in *Appendix C* of this report.

3.3 Post-Investigation Monitoring

3.3.1 Groundwater and Ground Gas Monitoring

A total of six groundwater level and ground gas monitoring visits over three months have been undertaken, to assess the groundwater levels and the ground gas conditions. The results of the groundwater level monitoring are detailed in *Section 5.8*. The results of the ground gas monitoring are detailed in *8.0*.

4.0 Laboratory Analysis

4.1 Geo-environmental Analysis

Representative soil samples were selected for laboratory chemical analysis, based on field observations and to provide information about the encountered ground conditions.

A total of 5 No. soil samples were obtained and selected for chemical testing, including 4 No. Made Ground soil samples and 1 No. natural soil sample. Soil samples were placed in laboratory provided containers and stored in cool boxes prior to being transported to the nominated laboratory under the laboratory's chain of custody documentation. The laboratories selected by Curtins for chemical and geotechnical analysis were Envirolab and i2 Analytical (UKAS and MCERTS accredited). Geotechnical analysis from the first stage of investigation was sub-contracted to Ian Farmer Associates, a UKAS accredited laboratory.

Given the lack of any obvious sources of potential contamination the sampling positions were generally located in a non-targeted, systematic array, beneath the proposed school footprint, to give adequate and representative coverage of the sites proposed end use and the immediate environmental setting, concentrated in the near surface deposits.

4.1.1 Soil Analysis

The source material of contaminants of concern potentially present on the site was considered to include, amongst others; organic matter, ash and fill, hydrocarbons (e.g. fuel/oils), polyaromatic hydrocarbons (PAHs), heavy metals, and asbestos.

The extent of the above is captured by the broad environmental testing suites listed in *Table 4.1.1*.

Table 4.1.1 – Environmental Chemistry Analysis Suite : Soils

Suite Ref.	Analyte	LOD
Soils Suite A	Asbestos Screen	-
	pH Value	0.1 pH
	2:1 Water Soluble Sulphate	0.01 g/l
	Soil Organic Matter (SOM)	0.1% w/w
	Arsenic, Chromium, Chromium VI, Copper, Lead, Nickel, Selenium	–1 mg/kg
	Zinc	5 mg/kg
	Boron (water soluble)	1mg/kg
	Cadmium	0.5 mg/kg
	Mercury	0.17 mg/kg

Suite Ref.	Analyte	LOD
	Cyanide (total)	1 mg/kg
	Phenols (screen)	0.2 mg/kg
	PAHs (USEPA 16)	0.01 – 0.08 mg/kg
	TPH (Aro/Ali Split)	0.01 – 1 mg/kg

A total of five soil samples were obtained from the boreholes and tested for Suite A. Copies of the environmental chemistry testing certificates are presented in *Appendix D*.

4.2 Geotechnical Testing

Soil samples for testing were prepared in accordance with BS1377: Part 1:2016 (12). Rock core samples for testing were prepared in accordance with ISRM Suggested Methods (13). The undertaken geotechnical testing is summarised in *Table 4.2*.

Table 4.2 – Geotechnical Testing

Test Type	Quantity	Standard
In Situ Testing		
Standard Penetration Testing	14	BS 5930: 2015, Clause 41
Laboratory Testing		
Atterberg Limit (4 Point)	4	BS1377 1990, Part 2 (clause 4.5, 5.3 & 5.4)
Moisture Content	4	BS1377 1990, Part 2
Particle Size Distribution (Dry Sieve)	2	BS 1377-2: 1990
Water Soluble Sulphate	21	ISO 17025 MCERTS
Sulphate (Acid Soluble)	9	ISO 17025 MCERTS
Sulphur (Total)	13	ISO 17025 MCERTS
pH Value	21	ISO 17025 MCERTS
Point Load Test (Axial Plane)	29	ISRM 2007
Unconfined Compressive Strength of Rock	3	ISRM 2007

The results of the geotechnical testing are summarised in *Section 6.0* of this report. Copies of the geotechnical testing certificates can be referred to in *Appendix E*.

5.0 Ground Conditions

The ground conditions across the site, determined during the Curtins ground investigation works, generally comprised cohesive or granular Made Ground, underlain by soft or firm cohesive Glacial Till, loose or medium dense granular Glacial Till and mudstone of the Pennine Lower Coal Measures Formation. No coal deposits were recorded during the investigation.

5.1 Encountered Ground Conditions

A summary of the ground conditions encountered during the Curtins site investigation works is presented below, with detailed information presented on the exploratory hole logs which can be referred to in *Appendix C*.

Table 5.1 – Summary of Ground Conditions Encountered in the Curtins Investigation

Stratum	Depth to top of strata, m bgl (m AOD)	Recorded Thickness (m)		Description
		Min	Max	
Made Ground	0.00	0.90	3.00	Surface covering underlain by: Dark brown very gravelly very sandy CLAY, with fragments of brick and concrete. Soft light grey very silty slightly sandy gravelly CLAY with fragments of brick and concrete. Loose brown or dark brown slightly clayey gravelly SAND with cobbles.
Cohesive Glacial Till	1.80 – 3.00 ¹	0.45	1.20	Soft dark greyish brown slightly sandy gravelly CLAY, with fragments of mudstone. Firm light brown very silty very sandy very gravelly CLAY, with mudstone and sandstone fragments.
Granular Glacial Till	0.90 – 2.25	1.50	4.10	Loose light brown or dark brown clayey gravelly fine and medium SAND, with gravel of fine and medium mudstone. Light brown very clayey sandy GRAVEL of fine to coarse sub-rounded to angular mudstone and sandstone.
Pennine Lower Coal Measures Formation	3.80 – 5.00 (129.80 – 128.87)	>25.00 ²	>26.20 ²	Soft, firm or stiff or very stiff light grey sandy gravelly CLAY with fragments of mudstone. Weathered bedrock. Very dense light brown/grey very sandy very silty GRAVEL of fine to coarse sub-rounded to angular mudstone and sandstone. Weathered bedrock. Extremely weak to medium strong grey MUDSTONE.

¹ Where encountered

² Base not proven

5.2 Made Ground

RC01 recorded a thin layer of topsoil (0.15m) underlain by 0.45m of Made Ground of loose dark brown slightly clayey gravelly fine and medium sand with cobbles with fragments of brick, concrete and mudstone. A thin layer (0.30m) of loose blackish brown mottled light brown and grey slightly gravelly clayey fine and medium sand was recorded beneath this.

RC02 recorded a thin layer of topsoil, underlain by Made Ground of dark brown very gravelly very sandy clay, with fragments of brick and concrete to 1.00m bgl. From 1.00m to 1.80m bgl, Made Ground comprises soft light grey very silty slightly sandy gravelly clay, with fragments of brick and concrete.

RC03 recorded a thin layer of tarmac and associated limestone sub-base, underlain by loose brown slightly clayey gravelly sand with cobbles to 1.20m bgl. The gravel fraction comprises mudstone, brick, tarmac and sandstone. From 1.20m to 3.00m bgl, soils comprise grey black and orange angular to subangular medium to coarse gravel of mudstone, concrete, brick, black tarmac and granite. The clay fraction may have been washed out during drilling.

5.3 Cohesive Glacial Till

Cohesive Glacial Till was recorded beneath Made Ground in RC02, from 1.80m bgl to 2.25m bgl, comprising firm light brown very silty very sandy very gravelly CLAY, with mudstone and sandstone fragments.

RC03 recorded soft dark greyish brown slightly sandy gravelly clay. Gravel is angular to subangular fine to coarse mudstone from 3.00m to 4.20m bgl.

Cohesive Glacial Till was not encountered in RC01.

5.4 Granular Glacial Till

RC01 recorded granular Glacial Till beneath Made Ground from 0.90m bgl. Soils comprise loose light brown or dark brown clayey slightly gravelly fine and medium sand to 3.50m bgl, becoming medium dense at 3.50m bgl to 5.00m bgl.

Granular Glacial Till was not encountered in RC03.

5.5 Pennine Lower Coal Measures Formation

Soils indicative of weathered bedrock were encountered in RC01, RC02 and RC03, from 5.00m to 6.50m bgl, 3.30m to 3.30m bgl and 4.20m to 4.50m bgl, respectively.

Solid bedrock of the Pennine Lower Coal Measures was encountered from depths of 3.80m (RC02) to 6.50m bgl (RC01) and was typically recovered as extremely weak to medium strong, though locally strong, thinly laminated light brownish grey mudstone.

Fractures are generally extremely closely to closely spaced, 0°-20°, planar, rough or smooth and occasionally with clay infill. Fractures often exhibited orange discolouration on their surface, associated with iron oxidation.

Inclined, sub-vertical (65°-80°) and vertical fractures were sporadically recorded throughout the borehole, typically recorded as planar or stepped, smooth or rough.

5.6 Observed Potential Contamination

No potential visual or olfactory contamination was observed during the intrusive investigation works.

5.7 Obstructions Encountered

No obstructions were encountered.

5.8 Groundwater

Due to the use of water flush, it was not possible to determine the location of water strikes during the intrusive investigation. Six rounds of groundwater monitoring have been undertaken between 16th June 2022 and 21st September 2022, the results of which are presented in *Table 5.8a*.

Table 5.8a – Groundwater Monitoring Results

Borehole Ref.	Installation Strata	Response Zone m bgl	Depth, m bgl (m AOD)					
			16/06/22	28/06/22	15/07/22	15/08/22	08/09/22	21/09/22
RC01 (S)	Sand	2.00 – 4.00	-	-	-	1.74	2.44	2.45
RC01 (D)	Mudstone	8.00 – 13.00	-	-	-	3.43	3.36	3.33
RC02 (S)	Made Ground and Glacial Till	1.20 – 2.14	2.11	Dry	Dry	Dry	Dry	Dry
RC02 (D)	Pennine Lower Coal Measures Formation	10.00 – 15.46	2.62	2.95	2.70	2.85	3.20	3.10
RC03 (S)	Made Ground	1.00 – 3.00	-	-	-	3.15	Dry	Dry
RC03 (D)	Mudstone	5.00 – 11.00	-	-	-	3.17	3.34	3.30

Based upon groundwater elevations and the underlying geology, the following considerations are given to the underlying groundwater regime:

- Limited perched water within Made Ground and shallow cohesive Glacial Till.
- Head level within the bedrock appears to be in the region of 2.62 to 3.43m bgl.

6.0 Ground Model

The ground model for the site is presented below, accounting for the findings of three boreholes. There may be variability of shallow and deeper ground conditions beyond the findings of this report.

6.1 Topsoil/Made Ground

RC01 recorded a thin layer of topsoil (0.15m) underlain by 0.45m of Made Ground of loose dark brown slightly clayey gravelly fine and medium sand with cobbles with fragments of brick, concrete and mudstone. A thin layer (0.30m) of loose blackish brown mottled light brown and grey slightly gravelly clayey fine and medium sand was recorded beneath this.

RC02 recorded a thin layer of topsoil, underlain by Made Ground of dark brown very gravelly very sandy clay, with fragments of brick and concrete to 1.00m bgl. From 1.00m to 1.80m bgl, Made Ground comprises soft light grey very silty slightly sandy gravelly clay, with fragments of brick and concrete.

RC03 recorded a thin layer of tarmac and associated limestone sub-base, underlain by loose brown slightly clayey gravelly sand with cobbles to 1.20m bgl. The gravel fraction comprises mudstone, brick, tarmac and sandstone. From 1.20m to 3.00m bgl, soils comprise grey black and orange angular to subangular medium to coarse gravel of mudstone, concrete, brick, black tarmac and granite. The clay fraction may have been washed out during drilling.

Standard penetration test (SPT) results were undertaken within the Made Ground. The results are summarised in *Table 6.1* below.

Table 6.1 – Summary of SPT 'N' Values Within Made Ground Soils.

Exploratory Hole I. D	Depth (m bgl)	Elevation (m AOD)	Stratum	SPT 'N' Value
RC02	1.20	132.40	Grey very silty slightly sandy gravelly clay	1/2/2/2/3/4 N=11
RC03	1.20	133.12	Clayey gravel	13/9/6/3/4/2 N=15
RC03	2.00	132.32	Clayey gravel	2/2/2/3/4/5 N=14

The results typically recorded 'N' values in the region of 11 to 15, however the results also indicate significant variability, accounting for coarse gravel and cobbles within the soils. Notably RC02 which recorded seating blows substantially greater than the representative values. Variation beyond these results should be anticipated across the site.

One Atterberg Limit test was undertaken on a soil sample at 1.40m bgl. The soils were deemed to be low plasticity clay, with a liquid limit of 27%, plastic limit of 16% and a plasticity index of 11%. Variability within Made Ground should be anticipated.

Estimated strength and compressibility of the cohesive Made Ground and density of granular has not been determined at this stage, due to the potential variability.

6.2 Cohesive Glacial Till

Cohesive Glacial Till was recorded in RC02 from 1.80m to 2.25m bgl, comprising firm light brown very silty very sandy very gravelly CLAY, with mudstone and sandstone fragments. RC03 recorded soft dark greyish brown slightly sandy gravelly clay, with mudstone fragments from 3.00m to 4.20m bgl.

Two SPTs was undertaken within these soils, recording an 'N' Value of 14 at 1.80m bgl in RC02, and >50 in RC03. It is likely the refusal in RC03 was due to the presence of a cobble of mudstone limiting progression of the test and is not considered representative of the cohesive ground conditions.

Plasticity testing of the cohesive soils in RC02 and RC03 determined a low plasticity clay, with low volume change potential.

Liquid limits of 28% and 29% were recorded respectively, plastic limits of 14% and 15% respectively, and both samples recorded plasticity indices of 14%.

A moderately conservative Undrained Shear Strength, c_u , of cohesive Glacial Till can be estimated from the correlation between Plasticity Index and SPT N values (14) using Equation 2:

$$c_u = f_1 \times \text{SPT N} \quad \text{Equation 2}$$

Where:

c_u is the Undrained Shear Strength

f_1 is the Stroud Factor determined from Figure 1.5 (Ref. 14)

SPT N is Characteristic Standard Penetration Test Result

Based on the Atterberg Limit result (plasticity index of 14%) an f_1 value of 6 has been selected. Using this correlation, it is estimated that the cohesive Glacial Till with an N value of 14 has an undrained shear strength of 84 kPa, indicating a high strength clay.

A moderately conservative unit weight of 18kN/m³ to 22 kN/m³ is deemed suitable for the cohesive Glacial Till above and below the groundwater table, from a review of BS8002 (15).

A moderately conservative estimate for the coefficient of volume compressibility, m_v , of cohesive soils can be estimated from the correlation between Plasticity Indices (PI) and SPT N values (14) using Equation 3:

$$m_v = 1 / (f_2 \times \text{SPT N}) \quad \text{Equation 3}$$

Where:

c_u is the Undrained Shear Strength

f_2 is the Stroud Factor determined from Figure 1.5 (14)

SPT N is Characteristic Standard Penetration Test Result

Based on the Atterberg Limit results (plasticity index of 14%) an f_2 value of 0.6 has been selected.

An estimate for the coefficient of volume compressibility, m_v , for the cohesive Glacial Till of 0.12 m²/MN was determined, indicating it is of medium compressibility.

The Angle of Shearing Resistance, ϕ' , for the cohesive Glacial Till has been derived from the correlation with Plasticity Indices after Gibson (16). A peak angle of drained shearing resistance of 31° is recommended based on this correlation taking into consideration the guidance from Gibson (16) and Trenter (17) regarding the variation in angle of friction with Plasticity Index for UK Glacial Tills. A peak angle of undrained shearing resistance of 26° is recommended.

6.3 Granular Glacial Till

RC01 recorded granular Glacial Till from 0.90m bgl, comprising loose light brown or dark brown clayey slightly gravelly fine and medium sand to 3.50m bgl, becoming medium dense at 3.50m bgl to 5.00m bgl.

RC02 recorded a layer of light brown very clayey sandy gravel from 2.25m to 3.30m bgl. This was underlain by a thin layer of very dense light brown/grey very sandy very silty gravel to 3.80m bgl. The gravel comprised fine to coarse sub-rounded to angular mudstone and sandstone.

1 No. SPT 'N' Values were recorded in this stratum, detailed in Table 6.3 below.

Table 6.3 – Summary of SPT 'N' Values Within Granular Glacial Till Soils.

Exploratory Hole I. D	Depth (m bgl)	Elevation (m AOD)	Stratum	SPT 'N' Value
RC01	1.20	132.67	Loose light brown clayey slightly gravelly fine and medium sand.	2/2/2/2/2/2 N=8

Two Particle Size Distribution Tests were undertaken on granular Glacial Till. The results are summarised in figure 6.3 below.

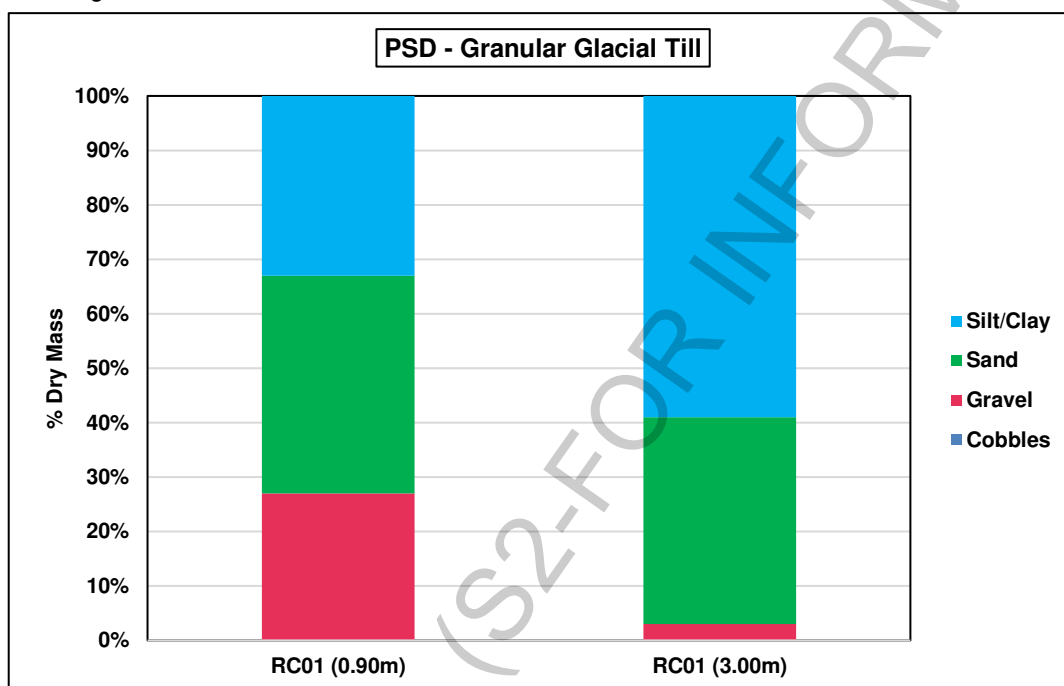


Figure 6.3 – PSD Results, Granular Glacial Till

A moderately conservative characteristic unit weight of 20 kN/m³ to 22 kN/m³, above the water table, increasing to 22 kN/m³ to 24 kN/m³ below the water table.

A moderately conservative characteristic Angle of Shearing Resistance (ϕ') of 29° has been derived from correlation with SPT N values (Peck et al) (18) and a review of published values.

6.4 Pennine Lower Coal Measures Formation

The Pennine Lower Coal Measures Formation was encountered in all three boreholes, from 3.30m to 5.00m bgl.

Bedrock was recovered as extremely weak to medium strong, locally strong, thinly laminated light brownish grey mudstone.

With exception of the first 2 core runs of RC01, the total Core Recovery (TCR) was relatively consistent throughout the boreholes. 100% core recovery was recorded in 19 of 26 runs, and >90% in 23 of 26 core runs.

The Solid Core Recovery (SCR) was relatively variable, through typically increased with depth. SCR values ranged between 17% and 100%.

The Rock Quality Designation (RQD) generally increased from typically very poor (from rockhead to 10m bgl), increasing to poor to fair.

The results are summarised in *Figure 6.5*.

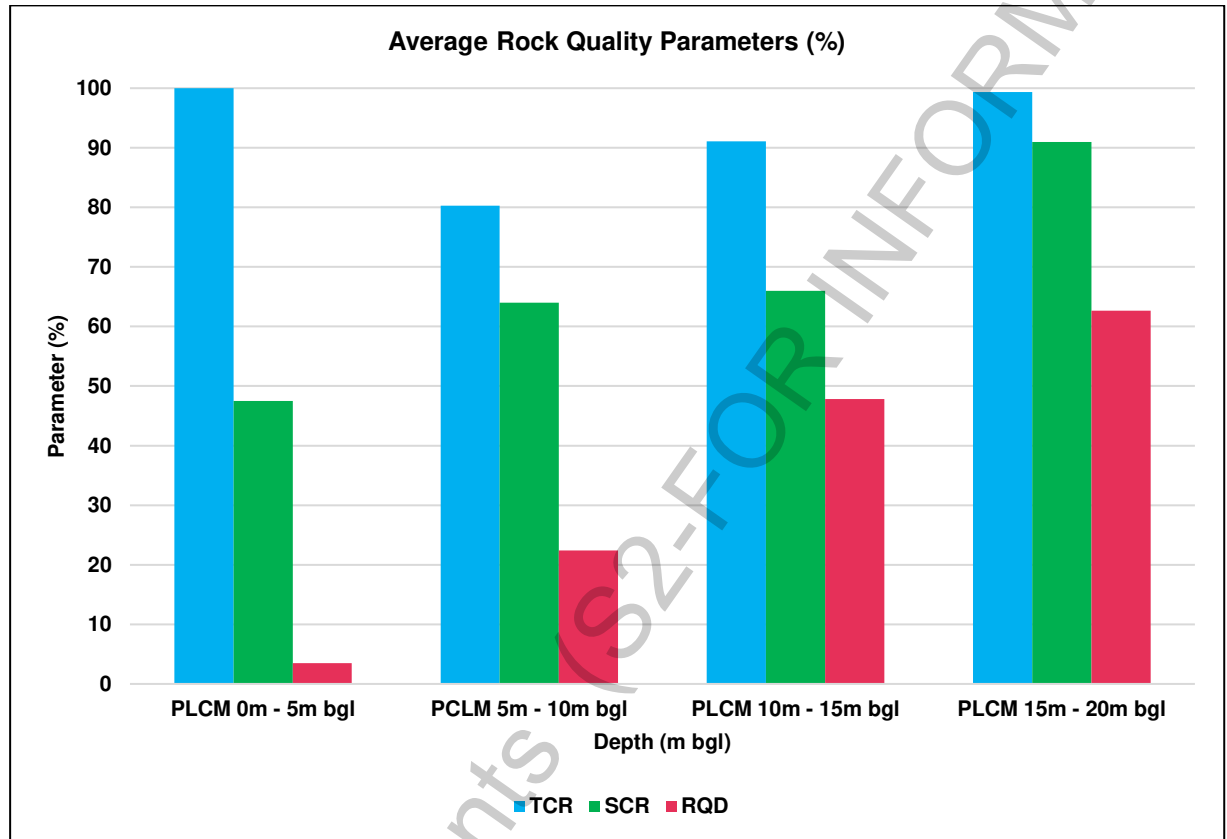


Figure 6.5 – Summary of Rock Quality Parameters – Pennine Lower Coal Measures Mudstone

Table 6.5 summarises the in-situ and laboratory testing undertaken on the mudstone encountered in the Pennine Lower Coal Measures Formation.

Table 6.5 – Summary of geotechnical test results – Pennine Lower Coal Measures Formation Mudstone

Parameter	No. of Tests	Results
SPT 'N' Value – Cohesive/Granular Weathered	4	27 - >50
SPT 'N' Value – Solid	2	>50
Laboratory Tests		
Axial Point Load Indices (MPa) (Is50)	20	Min: 0.06 Max: 3.78
Diametral Point Load Indices (MPa) (Is50)	9	Min: 0.11 Max: 2.28
Unconfined Compressive Strength (MPa)	3	Min: 22.9 Max: 7.5
Derived Parameters		

Parameter	No. of Tests	Results
Estimated UCS from Point Load Indices on the Axial Plane (MPa)	11	Min: 1.2 Max: 75.6
Estimated UCS from Point Load Indices on the Diametral Plane (MPa)	9	Min: 2.2 Max: 45.6

SPT 'N' Values within the weathered mudstone, recovered as gravelly clay, range between 27 and >50 (refusal). SPT 'N' Values from obtained from within the solid mudstone always recorded values >50 (refusal).

Overall, 20 No. axial Point Load Tests (PLT) were undertaken on selected samples of mudstone from rotary cores. Axial plane PLT (Is(50)) results ranged from 0.06 MPa to 3.78 MPa. 9 No. diametral plane tests were undertaken, with results in the range of 0.11 MPa to 2.28 MPa.

An approximation of the unconfined compression strength (UCS) of the rock may be derived from the following relationship, described in *Equation 5*:

$$UCS = PLT \text{ Is}(50) \times f_1 \quad \text{Equation 5 (Tomlinson)}$$

Where f_1 is derived from the correlation between PLT Is(50) and UCS Results

Due to the limited set of UCS results, a published correlation factor of 20 has been used for mudstone (19). Based on this relationship, estimated UCS values for bedrock range between 1.2 MPa and 75.6 MPa for axial tests, and 2.2 MPa and 45.6 MPa for diametral tests. These results indicate the rock tested has a strength index varying between very weak to medium strong, through locally strong rock was recorded.

These findings indicate variability in the strength of the rock, particularly at shallow depths (5 – 10m bgl). The variability decreases from 10m bgl, generally recording weak rock, locally very weak or medium strong.

The UCS testing results ranged between 7.5Mpa and 22.9 MPa. The reason for termination was due to multiple shear or axial cleavage.

Field descriptions are generally consistent with the lab recorded rock strengths.

The results of rock strength testing are shown in *Figure 6.5*.

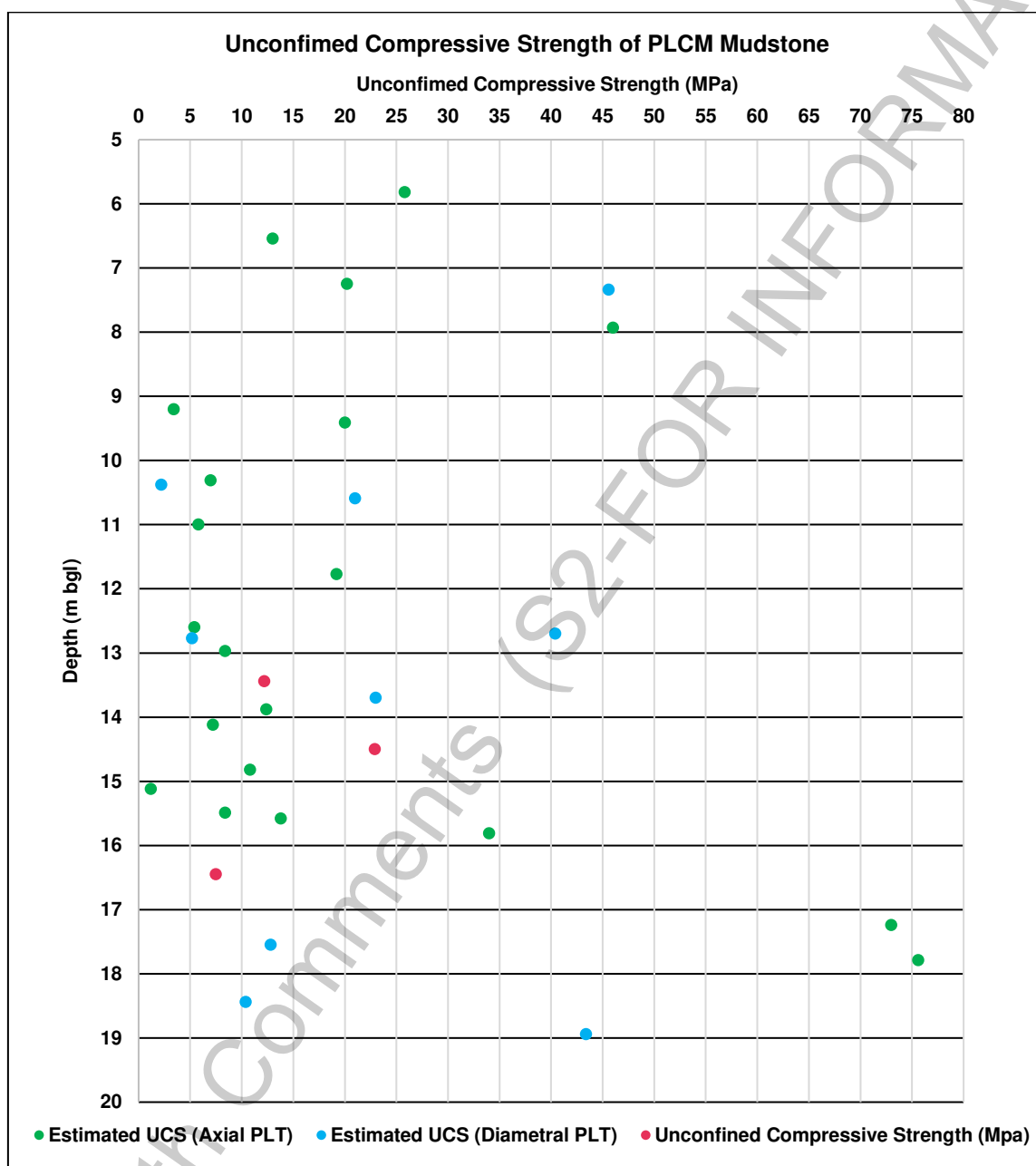


Figure 6.5 – Summary of Rock Strength Testing in PLCM Mudstone.

6.5 Aggressive Ground Conditions

Guidance for the characterisation of the site with respect to concrete in aggressive ground provided in Table C2 of the Building Research Establishment (BRE) Special Digest 1, 3rd edition of 2005 (20). The results obtained as a part of the ground investigation are summarised in *Table 6.5a* and *Table 6.5b*.

Table 6.5a –Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Test Type	No. of Tests	Range
Made Ground	pH	4	7.6 – 10.7
	Water Soluble Sulphate (mg/l)		30 – 250
Cohesive Glacial Till	pH	2	4.69 – 8.0
	Water Soluble Sulphate (mg/l)		12 - 76
Granular Glacial Till	pH	2	4.3 – 7.6
	Water Soluble Sulphate (mg/l)		6.7 - 10
Pennine Lower Coal Measures Formation	pH	13	6.59 – 9.34
	Water Soluble Sulphate (mg/l)		6.6 – 16.92

Table 6.5b –Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Design Sulphate Class	ACEC Class ⁽¹⁾
Made Ground	DS-1	AC-1
Cohesive Glacial Till	DS-1	AC-3z
Granular Glacial Till	DS-1	AC-4z
Pennine Lower Coal Measures Formation	DS-1	AC-1

(1) Assumes mobile groundwater scheme within a brownfield area

7.0 Ground and Groundwater Contamination Assessment

This section of the report includes the assessment of the potential contamination, solid, liquid and gas, identified on the subject site which may present a risk to the proposed end-users, associated utilities and the wider environment.

In guidance published by the Environment Agency, the risk to human health or controlled waters is determined through an assessment of pollutant linkages between a source of contamination (within the ground or groundwater either on or off site) and a sensitive receptor such as end-users of the site, building materials, edible plants grown in gardens or groundwater abstracted for drinking. This is termed a source-pathway-receptor relationship. The same model is applied to the assessment of risk arising from ground gases as detailed within BS8576:2013 (21).

These models have a common approach, which is one of a tiered assessment. At each stage of the assessment further detail can be applied to the conceptual site model to provide a detailed interpretation on a site-by-site basis. As part of the planning process this approach is adopted to establish either if the site is 'suitable for use' or whether additional work or else remedial work is required for the site to be deemed so.

The sub-sections hereafter therefore incorporate the first tier (Tier 1) of this approach otherwise referred to as the Generic Quantitative Risk Assessment (GQRA). The GQRA builds on the qualitative risk assessment presented in the Phase 1 Desk Study in conjunction with observations made during the ground investigation and is based solely on the results of the chemical and other testing data obtained as part of Curtins ground investigation. The GQRA is used to build/refine the Conceptual Site Model (CSM) for the site as detailed and presented in *Section 8.0* of this report.

The following sections present more detail on the risk assessment methodology rationale for the main receptors.

7.1 Human Health GQRA

The soil results will be screened against the relevant Generic Assessment Criteria (GAC) where available, including:

- i) **Soil Guideline Values (SGVs):** These have been published by the Environment Agency and are trigger values for screening out low risk areas of land contamination. SGV's give an indication of representative average concentrations of chemicals in soil, below which long-term health risks are likely to be minimal. SGVs have been published for several contaminants including arsenic, cadmium, mercury, nickel, selenium, BTEX, phenols and dioxins, furans and dioxin-like PCB substances for land uses including residential, allotments and commercial. The SGVs have been developed for a sandy loam soil with 6% soil organic matter (SOM) content;
- ii) **Supplementary Screening Values (SSVs):** In addition to the SGVs developed by the EA, other third-party organisations have derived SSVs for a wider range of contaminants and land uses using the CLEA Model. Curtins have adopted these numbers where applicable, including

those developed by Atkins AtriskSoil™, the LQM/CIEH Suitable for Use Levels (S4UL) and EIC/AGS/CL:AIRE published thresholds;

- iii) **Category 4 Screening Levels (C4SLs):** In March 2014 Defra published C4SLs for arsenic, benzene, benzo(a)pyrene, cadmium, hexavalent chromium and lead. These values were derived to support the revised Part 2A Statutory Guidance issued in 2012 (22) in which four categories of contaminated land are included, ranging from Category 1 (significant/high risk) to Category 4 (low risk). C4SLs are not representative of significant possibility of significant harm (SpoSH) and are low risk levels which, and therefore where the C4SLs are not exceeded, land can be demonstrated to be in Category 4 and cannot be determined as contaminated land.

7.1.1 Adopted Soil Human Health GACs Screening Methodology

Current development proposals indicate the construction of a two to three storey school building.

An educational end use scenario currently has no defined generic assessment criteria from which the site can be assessed against. Large proportions of the external space will be covered by hardstanding, or by the new building footprint, with limited soft landscaping generally, notwithstanding areas outside of the proposed development footprint. Considering the limited potential for contamination exposure pathways through hardstanding surfaces, chemical analysis results have firstly been compared against 'Commercial' end use scenario. Given Commercial thresholds may be considered overly tolerant for volatile contaminants which may exist beneath proposed buildings and for non-volatile contamination within soft landscaped areas soil chemical analysis results have also been screened against more conservative '*Residential without home grown produce*' end use scenario, accounting for the additional potential exposure risk to children at the school.

The assessment has been undertaken against the following GACs, in order of preference:

1. Environment Agency Soil Guideline Values,
2. CL:AIRE, AGS, EIC. Soil Generic Assessment Criteria for Human Health Risk Assessments,
3. LQM/CIEH 2015 S4ULs for Human Health Risk Assessment, and
4. DEFRA Category 4 Screening Levels.

The soil organic matter (SOM) content has an influence on the volatilisation of organic contaminants (i.e. the higher the SOM, the lower the volatilisation rate and therefore inhalation exposure risk). Soil organic matter (SOM) values within this investigation were ranged between 1.1% SOM and 5.8% SOM.

With consideration of the calculated geometric mean, the average SOM for Made Ground soils is 2.45% SOM.

As such, a comparison against Generic Assessment Criteria (GAC) thresholds for a conservative SOM of 1% for the identified end use thresholds have been adopted for Made Ground and Glacial Till.

The adopted GAC's can be referred to in *Appendix G*.

7.1.2 Generic Assessment Criteria Screening of Soil Laboratory Results

The results of the environmental testing can be referred to in *Appendix D*.

With respect to the most conservative '*Residential without home grown produce*' thresholds, no exceedances of contamination GACs were recorded in any of the soil samples tested. By extension, no exceedances were recorded against 'Commercial' thresholds.

All five soil samples scheduled for environmental chemical analysis were screened for asbestos. No suspected asbestos containing materials (ACMs) were identified within any of the exploratory hole logs or laboratory screening.

The results indicate there is limited potential for site end users or maintenance workers to come into contact with contaminated site soils. The risks to site end users or maintenance workers is low.

8.0 Ground Gas Assessment

The assessment of risk presented by ground gases is assessed with reference to guidance published by CIRIA Assessing Risks Posed by Hazardous Ground Gases to Buildings, C665 (23), BSI Publication code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings BS8485:2019 (24) and other broadly accepted references such as the Ground Gas Handbook 2009 (25).

The gas risk assessment adopts a tiered approach. In the first instance this involves a re-evaluation of the Conceptual Site Model described in Section 2.7 and thereafter validating this conceptual model with the ground gas data, the semi-quantitative risk assessment.

8.1 Ground Gas Monitoring Results

To characterise the site's ground gas regime and validate the qualitative assessment of ground gas risk, dual standpipe monitoring installations were incorporated within the three rotary boreholes (RC01, RC02 and RC03), as detailed in Section 3.2.

An initial programme of six gas monitoring visits over twelve weeks was proposed. Six visits have been undertaken between 16th June and 21st September 2022.

Barometric pressure was recorded between 985 mb and 1011 mb. Falling barometric pressure was recorded on the second (28 June 2022) visit.

The results log sheets are contained within Appendix F and summarised in Table 8.1.

Table 8.1 – Summary of Ground Gas Monitoring Results

Exploratory Hole ID	Maximum Methane Concentration (%)	Maximum Carbon Dioxide Concentration (%)	Minimum Steady Oxygen Concentration (%)	Maximum Peak Air Flow (l/hr)	Maximum Steady State Air Flow (l/hr)
RC01 (S)*	<0.1	4.5	11.2	<0.1	<0.1
RC01 (D)*	<0.1	0.3	19.9	<0.1	<0.1
RC02 (S)	<0.1	0.7	19.9	-40.8	-0.4
RC02 (D)	<0.1	1.7	18.3	-4.4 / 6.0	<0.1
RC03 (S)*	<0.1	1.8	13.3	2.6	<0.1
RC03 (D)*	<0.1	1.2	13.6	<0.1	<0.1

* Three monitoring visits undertaken following completion of second stage of investigation.

The maximum recorded concentration of carbon dioxide was 4.5% v/v, recorded in RC01 (S) on the sixth monitoring visit.

Methane (CH₄) was recorded below the instrument's detection limit within all monitoring wells throughout the monitoring period.

Hydrogen sulphide concentrations were recorded below the limit of detection of the monitoring instrument throughout the monitoring period.

The greatest concentrations of carbon monoxide were recorded in RC02(S) on the second monitoring visit (3 ppm).

The greatest positive peak air flow rates were recorded in RC02 (D) and RC03 (S) on the fifth monitoring visit, at 6.0 l/hr and 2.6 l/hr respectively. The greatest negative air flow rate was recorded in RC02(S) on the second monitoring visit, recording a value of -40.8 l/hr. All peak flow rates returned to a steady state air flow rate of <0.1 l/hr, with exception of RC02(S) on the first visit where a steady state air flow rate of -0.4 l/hr was recorded.

8.2 Ground Gas Assessment

The Conceptual Site Model presented in *Section 2.8* highlighted potential Made Ground and natural soils containing organic / putrescible content, and bedrock in continuity with potential coal seams beneath the site, as potential sources of ground gas generation.

Noxious and asphyxiate gases were attributed to include, but not limited to, carbon dioxide, carbon monoxide, methane and hydrogen sulphide.

The ground investigation revealed a ground model generally consistent with the preliminary conceptual site model. Ground conditions pertaining to the development site comprise variable Made Ground, overlying cohesive and granular Glacial Till, underlain by mudstone of the Pennine Lower Coal Measures Formation.

In accordance with BS8485:2015+A1:2019 (24), consideration of the recorded soil gas flow rates, presented below, enables hazardous gas flow rates (Q_{hg}) to be evaluated. Q_{hg} can be derived for both 'borehole' and 'worst case' scenarios, and a comparison made in support of an appropriate assessment of ground gas risk. For a 'borehole' scenario (highest hazardous gas flow rate identified a single borehole) steady state flow rates and maximum gas concentrations are adopted, whilst for a 'worst case' scenario (highest Q_{hg} across the entire dataset irrespective of location and discrete monitoring events) peak flows and gas concentrations are adopted.

The dataset is considered to be representative for the site, as monitoring visits were undertaken during a range of temporal and climatic conditions, including following precipitation events, and during periods of low pressure (<1000mb) and falling barometric state.

A review of the available dataset indicates a significant reduction of air flow rates from the peak flow rate, particularly in RC02 (S) on the second visit, always to a steady state of <0.1 l/hr, with exception of RC02 (S) on the first visit which recorded a steady state air flow of -0.4 l/hr.

The negative, and very high negative air flow rates recorded are not considered to be representative of site conditions. As such, the steady state air flow rates will be used to determine the gas screening

value (GSV) for the site. For the purposes of the assessment, it is assumed that positive values equal to the negative steady state air flow rates may be recorded. As such, the absolute values will be used to determine the Q_{hg} and GSV.

Evaluation of the 'worst case' scenario (highest gas flow and highest gas concentration within a single stratum) records a maximum Q_{hg} of 0.0045 l/hr for carbon dioxide within shallow Made Ground and Glacial Till, and 0.0017 l/hr for carbon dioxide within the deeper Pennine Lower Coal Measures Formation.

Methane was recorded at concentrations below the limit of detection throughout the monitoring period and therefore the risk associated with methane emissions is low.

The worst case Q_{hg} calculated from the available dataset therefore indicates a CS1 classification on site. No gas protection measures are required for the proposed development.

The potential risks from ground gases to the excavations are to be dealt with by the Contractor, in accordance with the Confined Space Regulations, during construction. Appropriate ground gas monitoring and safety measures should be in place during the works, as the potential presence of ground gases could pose a risk in any confined spaces of deep excavations.

9.0 Coal Mining Risk Assessment

The aim of the Coal Mining Risk Assessment is to determine if mining related hazards are present and where present, the risk they present to the proposed development.

Hazards associated with coal mining can be broadly characterised by the following scenarios: deep coal mining, shallow coal mining, mine entries, opencast coal mining, mine gases and spontaneous combustion.

9.1 Deep Coal Mining

Within the scope of this report deep coal mining risk relates to mine workings present at depths greater than 30m below existing ground level.

There are no records of coal seams having been worked beneath the site at depths greater than 30m bgl in the information which has been obtained for review. It is unlikely that deep coal workings are present beneath the site. Furthermore where any voids are present at such depths these are unlikely to propagate to the surface.

As such, it is considered that the risk presented from deep coal mining hazards is **Very Low**.

9.2 Shallow Coal Mining

The Development High Risk Areas identified on or adjacent to the site relate to shallow working of coal seams at depths less than 30m below existing ground level.

At these depths collapses within relic workings are more likely to result in propagation of voids to the surface of the site, crown holes for example. Collapses within relic mine workings can occur immediately following abandonment but can be delayed for decades and be influenced by many factors including strength of roof material, groundwater regime, structural geology and surface loading. Given their age most shallow workings can be said to be in a state of "rest", be that as mined or partially or fully collapsed with changes to surface loading or groundwater regimes the typical stimulus for inducing collapses.

Three rotary boreholes have been undertaken. Mudstone bedrock was encountered from depths of between 3.80m and 5.00m bgl, with no evidence of shallow coal seams, broken ground or voids recorded to 30m bgl.

Following a review of the available Coal Authority records and in absence of evidence of shallow coal mine workings during this investigation, the risk associated with historic shallow coal mining is **Low**.

9.3 Opencast Mining

Opencast coal mining risk is assessed to be **Very Low** as there are no opencast workings recorded on site or in the surrounding area.

9.4 Coal Mining Geology

Coal mining geology risk relates to geological disturbances or fractures in the bedrock disturbed by underground mining. In some circumstances faults fissures or break lines have been known to contribute to surface subsidence when activated by underground mining.

A BGS recorded fault is located within the wider school site, however no faults are recorded beneath the development site.

It is considered that there is a **Low** risk posed by coal mining geology in absence of evidence of on-site coal mining.

9.5 Mine Gas

Mine gas risk relates to the potential of explosive, toxic and asphyxiant gases to affect the development site or affect neighbouring properties because of development works. RC02 did not record any abnormal concentrations of the monitored ground gases (CH₄, CO₂, O₂, CO or H₂S) throughout borehole progression.

It is considered the risk presented from mine gases to site end users and construction workers from mine gas emissions is **Low**. A ground gas risk assessment was undertaken in Section 8.0.

9.6 Spontaneous Combustion

Spontaneous combustion risk relates to the potential for underground fires to be started through the action of developing the site.

No coal seams have been recorded beneath the site, and as such the risk of spontaneous combustion is **Low**.

10.0 Revised Conceptual Site Model

The Preliminary Conceptual Site Model (PCSM) presented *Section 2.8* and discussed in *Section 2.0* of this report has been revised following the GQRA in *Sections 6.0* and *7.0* above. The Revised Conceptual Site Model (CSM) is summarised in the table overleaf.

The CSM details the source-pathway-receptor linkages or potential pollutant linkages (PPL) that have been identified as relevant for the site. The GQRA details the associated level of risk relating to these potential pollutant linkages.

The CSM follows the framework outlined within CIRIA C552 (26) which is summarised within *Appendix H*.

The 'risk rating' within the CSM refers to the risk that the source, pathway, receptor linkage or PPL is complete. Unless specifically stated it does not necessarily refer to an immediate risk and is intended to be used as a tool to assess the necessity for further assessment/investigation.

Risks presented by Unexploded Ordnance is discussed and assessed in *Section 2.5*.

Under current health and safety legislation, employers are required to carry out their own appropriate risk assessments and mitigation to protect themselves and their employees, other human receptors and the environment from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulations (27) which require that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk.

It has been assumed that any future construction works on site will be undertaken in compliance with these requirements. This assumption is factored into the conceptual site model. Reference should be given to the environmental testing results discussed within *Section 6.0* and presented within *Appendix D*.

Qualitative Risk Assessment

Generic Quantitative Risk Assessment

Detailed Quantitative Risk Assessment or; Remedial Action

- The table below represents the Second stage in the land quality risk assessment process; the Revised Conceptual Site Model following the Quantitative Risk Assessment.
- For a development site to be deemed 'suitable for use' the level of risk needs to be brought down to acceptable levels, i.e. low to very low risk. The purpose of each stage of risk assessment is ultimately to establish if there is a requirement for additional levels of assessment to be made to have sufficient confidence to support a risk characterisation or management decision, e.g. remedial action.
- In the absence of specific site data, a Generic Quantitative Risk Assessment is invariably recommended.

Conceptual Site Model			Generic Qualitative Risk Assessment			Comments	Action
Identified Source	Pathway(s)	Receptor(s)	Consequence	Likelihood of Occurrence	Risk Rating		
Limited thickness of Made Ground underlying surface covering of topsoil, tarmac and concrete.	Direct contact and dermal uptake, soil and dust ingestion, dust and migration inhalation (indoor & outdoor air)	Site End Users	Medium Human Health Risk	Unlikely	Low	No exceedances identified in any of the soil samples tested above 'Residential without home grown produce' or 'Commercial GACs'. No ACMs were recorded during the investigation, or in laboratory screening. Additional post-demolition chemical analysis to be undertaken.	Post-Demolition ground investigation to be undertaken. Construction workers to be provided with appropriate PPE with reference to chemical analysis results contained within this report.
		Construction and maintenance workers					
		Construction and maintenance workers (Soft landscaping)					
	Vertical and horizontal migration of soluble phase contamination through groundwater.	Controlled Waters (Groundwater) Superficial Soils: Glacial Till (Secondary Undifferentiated Aquifer). Bedrock: Pennine Lower Coal Measures Formation (Secondary A Aquifer) There are no potable groundwater abstraction points within 500m. The site is not within a designated Source Protection Zone.	Medium	Unlikely	Low	Risk assessed as Low in preliminary assessment. No gross contamination identified during ground investigation or subsequent monitoring to raise risk level identified.	No further action required.
	Vertical and horizontal migration of soluble phase contamination through superficial deposits and bedrock.	Controlled Waters (Surface Water) The apparent nearest surface water feature is located >500m south of the site (Whittle Brook).	Mild	Unlikely	Very Low		
On and off-site soils with the potential to generate ground gases: - Potential for localised deposits of organic / putrescible material to be present within limited thickness of Made Ground or natural soils. - Coal Measures underlying the site may be a source of ground gas generation.	Ground gas & vapour migration and inhalation. Vertical and horizontal migration through existing service corridors and the underlying superficial deposits.	Site End Users	Medium Human Health Risk	Unlikely	Low	Using the 'worst case' scenario, the calculated Q_{hg} for the site was 0.0045l/hr for carbon dioxide, with no notably elevated CO ₂ recorded. Characteristic Gas Situation is assessed as CS1 no gas protection measures are required in accordance with BS8485.	CS-1 No gas protection measures required.

10.1 Summary of Significant Pollutant Linkages

A **Low**-risk rating is identified to site end-users and construction workers, from soils and dust from inhalation and ingestion, beneath the proposed building footprint. Construction and maintenance workers should be provided with suitable PPE with reference to chemical analysis results contained within this report.

A **Low** and **Very Low** risk rating is identified to controlled waters (Groundwater and Surface Waters) following the ground investigation, where no major sources of contamination were identified.

A **Low-risk** rating is identified to site end users from ground gases arising from site soils, migrating into buildings and subsequent inhalation by on-site staff and pupils. This corresponds to a Characteristic Gas Situation assessed as CS1. No gas protection measures will be required.

11.0 Geotechnical Assessment and Recommendations

11.1 Introduction

This section will discuss the ground and groundwater conditions encountered across the site and assess their associated risks for the proposed scope of the works. Development proposals for the partial redevelopment of the site include the construction of a new two to three storey school building including teaching facilities and a sports hall. The proposed layout is included in *Appendix A*.

At the time of writing, estimated vertical pile loads, provided by the structural engineer of up to 965kN are anticipated.

Consideration has also been given to construction of traditional shallow foundations. Foundation loads of up to 150 kPa may be anticipated.

Any changes in the development of designs beyond the issue of this Ground Investigation Report to the client, should be further investigated by the Construction Designer.

11.2 Geotechnical Considerations

The ground conditions beneath the site comprise a thin layer of cohesive Made Ground, locally 3m in thickness, underlain by firm cohesive Glacial Till, granular Glacial Till and mudstone of the Pennine Lower Coal Measures Formation. No coal deposits were recorded during the investigation.

Site levels are relatively flat across the site, with exception of a gentle southerly gradient in the south of the site.

The shallow ground conditions, firm clay underlain by sand and gravel, are unlikely to be suitable to provide a founding stratum for the proposed school buildings, without ground improvement.

Two foundation options may be viable for the site.

11.2.1 Piled Foundation Solution

A piled foundation solution may be adopted, taking structural loads to the underlying mudstone of the Pennine Lower Coal Measures Formation. It is important that the piling contractor has experience piling in similar conditions and it is advised that early engagement with the suitably qualified and experienced piling contractor is considered.

Pile design and installation are continually evolving processes, it is recommended that specialist piling contractors are contracted as to the suitability and carrying capacity of the piles in the ground conditions pertaining to the site.

It is understood that Cohesion Piling have been contacted regarding the capabilities of their piles, indicating pile capacities of up to 1250kN compression and 75kN shear.

11.2.1 Ground Improvement

Curtins have approached Vibro Menard to determine the suitability of a ground improvement solution to enable construction of traditional shallow foundations.

Based on the results of the ground investigation, Vibro Menard advised that Vibro Stone Columns may be used to improve the shallow ground conditions to allow a bearing capacity of 150 kPa beneath the foundations.

Based on the results of geotechnical testing, the cohesive Glacial Till encountered is of low volume change potential.

Consideration must be given to excessive vibration in close proximity to the existing school building to ensure safety of building users.

11.3 Ground Floor Slabs

11.3.1 Piled Foundation Solution

Based on observations onsite together with the results of laboratory tests, it is recommended that consideration is given to a suspended ground floor slab, bearing on pile caps supported by a network of beams.

11.3.2 Ground Improvement

Ground bearing slabs may be constructed on the improved formation. Soft or deleterious materials should be removed prior to construction.

11.4 Chemical Attack on Buried Concrete

The site has been classified in accordance with BRE Special Digest 1 (20) and laboratory testing undertaken accordingly in *Section 7.0*. The results of laboratory chemical analysis and associated concrete classification are presented in Table 10.4.

Table 10.4 –Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Test Type	No. of Tests	Range	Design Sulphate Class	ACEC Class ⁽¹⁾
Made Ground	pH	4	7.66 – 10.7	DS-1	AC-1
	Water Soluble Sulphate (mg/l)		30 – 250		
Glacial Till	pH	3	4.30 – 7.60	DS-1	AC-3z

Phase 2 Ground Investigation Report

Stratum	Test Type	No. of Tests	Range	Design Sulphate Class	ACEC Class ⁽¹⁾
	Water Soluble Sulphate (mg/l)		6.7 – 12		
Pennine Lower Coal Measures Formation	pH	14	6.59 – 9.34	DS-1	AC-1
	Water Soluble Sulphate (mg/l)		6.6 - 76		

(1) Assumes mobile groundwater scheme within a brownfield area

11.5 Excavation and Support

Groundwater head level within the bedrock appears to be at c.2.60 – 2.70m bgl.

Notwithstanding, shallow perched water may be encountered in shallow excavations, which may be controlled through closed wall side support and pumping from sumps.

In accordance with Health and Safety Regulations, side support for safety purposes should be provided to all excavations which appear unstable, including where groundwater is encountered, and those more than 1.20m deep. Excavations shallower than 1.20m deep, requiring personnel access, will require closed side support.

The chosen contractor should provide details on how they intend to ensure the safety and stability of proposed excavations.

12.0 Conclusions & Recommendations

12.1 Conclusions

12.1.1 Ground and Groundwater Contamination

The environmental chemistry soil results have been compared with the Generic Assessment Criteria (GAC) for soils with respect to human health against the conservative '*Residential without plant uptake*' thresholds and '*Commercial*' thresholds.

No suspected asbestos containing materials (ACMs) were identified within any of the exploratory hole logs or during laboratory screening.

A **Low**-risk rating is identified to site end-users and construction workers, from soils and dust from inhalation and ingestion.

A **Low** and **Very Low** risk rating is identified to controlled waters (Groundwater and Surface Waters) following the ground investigation, where no major sources of contamination were identified.

Post demolition investigation will be required to inform human health risk assessment for soils beneath the existing school building which may be used as managed landscaping.

12.1.2 Ground Gas Assessment

Using the 'worst case' scenario, in absence of a full and representative dataset, the calculated Qhg for the site was 0.045l/hr for carbon dioxide, with no notably elevated CO₂ recorded. No notably elevated carbon dioxide concentrations (>5% v/v) were recorded.

Methane was recorded below the limit of detection (<0.1% v/v) for all visits throughout the monitoring period.

A **Low-risk** rating is identified to site end users from ground gases arising from site soils and the underlying bedrock. The site is preliminarily assessed as Characteristic Gas Situation CS1, where no gas protection measures are required in accordance with BS8485.

The site is located within a Lower Probability Radon Area (less than 1% of homes are estimated to be at or above the Action Level).

12.2 Recommendations

Based on the findings of the ground investigation, the following recommendations are made:

- 1) Post-demolition investigation including soil chemical analysis and GQRA should be undertaken in areas beneath the existing building footprint.

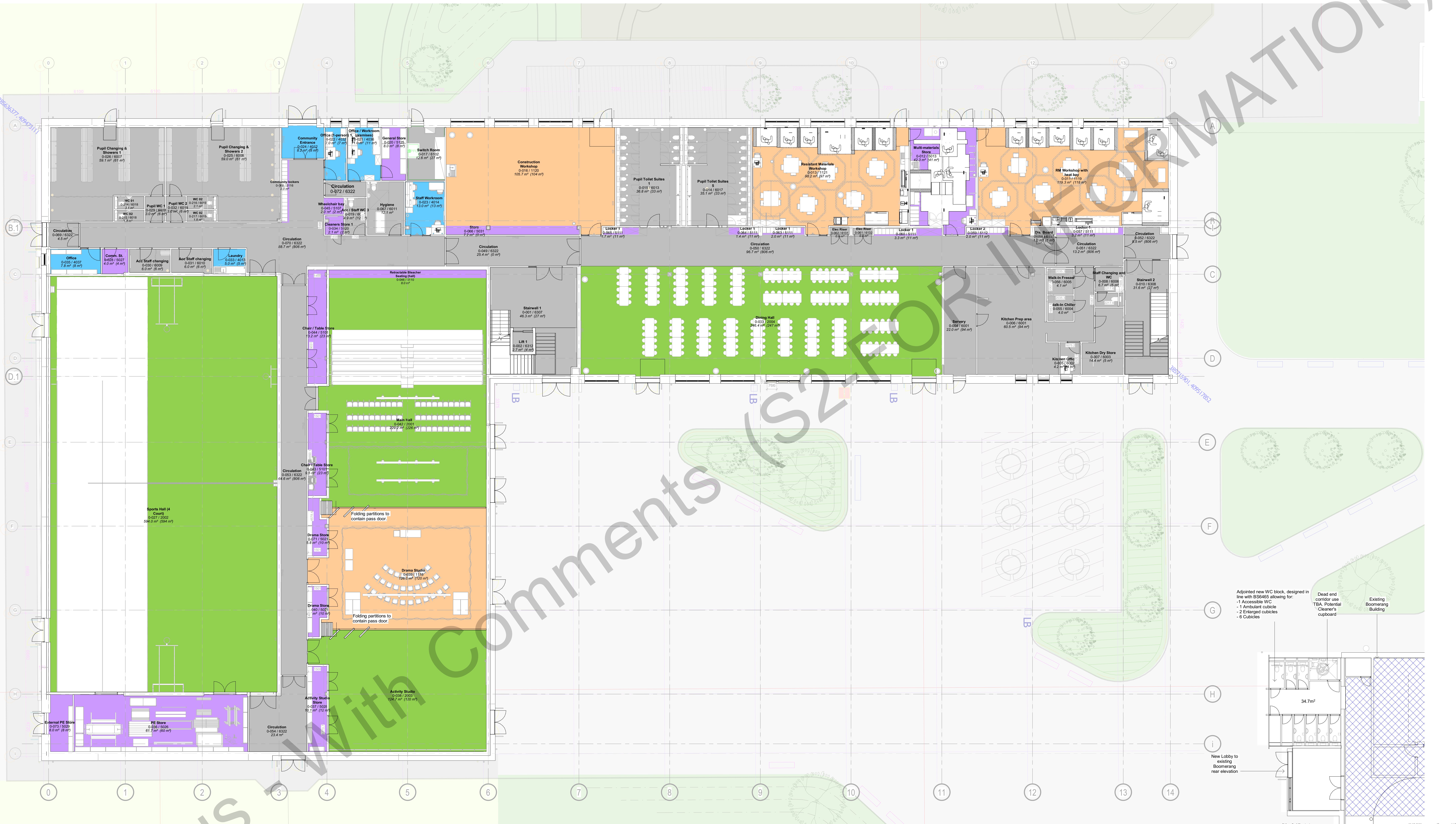
- 2) A remediation strategy will not be required prior to construction of the new school building. The findings of post-demolition investigations will determine the requirement for remedial action beneath the existing school building.
- 3) Vibro Stone Columns may be used to improve shallow ground conditions to facilitate the use of shallow foundations. Vibro Menard have confirmed that an allowable bearing pressure of 150 kPa may be achieved on the improved ground.
- 4) Ground bearing slabs may be constructed on the improved ground.
- 5) It is recommended that construction workers are provided with appropriate PPE and sanitary facilities, with reference to the environmental testing results presented herein and within *Appendix D*.
- 6) Should unexpected contamination be observed during construction advice should be obtained from a Geo-environmental Engineer.

13.0 References

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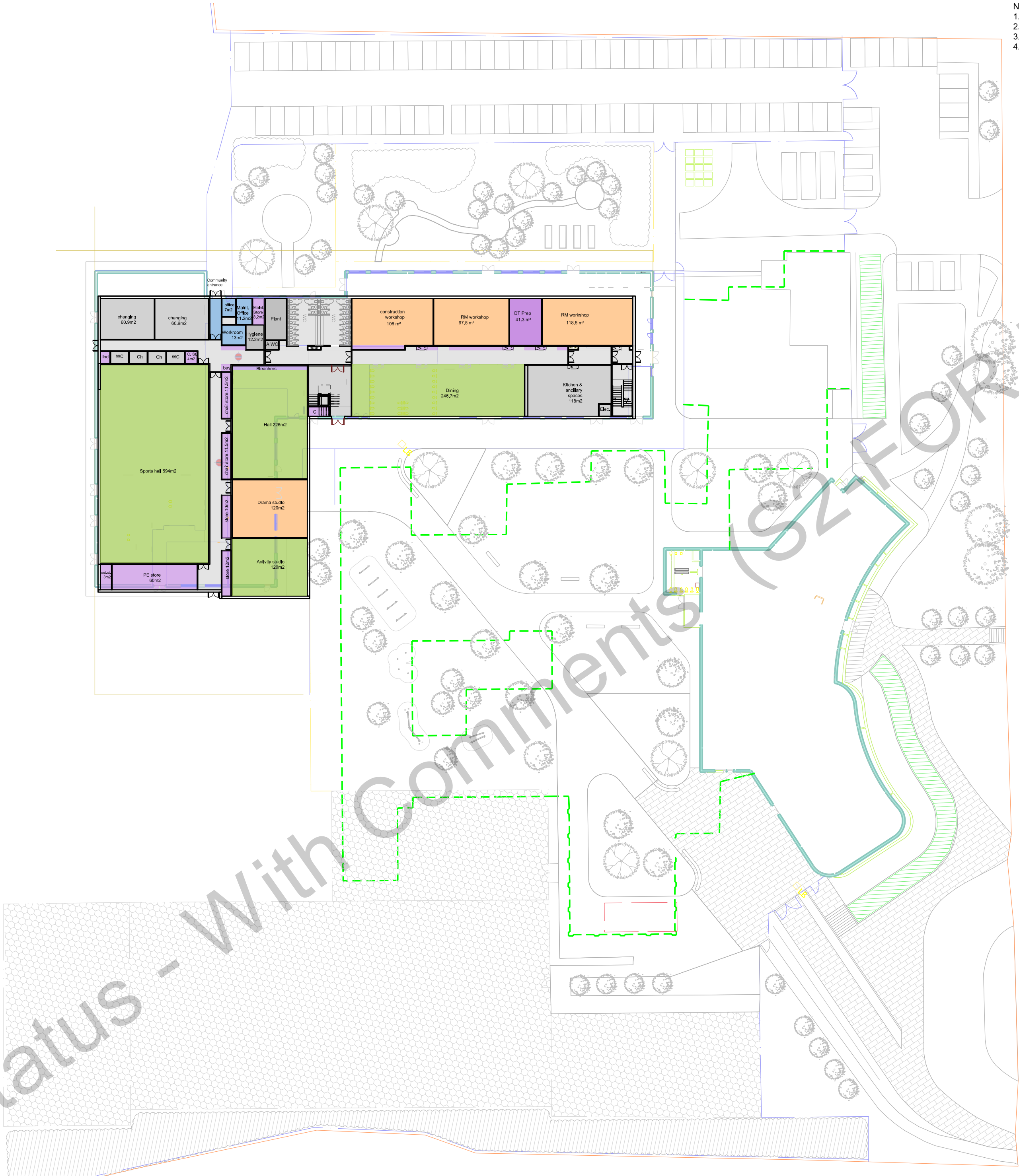
Appendix A – Drawings

- JM Architects (2022), Newhouse Academy Proposed Ground Level Plan, ref. SRP1019-JMA-01-00-DR-A-00-0001-S3-P13
- JM Architects (2022), Newhouse Academy Site Plan – Myschool Option, ref. 6945-JMA-01-01-DR-A-00-0001-P04
- Curtins (2022), Proposed Exploratory Hole Location Plan, ref. 079809-CUR-00-XX-DR-GE-003-V02
- Curtins (2022), CPT Location Plan, ref. 079809-CUR-00-XX-DR-GE-004-P01



Note: For risks marked with red cube refer to drawing 6945-JMA-01-ZZ-DR-A-00-0004.

P13	Draft Planning Issue		26.05.2022	JE	PM
P12	Disruption planning in line with DWP17 CP Clarifications response		22.04.2022	JE	NM
P11	Disruption issued and released ahead of draft CP submission		06.04.2022	JE	PM
P10	Issued for Draft Contractors Proprietary Package		01.04.2022	JE	PM
P9	Drawings issued for CEMT Meeting		26.03.2022	AM	
P8	Drawings issued for CEMT meeting		21.03.2022	AM	
P7	Latest V4 issued		14.03.2022	JE	AM
P6	Drawings issued for CEMT meeting		06.03.2022	JE	AM
P5	Latest V4 issued		28.02.2022	JE	PM
P4	G4's updated to reflect V4 in accordance with client comments		01.02.2022	JE	PM
P3	G4's updated with construction zone indicated		10.01.2022	JE	PM
P2	Revised layout in line with client's comments		06.01.2022	V4	PM
P1	For Information		22.12.2021	V4	PM
	Description	Date	Prep'd	Chk'd	

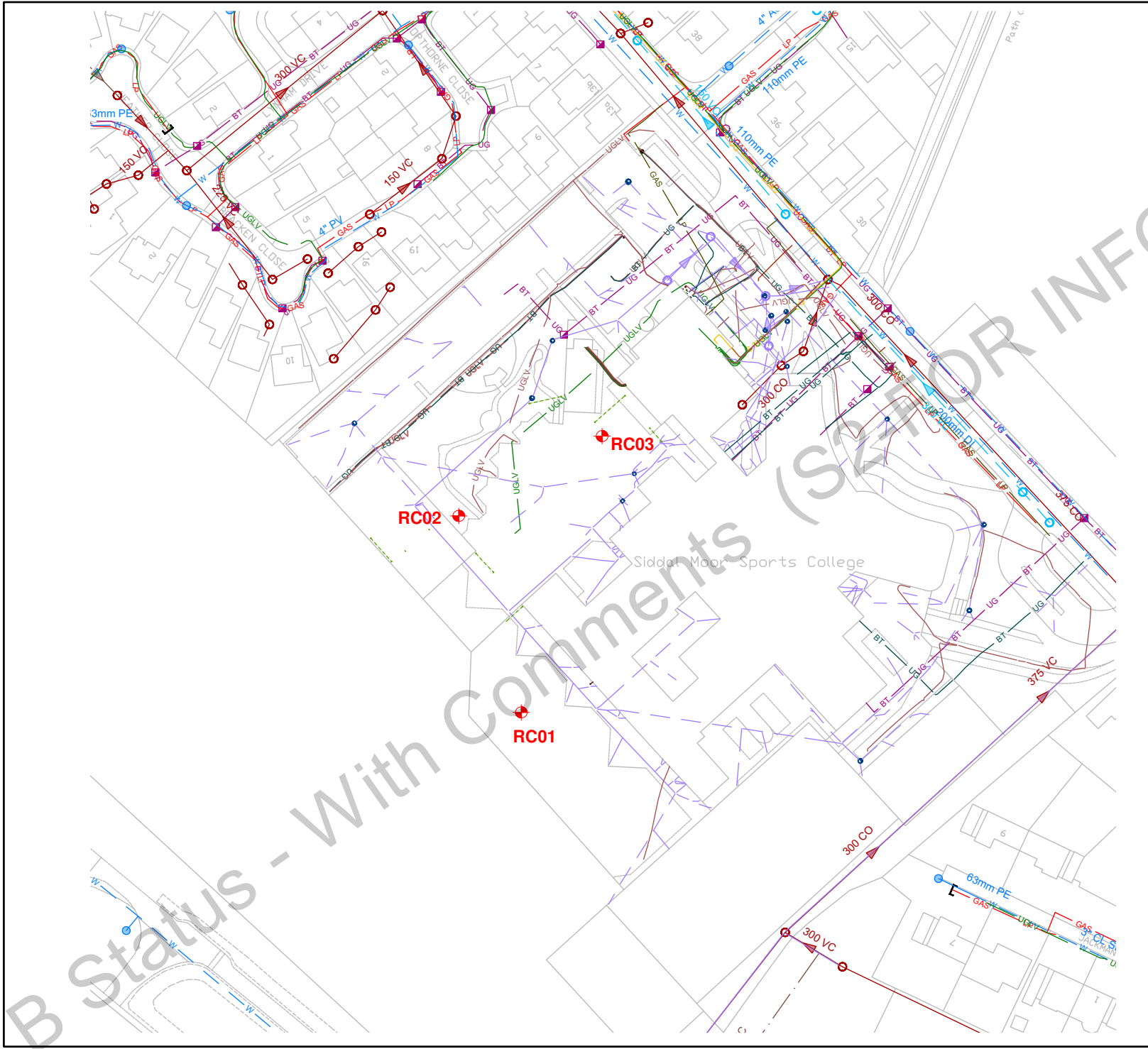


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P04	General amendments	07/02/21	AM	AI
P03	General amendments	07/02/21	AM	AI
-	-	-	-	-
REV.	DESCRIPTION	DATE	DRN BY	CKD BY

PROJECT	Newhouse Academy			Second Floor
TITLE	Site Plan - Myschool Option			37 Alfred Place London WC1E 7DP
CLIENT	Morgan Sindall			T: 0207 580 5330 lon@jmarchitects.net www.jmarchitects.net
JOB No.	6945	DRAWING No.	6945-JMA-01-01-DR-A-00-0001	REVISION
SCALE	1/500@A2	DRAWN BY	AM	P04
STATUS	S2 Information	CHECKED BY	AI	DATE
				03/02/22



 **GEOBORE-S ROTARY CORED BOREHOLES
WITH ROTARY OPEN HOLE FOLLOW ON**

Rev:	Description:	Date:	By:	Chkd:
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Birmingham - Bristol - Cardiff - Douglas - Edinburgh - Kendal - Leeds - Liverpool - London - Manchester - Nottingham

Status: **INFORMATION**

Project: **NEWHOUSE ACADEMY**

Drg Title: **EXPLORATORY HOLE LOCATION PLAN**

Scale:	Size:	First Issue:	Drawn:	Checked:
NTS	A3	03/10/2022	MH	RA

Drg No:	Rev:
079809-CUR-00-XX-GE-003	V02



APPROXIMATE GEOBORE S-OREHOLE
LOCATION



PROPOSED CPT LOCATION

Notes:
Locations subject to Morgan Sindall approval.
Proposals to undertake up to 15 No. CPT tests on Friday. Should
this not be achievable, locations will be selected to provide good
coverage of the investigation area.

Rev.	Description:	Date:	By:	CHKd:
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Birmingham - Bristol - Cardiff - Edinburgh - Glasgow - Leeds - Liverpool - London - Manchester - Nottingham

Status:

INFORMATION

Project:

NEWHOUSE ACADEMY

Dwg Title:

PROPOSED CPT LOCATION PLAN

Scale:

NTS

Size:

A3

First Issue:

21/10/2022

Drawn:

MH

Checked:

RA

Dwg No:

079809-CUR-00-XX-DR-GE-004

Rev:

P01

Appendix B – Supplementary Information

- Landmark, Envirocheck Report Ref. 298633447_1_1
- Coal Authority Consultants Mining Report Ref. 51003284015001

Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

298633447_1_1

Customer Reference:

B079809.300

National Grid Reference:

385690, 409490

Slice:

A

Site Area (Ha):

0.4

Search Buffer (m):

1000

Site Details:

Newhouse Academy

Newhouse Road

HEYWOOD

OL10 2NT

Client Details:

Mr M Holroyd

Curtins Consulting Ltd

Beetham Court

51-55 Tithebarn Street

Liverpool

L2 2SB

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Geological	18
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Sensitive Land Use	45
Data Currency	46
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Useful Contacts	54

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client. In this datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 3		1		10
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control	pg 5				1
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 6				4
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 6			Yes	
Pollution Incidents to Controlled Waters	pg 6			1	3
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 7				1 (*11)
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 10	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk			n/a	n/a	n/a
Groundwater Vulnerability - Local Information			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 10	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 10	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 10				37

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites	pg 15				1
Historical Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 15	1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)	pg 15			2	7
Potentially Infilled Land (Water)	pg 15		4	10	17
Registered Landfill Sites					
Registered Waste Transfer Sites	pg 17				1
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 18	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 18	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 20			2	3
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 21	Yes	n/a	n/a	n/a
Mining Instability	pg 21	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 21	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 21	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 21	Yes		n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 22	Yes		n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 23		4	5	116
Fuel Station Entries	pg 34				2
Points of Interest - Commercial Services	pg 34		1	1	40
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 37			1	66
Points of Interest - Public Infrastructure	pg 43		1	2	9
Points of Interest - Recreational and Environmental	pg 44			3	
Gas Pipelines					
Underground Electrical Cables					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt	pg 45			1	
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (SE)	0	1	385686 409490
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SW (SW)	157	1	385550 409350
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (N)	186	1	385600 409700
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (N)	206	1	385686 409750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (N)	212	1	385650 409750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (N)	256	1	385700 409800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (NW)	256	1	385550 409750
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NE (NE)	296	1	385850 409800
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (SW)	299	1	385450 409250
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	306	1	385686 409850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	306	1	385700 409850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	321	1	385800 409850
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13NW (NW)	322	1	385450 409750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SW (N)	342	1	385550 409850
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A13SE (SE)	352	1	385950 409200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	356	1	385686 409900
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (SE)	357	1	385900 409150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13SW (SW)	369	1	385400 409200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	369	1	385800 409900
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A8NE (SE)	374	1	385850 409100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (SE)	389	1	385950 409150
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (SE)	398	1	385900 409100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A18SE (N)	406	1	385686 409950
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SE (NE)	407	1	385900 409900
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	418	1	385800 409950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (S)	419	1	385850 409050
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A14NW (E)	426	1	386150 409500
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (SE)	427	1	385950 409100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (SE)	427	1	386050 409200
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	432	1	385850 409950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A18SE (N)	456	1	385686 410000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A18SE (N)	458	1	385750 410000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A18SW (N)	459	1	385650 410000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SW (NW)	463	1	385350 409850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	466	1	385800 410000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A8NE (S)	466	1	385850 409000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SW (N)	467	1	385600 410000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A14SW (E)	469	1	386150 409300
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	479	1	385850 410000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SW (N)	481	1	385550 410000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A8NE (SE)	486	1	385900 409000
	BGS Groundwater Flooding Susceptibility Flooding Type: Limited Potential for Groundwater Flooding to Occur	A18SE (NE)	497	1	385900 410000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	Discharge Consents Operator: Craig Daniel & Elaine Elizabeth Mansfield Property Type: DOMESTIC PROPERTY (MULTIPLE) (INCL FARM HOUSES) Location: 367-381 Manchester Road, Birch, Heywood, Lancashire Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 0167/716 Permit Version: 1 Effective Date: 14th November 1967 Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook Status: Pre National Rivers Authority Legislation where issue date < 01/09/1989 Positional Accuracy: Located by supplier to within 100m	A13SE (SE)	247	2	385900 409300
2	Discharge Consents Operator: Siddall Moor Farm Property Type: FARMS (NOT HOUSE)/CROP + ANIMAL REARING/PLANT NURSERY Location: Siddal Moor Farm, Hareshill Road, Heywood, Lancashire, OI10 2tb Authority: Environment Agency, North West Region Catchment Area: Roch Reference: 0172/1669 Permit Version: 1 Effective Date: 9th February 1972 Issued Date: 9th February 1972 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Unknown Status: Pre National Rivers Authority Legislation where issue date < 01/09/1989 Positional Accuracy: Located by supplier to within 100m	A7NE (SW)	581	2	385300 409000
3	Discharge Consents Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Middleton Road Cso Rear Of Northolt Fold, Heywood, ., Greater Manchester, OI10 2wh Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: Npswqd010709 Permit Version: 1 Effective Date: 27th November 2019 Issued Date: 27th November 2019 Revocation Date: Not Supplied Discharge Type: Public Sewage: Storm Sewage Overflow Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook Via Sws Status: Varied under EPR 2010 Positional Accuracy: Located by supplier to within 10m	A9NW (SE)	597	2	386211 409135
3	Discharge Consents Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Middleton Road Cso Rear Of Northolt Fold, Heywood, ., Greater Manchester, OI10 2wh Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 01roc0033 Permit Version: 2 Effective Date: 31st August 2013 Issued Date: 26th March 2010 Revocation Date: 26th November 2019 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook Status: Modified (Water Resources Act 1991, Schedule 10 as amended by Environment Act 1995) Positional Accuracy: Located by supplier to within 10m	A9NW (SE)	599	2	386210 409130

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	Discharge Consents Operator: United Utilities Water Limited Property Type: WWTW/SEWAGE TREATMENT WORKS (WATER COMPANY) Location: Birth Tree Grange, Heywood, Greater Manchester Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 01ROC0181 Permit Version: 1 Effective Date: 1st January 1995 Issued Date: Not Supplied Revocation Date: 1st January 1995 Discharge Type: Storm /emergency overflow Discharge: Unknown Environment: Receiving Water: Not Supplied Status: Consent revoked or revised: New Consent issued (Section 37(1)) Positional Accuracy: Located by supplier to within 100m	A14SW (SE)	600	2	386240 409180
5	Discharge Consents Operator: United Utilities Water Limited Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Whitehouse Fields Ps, Heywood, Rochdale, Greater Manchester Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 016982947 Permit Version: 1 Effective Date: 23rd June 1995 Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook Status: Post National Rivers Authority Legislation where issue date > 31/08/1989 Positional Accuracy: Located by supplier to within 100m	A8NE (S)	605	2	385700 408830
6	Discharge Consents Operator: Abdul Haq Property Type: WWTW (NOT WATER CO) (NOT STP AT A PRIVATE PREMISES) Location: Hareshill Road (1/3/5), Heywood, Greater Manchester Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 016990481 Permit Version: 1 Effective Date: 27th April 1984 Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook (River Roch) Status: Pre National Rivers Authority Legislation where issue date < 01/09/1989 Positional Accuracy: Located by supplier to within 100m	A8NW (SW)	607	2	385400 408900
7	Discharge Consents Operator: United Utilities Water Limited Property Type: STORM TANK/CSO ON SEWERAGE NETWORK (WATER COMPANY) Location: Middleton Road Cso Rear Of Northolt Fold, Heywood, ., Greater Manchester, OI10 2wh Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 01ROC0033 Permit Version: 1 Effective Date: 1st January 1995 Issued Date: Not Supplied Revocation Date: 31st August 2013 Discharge Type: Public Sewage: Storm Sewage Overflow Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook Status: Post National Rivers Authority Legislation where issue date > 31/08/1989 Positional Accuracy: Located by supplier to within 100m	A9NW (SE)	725	2	386350 409120

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	Discharge Consents Operator: United Utilities Water Limited Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Middleton Rd Ps, Heywood, Rochdale, Greater Manchester Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 016982942 Permit Version: 1 Effective Date: 17th November 1995 Issued Date: Not Supplied Revocation Date: 16th December 2013 Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook Status: Post National Rivers Authority Legislation where issue date > 31/08/1989 Positional Accuracy: Located by supplier to within 100m	A8SE (S)	886	2	385820 408560
9	Discharge Consents Operator: United Utilities Water Limited Property Type: PUMPING STATION ON SEWERAGE NETWORK (WATER COMPANY) Location: Middleton Rd Ps, Heywood, Rochdale, Greater Manchester Authority: Environment Agency, North West Region Catchment Area: Not Supplied Reference: 016982942 Permit Version: 2 Effective Date: 17th December 2013 Issued Date: 14th August 2013 Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Pumping Station - Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook Status: Post National Rivers Authority Legislation where issue date > 31/08/1989 Positional Accuracy: Located by supplier to within 10m	A8SE (S)	908	2	385760 408530
10	Discharge Consents Operator: Courtesy World Ltd Property Type: HOLIDAY ACCOM/CAMP SITE/CARAVAN SITE/HOTEL/HOSTEL Location: Birch Hotel, Manchester Road, Heywood, Lancashire Authority: Environment Agency, North West Region Catchment Area: Not Given Reference: 0172/1689 Permit Version: 1 Effective Date: 6th March 1972 Issued Date: Not Supplied Revocation Date: Not Supplied Discharge Type: Sewage Discharges - Final/Treated Effluent - Not Water Company Discharge: Freshwater Stream/River Environment: Receiving Water: Whittle Brook Status: Pre National Rivers Authority Legislation where issue date < 01/09/1989 Positional Accuracy: Located by supplier to within 100m	A3NW (S)	991	2	385580 408450
11	Prosecutions Relating to Controlled Waters Location: Whittle Brook, Birch Hotel, Manchester Road, Heywood, OL10 Prosecution Text: Breaching the conditions of a consent to discharge sewage Prosecution Act: Wra91 S85(6) Hearing Date: 13th September 2005 Verdict: Guilty Fine: 1500 Cost: 1105 Positional Accuracy: Manually positioned to the road within the address or location	A8NE (S)	440	2	385775 409005
12	Integrated Pollution Prevention And Control Name: Urban Reserve (Assetco) Limited Location: Pilsworth Power, Heywood Distribution Park, Pilsworth Road, Broadfield,, Rochdale, OL10 2TL Authority: Environment Agency, North West Region Permit Reference: RP3006PB Original Permit Ref: Rp3006pb Effective Date: 16th January 2020 Status: Effective Application Type: Application App. Sub Type: New Positional Accuracy: Located by supplier to within 10m Activity Code: 25B (3)(1)(a) Activity Description: Tranche B SG permitting date 1st January 2019 Primary Activity: N Activity Code: 25A (a) Activity Description: New Medium Combustion Plant Primary Activity: Y	A17SW (NW)	957	2	384780 409910

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
13	Local Authority Pollution Prevention and Controls Name: Somerfield Service Station Location: Middleton Road, Heywood, ROCHDALE, Lancashire, OL10 2LU Authority: Rochdale Metropolitan Borough Council, Environmental Health Department Permit Reference: 87/09 Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG1/14 Petrol filling station Status: Authorised Positional Accuracy: Automatically positioned to the address	A14SW (E)	566	3	386285 409444
14	Local Authority Pollution Prevention and Controls Name: Inx International Ltd Location: Hareshill Distribution Centre, Hilltop Road, Heywood, Lancashire, OL10 2tw Authority: Rochdale Metropolitan Borough Council, Environmental Health Department Permit Reference: 138/13 Dated: Not Supplied Process Type: Local Authority Pollution Prevention and Control Description: PG6/44 Manufacture of coating materials Status: Permitted Positional Accuracy: Manually positioned to the road within the address or location	A12NW (W)	768	3	384871 409504
15	Local Authority Pollution Prevention and Controls Name: Reeve (Derby) LtdPentagon Vauxhall Location: Green Lane, Heywood, ROCHDALE, Lancashire, OL10 2EP Authority: Rochdale Metropolitan Borough Council, Environmental Health Department Permit Reference: 59/10 Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG6/34 Respraying of road vehicles Status: Authorised Positional Accuracy: Manually positioned to the address or location	A19SE (NE)	950	3	386512 410052
16	Local Authority Pollution Prevention and Controls Name: Castleton Service StationStar Texaco Location: Manchester Road, ROCHDALE, Lancashire, OL10 2DZ Authority: Rochdale Metropolitan Borough Council, Environmental Health Department Permit Reference: Not Given Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG1/14 Petrol filling station Status: Authorised Positional Accuracy: Manually positioned to the address or location	A19NW (N)	954	3	386064 410427
	Nearest Surface Water Feature	A13SW (SW)	312	-	385412 409273
17	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Greater Manchester Authority: Environment Agency, North West Region Pollutant: Unknown Note: None Affected; None Pollution Found Incident Date: 17th September 1996 Incident Reference: 96622033 Catchment Area: Roch Receiving Water: Not Given Cause of Incident: Other Incident/Unknown Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8NE (S)	436	2	385700 409000
18	Pollution Incidents to Controlled Waters Property Type: Private Sewage (Non-PLC): Sewerage Systems Location: Location Description Not Available Authority: Environment Agency, North West Region Pollutant: Crude Sewage Note: Whittle Bk Incident Date: 18th July 1994 Incident Reference: 94621576 Catchment Area: Roch Receiving Water: Not Given Cause of Incident: Blocked Sewer Incident Severity: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 100m	A12SW (SW)	699	2	385001 409201

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
19	Pollution Incidents to Controlled Waters Property Type: Stables Location: Haywood Old Road Authority: Environment Agency, North West Region Pollutant: Organic Wastes: Horse manure (solid) Note: Muck From Muck Heap Incident Date: 8th December 1998 Incident Reference: SO982137 Catchment Area: Roch Receiving Water: Freshwater Stream/River Cause of Incident: Leaking Field Heap Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A8SE (S)	835	2	385700 408600
20	Pollution Incidents to Controlled Waters Property Type: Not Given Location: Greater Manchester Authority: Environment Agency, North West Region Pollutant: Unknown Note: None Affected; Chemical Spill Incident Date: 21st December 1996 Incident Reference: 96622570 Catchment Area: Roch Receiving Water: Not Given Cause of Incident: Fire Incident Severity: Category 3 - Minor Incident Positional Accuracy: Located by supplier to within 100m	A18NW (N)	961	2	385600 410500
21	Water Abstractions Operator: Oak Brewing Company Ltd Licence Number: 2569002029 Permit Version: 100 Location: Borehole At Premises, Green Lane, Heywood Authority: Environment Agency, North West Region Abstraction: Food And Drink: General Cooling (Existing Licences Only) (Low Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 218 Yearly Rate (m3): 79646 Details: Premises At Green Lane, Heywood Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 15th November 1990 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A19SE (NE)	969	2	386500 410100
	Water Abstractions Operator: G. S. Cold Storage And Warehousing Ltd. Licence Number: 2569002082 Permit Version: 102 Location: Boreholes (2) At Premises, Roeacre Tannery, Heywood, L97 Authority: Environment Agency, North West Region Abstraction: Textiles And Leather: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Premises, Roeacre Tannery, Heywood Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 22nd December 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A24SW (NE)	1168	2	386200 410600
	Water Abstractions Operator: Litton Ltd Licence Number: 2569002082 Permit Version: 101 Location: Boreholes (2) At Premises, Roeacre Tannery, Heywood, L97 Authority: Environment Agency, North West Region Abstraction: Textiles And Leather: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 0 Yearly Rate (m3): 0 Details: Premises, Roeacre Tannery, Heywood Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 22nd June 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A24SW (NE)	1168	2	386200 410600

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Tarmac Topmix Ltd Licence Number: 2569002257 Permit Version: 100 Location: Borehole At Green Lane, Heywood Authority: Environment Agency, North West Region Abstraction: Construction: General Use (Medium Loss) Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 35 Yearly Rate (m3): 10000 Details: Land & Prems-Green Lane, Heywood Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 28th June 1993 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A20NW (NE)	1189	2	386700 410200
	Water Abstractions Operator: Mr Fletcher Licence Number: 2569002247 Permit Version: 100 Location: Borehole At Siddall Fold Farm, Birch Authority: Environment Agency, North West Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 5 Yearly Rate (m3): 236 Details: Lic. Holders Prem'S-Siddall Fold Fm Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 12th June 1991 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A3NE (S)	1254	2	385900 408200
	Water Abstractions Operator: Roe Acre Dyeing & Felting Co. Ltd. Licence Number: 2569002022 Permit Version: Not Supplied Location: Reservoir Fed By Roe Acre Brook, Roe Acre Dam, HEYWOOD Authority: Environment Agency, North West Region Abstraction: Boiler Feed & Manufacturing Abstraction Type: Not Supplied Source: River Daily Rate (m3): 2309 Yearly Rate (m3): 340950 Details: Additional Purpose: Boiler feed; Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A24SW (NE)	1254	2	386200 410695
	Water Abstractions Operator: G. S. Cold Storage And Warehousing Ltd. Licence Number: 2569002082 Permit Version: 102 Location: Boreholes (2) At Premises, Roeacre Tannery, Heywood Authority: Environment Agency, North West Region Abstraction: Textiles And Leather: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Premises, Roeacre Tannery, Heywood Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 22nd December 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A24SW (NE)	1259	2	386200 410700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Litton Ltd Licence Number: 2569002082 Permit Version: 101 Location: Boreholes (2) At Premises, Roeacre Tannery, Heywood Authority: Environment Agency, North West Region Abstraction: Textiles And Leather: Process Water Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 546 Yearly Rate (m3): 134016 Details: Premises, Roeacre Tannery, Heywood Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 22nd June 2000 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A24SW (NE)	1259	2	386200 410700
	Water Abstractions Operator: Mutual Mills Ltd Licence Number: 2569002124 Permit Version: Not Supplied Location: Millers Brook, HEYWOOD, Lancashire Authority: Environment Agency, North West Region Abstraction: Boiler Feed & Drinking; Cooking; Sanitary; Washing For Industrial Premises Abstraction Type: Not Supplied Source: River Daily Rate (m3): 0 Yearly Rate (m3): 0 Details: Additional Purpose: Domestic - industrial; Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(N)	1683	2	386000 411200
	Water Abstractions Operator: Mutual Mills Ltd Licence Number: 2569002124 Permit Version: Not Supplied Location: Two Reservoirs & Millers Brook, HEYWOOD, Lancashire Authority: Environment Agency, North West Region Abstraction: Boiler Feed & Drinking; Cooking; Sanitary; Washing For Industrial Premises Abstraction Type: Not Supplied Source: River Daily Rate (m3): 45 Yearly Rate (m3): 7274 Details: Additional Purpose: Domestic - industrial; Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(N)	1729	2	386200 411200
	Water Abstractions Operator: The Manchester Golf Club Ltd Licence Number: 2569005053 Permit Version: 100 Location: Trub Brk At Rochdale Authority: Environment Agency, North West Region Abstraction: Golf Courses: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 0 Yearly Rate (m3): 0 Details: Manchester Golf Club Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2008 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(E)	1923	2	387600 409100

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: The Manchester Golf Club Ltd Licence Number: 2569005053 Permit Version: 100 Location: Trub Brk At Rochdale Authority: Environment Agency, North West Region Abstraction: Golf Courses: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 0 Yearly Rate (m3): 0 Details: Manchester Golf Club Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 1st April 2008 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	(E)	1973	2	387600 408900
	Groundwater Vulnerability Map Combined Classification: Secondary Superficial Aquifer - Low Vulnerability Combined Vulnerability: Low Combined Aquifer: Productive Bedrock Aquifer, Productive Superficial Aquifer Pollutant Speed: Low Bedrock Flow: Well Connected Fractures Dilution: >550 mm/year Baseflow Index: <40% Superficial Patchiness: >90% Superficial Thickness: 3-10m Superficial Recharge: Low	A13NE (SE)	0	4	385686 409490
	Groundwater Vulnerability - Soluble Rock Risk None				
	Bedrock Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13NE (SE)	0	4	385686 409490
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - Undifferentiated	A13NE (SE)	0	4	385686 409490
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
22	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 272.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A9NW (SE)	551	5	386121 409092
23	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 7.6 Watercourse Level: Underground Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A9NW (SE)	583	5	386035 408969

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
24	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 2.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A9NW (SE)	584	5	386185 409119
25	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 71.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A9NW (SE)	585	5	386030 408963
26	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 182.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8NE (SE)	604	5	385972 408904
27	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 7.9 Watercourse Level: Underground Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8NE (SE)	606	5	385978 408905
28	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 2.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8NE (SE)	609	5	385985 408906
29	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 1.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A8NE (SE)	610	5	385987 408906
30	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 8.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A8NE (SE)	611	5	385988 408905
31	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 111.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NE (SW)	619	5	385230 409016
32	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 88.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A8NE (SE)	620	5	385993 408898

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
33	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 51.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A8SE (S)	623	5	385694 408812
34	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 7.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A8SE (S)	639	5	385743 408799
35	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 132.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A8SE (S)	642	5	385750 408797
36	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 1.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NE (SW)	657	5	385097 409114
37	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 4.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NE (SW)	657	5	385097 409115
38	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 17.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NE (SW)	662	5	385093 409112
39	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 114.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8SE (S)	679	5	385880 408785
40	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 8.7 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A9NW (SE)	679	5	386063 408871
41	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 15.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NE (SW)	679	5	385077 409105

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
42	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 194.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A9NW (SE)	684	5	386071 408871
43	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 310.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NE (SW)	694	5	385063 409099
44	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 30.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A12NW (W)	713	5	384942 409640
45	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 4.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NE (SW)	727	5	385170 408923
46	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 135.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NE (SW)	731	5	385168 408919
47	OS Water Network Lines Watercourse Form: Lake Watercourse Length: 47.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8SE (S)	778	5	385875 408681
48	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 263.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A12NW (W)	798	5	384856 409643
49	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 14.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8SE (S)	819	5	385865 408637
50	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 54.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8SE (S)	828	5	385860 408626

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
51	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 123.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8SE (S)	862	5	385825 408584
52	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 122.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7SE (SW)	863	5	385095 408806
53	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 220.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Whittle Brook Catchment Name: Mersey Primacy: 1	A8SE (S)	945	5	385744 408492
54	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 121.8 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A8SE (S)	945	5	385744 408492
55	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 4.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7SE (SW)	984	5	385028 408703
56	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 270.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A8SE (S)	985	5	385914 408477
57	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 293.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7SE (SW)	988	5	385026 408699
58	OS Water Network Lines Watercourse Form: Inland river Watercourse Length: 6.1 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Mersey Primacy: 1	A7NW (SW)	997	5	384820 408916

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
59	BGS Recorded Landfill Sites Site Name: Rochdale Canal Location: Green Lane, HEYWOOD, Lancs Authority: British Geological Survey, National Geoscience Information Service Ground Water: No threat to ground water Surface Water: No threat to surface water Geology: N/A Positional Accuracy: Manually positioned to the address or location Boundary Accuracy: Derived	A19SE (NE)	844	-	386382 410049
	Local Authority Landfill Coverage Name: Rochdale Metropolitan Borough Council - Has no landfill data to supply		0	3	385686 409490
60	Potentially Infilled Land (Non-Water) Bearing Ref: SE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1984	A14SW (SE)	401	-	386043 409235
61	Potentially Infilled Land (Non-Water) Bearing Ref: E Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1984	A14SW (E)	401	-	386102 409387
62	Potentially Infilled Land (Non-Water) Bearing Ref: NW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1983	A17SW (NW)	757	-	384967 409838
63	Potentially Infilled Land (Non-Water) Bearing Ref: SE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1984	A9NE (SE)	768	-	386364 409057
64	Potentially Infilled Land (Non-Water) Bearing Ref: N Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A18NW (N)	796	-	385512 410317
65	Potentially Infilled Land (Non-Water) Bearing Ref: E Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1984	A14NE (E)	891	-	386574 409787
66	Potentially Infilled Land (Non-Water) Bearing Ref: NW Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A17NE (NW)	900	-	385292 410345
67	Potentially Infilled Land (Non-Water) Bearing Ref: E Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1984	A14NE (E)	954	-	386665 409678
68	Potentially Infilled Land (Non-Water) Bearing Ref: NE Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A19SE (NE)	956	-	386510 410065
69	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A13SE (S)	124	-	385694 409312
70	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13NE (NE)	178	-	385801 409692
71	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13NW (N)	195	-	385605 409713
72	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A13NW (W)	196	-	385444 409512
73	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13NW (N)	288	-	385629 409822
74	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A13NW (NW)	304	-	385429 409714

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
75	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13NW (NW)	327	-	385422 409731
76	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1932	A8NW (S)	341	-	385560 409118
77	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A13SE (SE)	352	-	385911 409166
78	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1932	A14SW (E)	430	-	386134 409390
79	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A12SE (W)	440	-	385200 409448
80	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A14NW (NE)	447	-	386069 409805
81	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A14NW (NE)	481	-	386145 409752
82	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A8NW (S)	496	-	385567 408954
83	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A14NW (NE)	522	-	386168 409795
84	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1910	A18SE (NE)	524	-	385922 410019
85	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A14NW (E)	585	-	386303 409603
86	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A14NW (NE)	608	-	386287 409750
87	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A14NW (E)	624	-	386341 409609
88	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A18SW (N)	643	-	385519 410160
89	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A14SE (E)	669	-	386358 409301
90	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1932	A18NE (N)	813	-	385834 410347
91	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A19SE (NE)	852	-	386383 410061
92	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1932	A18NE (N)	856	-	385917 410373
93	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A18NE (N)	869	-	386008 410358
94	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1955	A12NW (W)	902	-	384778 409758
95	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1910	A18NE (N)	955	-	385694 410499

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
96	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A8SW (S)	964	-	385354 408530
97	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A17NE (NW)	967	-	385178 410356
98	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A23SW (N)	974	-	385660 410517
99	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1894	A23SE (N)	981	-	385829 410517
100	Registered Waste Transfer Sites Licence Holder: Quickmix Ltd Licence Reference: 00087/77/M2 Site Location: Green Lane, Heywood, Lancashire Operator Location: RMC House, High Street, Feltham, HOUNSLOW, Middlesex, TW13 4HA Authority: Environment Agency - North West Region, South Area Site Category: Transfer Max Input Rate: Very Small (Less than 10,000 tonnes per year) Waste Source: Waste produced/controlled by licence holder Restrictions: Licence Status: Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled Dated: 22nd September 1983 Preceded By: Not Given Licence: Superseded By: Not Given Licence: Positional Accuracy: Approximate location provided by supplier Boundary Quality: Not Supplied Authorised Waste: Concrete Waste	A19SE (NE)	914	2	386501 410001

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Pennine Lower Coal Measures Formation And South Wales Lower Coal Measures Formation (Undifferentiated)	A13NE (SE)	0	1	385686 409490
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic: <15 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A13NE (SE)	0	1	385686 409490
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic: <15 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A13NW (W)	138	1	385500 409490
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic: <15 mg/kg Concentration: Cadmium: 1.8 - 2.2 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A13NE (E)	276	1	386000 409490
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: 1.8 - 2.2 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14SW (SE)	397	1	386030 409223
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic: <15 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A8NE (SE)	537	1	386000 409000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A18NW (N)	719	1	385560 410249

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8SW (S)	748	1	385410 408740
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic 15 - 25 mg/kg Concentration: Cadmium 2.2 - 3.0 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel 15 - 30 mg/kg Concentration:	A14NE (E)	776	1	386500 409500
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic 15 - 25 mg/kg Concentration: Cadmium 2.2 - 3.0 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: 200 - 300 mg/kg Nickel 15 - 30 mg/kg Concentration:	A14NE (E)	776	1	386500 409490
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic <15 mg/kg Concentration: Cadmium 2.2 - 3.0 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: 200 - 300 mg/kg Nickel 15 - 30 mg/kg Concentration:	A14SE (E)	783	1	386500 409412
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel <15 mg/kg Concentration:	A7NW (SW)	815	1	385000 408980
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic <15 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A17SW (NW)	819	1	385000 410000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic 15 - 25 mg/kg Concentration: Cadmium 1.8 - 2.2 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel 15 - 30 mg/kg Concentration:	A19SE (NE)	866	1	386445 410000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic 15 - 25 mg/kg Concentration: Cadmium 2.2 - 3.0 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel 15 - 30 mg/kg Concentration:	A19SE (NE)	912	1	386500 410000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic <15 mg/kg Concentration: Cadmium 2.2 - 3.0 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: 100 - 200 mg/kg Nickel 15 - 30 mg/kg Concentration:	A9NE (SE)	914	1	386500 409000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Rural Soil and Sediment Arsenic 15 - 25 mg/kg Concentration: Cadmium 1.8 - 2.2 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <100 mg/kg Nickel 15 - 30 mg/kg Concentration:	A18NE (N)	956	1	385686 410500
101	BGS Recorded Mineral Sites Site Name: Wicken Bank Farn Gravel Pit Location: Hopwood, Heywood, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96580 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A14SW (E)	409	1	386110 409385
102	BGS Recorded Mineral Sites Site Name: Collop Gate Location: Hopwood, Heywood, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96546 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A14SW (SE)	443	1	386106 409263

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
103	BGS Recorded Mineral Sites Site Name: Pot Hall Sand Pit Location: Heywood, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96534 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A18NW (N)	807	1	385505 410327
104	BGS Recorded Mineral Sites Site Name: Pot Hall Gravel Pit Location: Heywood, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96533 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand and Gravel Positional Accuracy: Located by supplier to within 10m	A17NE (NW)	915	1	385284 410358
105	BGS Recorded Mineral Sites Site Name: Cow Field Location: Hopwood, Heywood, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96547 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Lower Coal Measures Formation Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	A9NE (SE)	947	1	386513 408957
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A13NE (SE)	0	6	385686 409490
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A13NE (SE)	0	-	385686 409490
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	1	385686 409490
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	1	385686 409490
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	1	385686 409490
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	1	385686 409490
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	1	385686 409490

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	176	1	385699 409720
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	1	385686 409490
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (N)	176	1	385699 409720
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	1	385686 409490
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NE (SE)	0	1	385686 409490

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
106	Contemporary Trade Directory Entries Name: Clean Right Ultra Dry Location: 2, Salisbury Avenue, Heywood, Lancashire, OL10 2NZ Classification: Carpet, Curtain & Upholstery Cleaners Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NW (N)	223	-	385590 409736
106	Contemporary Trade Directory Entries Name: Clean Right Location: 2, Salisbury Avenue, Heywood, Lancashire, OL10 2NZ Classification: Commercial Cleaning Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NW (N)	223	-	385590 409736
107	Contemporary Trade Directory Entries Name: Tom Lyons Sales Engineering Ltd Location: 30, Links Road, Heywood, Lancashire, OL10 2BY Classification: Engineers - General Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NE (NE)	242	-	385852 409733
108	Contemporary Trade Directory Entries Name: Coupe & Cabriolet Location: 122, Manchester Road, HEYWOOD, Lancashire, OL10 2NN Classification: Classic Car Specialists Status: Inactive Positional Accuracy: Automatically positioned to the address	A13NE (E)	244	-	385968 409522
109	Contemporary Trade Directory Entries Name: Global Fleet Serve Location: 227, Manchester Road, Heywood, Lancashire, OL10 2NL Classification: Car Dealers Status: Inactive Positional Accuracy: Automatically positioned to the address	A13SE (SE)	299	-	385990 409359
110	Contemporary Trade Directory Entries Name: Pressed 4 You Location: 10, Ashworth Street, Heywood, Lancashire, OL10 2AZ Classification: Ironing & Home Laundry Services Status: Active Positional Accuracy: Automatically positioned to the address	A13NE (NE)	360	-	386004 409748
111	Contemporary Trade Directory Entries Name: Computa Tune Location: 29, Lenten Grove, Heywood, Lancashire, OL10 2LR Classification: Car Engine Tuning & Diagnostic Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A14SW (SE)	399	-	386077 409305
111	Contemporary Trade Directory Entries Name: A 2 B Services Location: 29, Lenten Grove, Heywood, Lancashire, OL10 2LR Classification: Car Engine Tuning & Diagnostic Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A14SW (SE)	399	-	386077 409305
112	Contemporary Trade Directory Entries Name: Heywood Reclaimed Building Materials Location: 102, Newhouse Road, Heywood, Lancashire, OL10 2NU Classification: Reclamation Centres Status: Active Positional Accuracy: Automatically positioned to the address	A18SW (N)	439	-	385572 409963
113	Contemporary Trade Directory Entries Name: Siddall Street Garage Location: Siddall Street, Heywood, Lancashire, OL10 2AS Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A14NW (NE)	515	-	386160 409796
114	Contemporary Trade Directory Entries Name: Lineage Logistics Location: Hareshill Road, HEYWOOD, Lancashire, OL10 2TP Classification: Road Haulage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A8NW (SW)	526	-	385434 408973
114	Contemporary Trade Directory Entries Name: Lineage Location: Hareshill Road, Heywood, Lancashire, OL10 2TP Classification: Distribution Services Status: Active Positional Accuracy: Automatically positioned to the address	A8NW (SW)	526	-	385434 408973

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
114	Contemporary Trade Directory Entries Name: H Yearsley Ltd Location: Hareshill Road, Heywood, Lancashire, OL10 2TP Classification: Frozen Food Processors & Distributors Status: Inactive Positional Accuracy: Automatically positioned to the address	A8NW (SW)	526	-	385434 408973
114	Contemporary Trade Directory Entries Name: Yearsley Location: Hareshill Road, Heywood, Lancashire, OL10 2TP Classification: Distribution Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A8NW (SW)	526	-	385434 408973
115	Contemporary Trade Directory Entries Name: Lindsey Alderson Location: 75, Newhouse Road, Heywood, Lancashire, OL10 2NX Classification: Jewellery Manufacturers & Repairers Status: Inactive Positional Accuracy: Automatically positioned to the address	A18SW (N)	541	-	385485 410040
116	Contemporary Trade Directory Entries Name: Texaco Filling Station Location: Middleton Road, Heywood, Lancashire, OL10 2LU Classification: Petrol Filling Stations Status: Inactive Positional Accuracy: Automatically positioned to the address	A14SW (E)	565	-	386284 409443
116	Contemporary Trade Directory Entries Name: Texaco Location: Middleton Road, Heywood, Lancashire, OL10 2LU Classification: Petrol Filling Stations Status: Active Positional Accuracy: Automatically positioned to the address	A14SW (E)	566	-	386285 409444
116	Contemporary Trade Directory Entries Name: Star Hopwood Service Station Location: Middleton Road, Heywood, Lancashire, OL10 2LU Classification: Petrol Filling Stations - 24 Hour Status: Inactive Positional Accuracy: Automatically positioned to the address	A14SW (E)	566	-	386285 409444
116	Contemporary Trade Directory Entries Name: Co-Op Petrol Location: Middleton Road, Heywood, Lancashire, OL10 2LU Classification: Petrol Filling Stations Status: Active Positional Accuracy: Manually positioned to the address or location	A14SW (E)	569	-	386288 409446
117	Contemporary Trade Directory Entries Name: Crease Lightning Location: 4, Prospect Street, Heywood, Lancashire, OL10 2BB Classification: Ironing & Home Laundry Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A18SE (NE)	577	-	385994 410042
118	Contemporary Trade Directory Entries Name: Varley Smith Emmott Ltd Location: Springfield Works, Lloyd Street, Heywood, Lancashire, OL10 2BP Classification: Printers Status: Inactive Positional Accuracy: Automatically positioned to the address	A18SE (NE)	606	-	385967 410089
118	Contemporary Trade Directory Entries Name: Jola Ltd Location: Springfield Works, Lloyd Street, Heywood, Lancashire, OL10 2BP Classification: Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A18SE (NE)	606	-	385967 410089
118	Contemporary Trade Directory Entries Name: Aquatec Builders (Northwest) Location: Lloyd St, Heywood, Lancashire, OL10 2BP Classification: Fascias and Soffits Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A18SE (NE)	636	-	385976 410118
119	Contemporary Trade Directory Entries Name: A C S Lining Ltd Location: 2, Middleton Road, Heywood, Lancashire, OL10 2HT Classification: Ventilators & Ventilation Systems Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SW (NE)	625	-	386249 409860

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
120	Contemporary Trade Directory Entries Name: Abx Logistics (Uk) Ltd Location: Unit B10, Heywood Distribution Park, Middleton Rd, Heywood, Lancashire, OL10 2LU Classification: Freight Forwarders Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A14SW (E)	637	-	386340 409358
121	Contemporary Trade Directory Entries Name: Absolutley Steamin Location: 19, Middleton Road, Heywood, Lancashire, OL10 2HU Classification: Ironing & Home Laundry Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A14NW (NE)	642	-	386308 409787
121	Contemporary Trade Directory Entries Name: Westwood Horse Boxes Location: 3, Charles Street, Heywood, Lancashire, OL10 2HR Classification: Horse Boxes & Transporting Status: Inactive Positional Accuracy: Automatically positioned to the address	A14NW (NE)	684	-	386348 409800
122	Contemporary Trade Directory Entries Name: Aquarius Washers Location: 26, Walton Street, Heywood, Lancashire, OL10 2BS Classification: Washing Machines - Servicing & Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SW (NE)	645	-	386030 410100
122	Contemporary Trade Directory Entries Name: Gasfix Location: Heywood, Lancashire, OL10 2bs Classification: Boilers - Servicing, Replacements & Repairs Status: Active Positional Accuracy: Manually positioned within the geographical locality	A19SW (NE)	647	-	386060 410083
122	Contemporary Trade Directory Entries Name: Sealtight Roofing Location: 40, Vigo Street, Heywood, Lancashire, OL10 2BT Classification: Fascias and Soffits Status: Inactive Positional Accuracy: Automatically positioned to the address	A18SE (NE)	659	-	386011 410126
123	Contemporary Trade Directory Entries Name: Armourclad Coatings Location: 70, Manchester Road, Heywood, Lancashire, OL10 2AW Classification: Spraying - Paint & Coatings Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SW (NE)	647	-	386168 409993
124	Contemporary Trade Directory Entries Name: Antalis Ltd Location: 5, Broadfield Distribution Centre, Heywood, OL10 2TU Classification: Packaging Materials Manufacturers & Suppliers Status: Active Positional Accuracy: Automatically positioned to the address	A17SE (NW)	666	-	385116 409900
125	Contemporary Trade Directory Entries Name: J C Location: Higher Broadfield Farm, Pilsworth Road, Heywood, OL10 2TA Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A17SE (NW)	712	-	385033 409862
126	Contemporary Trade Directory Entries Name: Alphatech Print & Data Services Ltd Location: Unit 4 Block A, Axis Point, Hill Top Road, Heywood, OL10 2RQ Classification: Printers Status: Active Positional Accuracy: Automatically positioned to the address	A12NW (W)	727	-	384949 409716
126	Contemporary Trade Directory Entries Name: Bindmont Print Services Location: Unit 4 Block A, Axis Point, Hill Top Road, Heywood, Lancashire, OL10 2RQ Classification: Printers Status: Active Positional Accuracy: Automatically positioned to the address	A12NW (W)	728	-	384950 409722

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
126	Contemporary Trade Directory Entries Name: Controlled Air Solutions Ltd Location: Unit 6 Block A, Axis Point, Hill Top Road, Heywood, Lancashire, OL10 2RQ Classification: Air Conditioning & Refrigeration Contractors Status: Active Positional Accuracy: Automatically positioned to the address	A12NW (W)	751	-	384927 409729
126	Contemporary Trade Directory Entries Name: Rms Eleitrical Services Location: Unit 8 Block A, Axis Point, Hill Top Road, Heywood, Lancashire, OL10 2RQ Classification: Electrical Engineers Status: Inactive Positional Accuracy: Automatically positioned to the address	A12NW (W)	775	-	384905 409736
127	Contemporary Trade Directory Entries Name: Yearsley Food Location: Hareshill Road, Heywood, OL10 2TP Classification: Frozen Food Processors & Distributors Status: Inactive Positional Accuracy: Automatically positioned to the address	A12SW (W)	733	-	384915 409367
128	Contemporary Trade Directory Entries Name: Arnold'S Location: Unit B, Gregge Street, Heywood, Lancashire, OL10 2ED Classification: Garage Services Status: Active Positional Accuracy: Automatically positioned to the address	A19SW (NE)	752	-	386296 410008
128	Contemporary Trade Directory Entries Name: R E M Services Location: Unit 1, Gregge Street Works, Gregge Street, Heywood, OL10 2EJ Classification: Mechanical Handling Equipment Status: Active Positional Accuracy: Automatically positioned to the address	A19SW (NE)	792	-	386335 410024
128	Contemporary Trade Directory Entries Name: R E M Services Location: Unit 1, Gregge Street Works, Gregge Street, Heywood, Lancashire, OL10 2ED Classification: Electrical Engineers Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SW (NE)	793	-	386338 410022
129	Contemporary Trade Directory Entries Name: York Street Washing Machines Ltd Location: 19, Nelson Street, Heywood, Lancashire, OL10 1BN Classification: Washing Machines - Servicing & Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A18NE (N)	765	-	385722 410309
129	Contemporary Trade Directory Entries Name: York Street Washing Machines Location: 19, Nelson Street, Heywood, Lancashire, OL10 1BN Classification: Washing Machines - Servicing & Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A18NE (N)	765	-	385722 410309
129	Contemporary Trade Directory Entries Name: A & E Electrical (Manchester) Ltd Location: 62-64, King Street, Heywood, Lancashire, OL10 1BW Classification: Electric Motor Sales & Service Status: Inactive Positional Accuracy: Automatically positioned to the address	A18NE (N)	786	-	385766 410328
130	Contemporary Trade Directory Entries Name: Commercial Catering Spares Ltd Location: Unit 2-4 Block C, Axis Point, Hill Top Road, Heywood, OL10 2RQ Classification: Catering Equipment Status: Active Positional Accuracy: Automatically positioned to the address	A12NW (W)	779	-	384880 409665
130	Contemporary Trade Directory Entries Name: Tuthill Vacuum & Blower Systems Location: Pennine Business Park, Pilsworth Road, Heywood, Lancashire, OL10 2TL Classification: Pumps - Sales, Servicing & Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A12NW (W)	806	-	384855 409673

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
131	Contemporary Trade Directory Entries Name: Servicecal Ltd Location: Unit 9 Block A, Axis Point, Hill Top Road, Heywood, OL10 2RQ Classification: Testing, Inspection & Calibration Equipment Manufacturers Status: Active Positional Accuracy: Automatically positioned to the address	A12NW (W)	786	-	384891 409733
132	Contemporary Trade Directory Entries Name: Harris Hart & Co Ltd Location: Gregge Street Works, Gregge Street, HEYWOOD, Lancashire, OL10 2EJ Classification: Chemicals & Allied Products Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SW (NE)	791	-	386297 410066
133	Contemporary Trade Directory Entries Name: Inter Count Truck & Van Location: Unit 7, Broadfield Distribution Park, Pilsworth Road, Heywood, OL10 2TA Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A17SE (NW)	794	-	385108 410078
134	Contemporary Trade Directory Entries Name: Hutson & Amro Print Ltd Location: Unit 5, Cowburn Street, Heywood, OL10 2AJ Classification: Printers Status: Active Positional Accuracy: Automatically positioned to the address	A18NE (N)	813	-	386015 410294
134	Contemporary Trade Directory Entries Name: Bamford Print Ltd Location: Unit 5, Cowburn Street, Heywood, Lancashire, OL10 2AJ Classification: Printers Status: Active Positional Accuracy: Automatically positioned to the address	A18NE (N)	813	-	386015 410294
134	Contemporary Trade Directory Entries Name: Hillside Bodyshop Location: Unit 1-2, Cowburn Street, Heywood, Lancashire, OL10 2AJ Classification: Car Body Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	843	-	386060 410308
134	Contemporary Trade Directory Entries Name: L C Motor Engineers Location: Unit 1, Cowburn Street, Heywood, Lancashire, OL10 2AJ Classification: Tyre Dealers Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	843	-	386060 410308
134	Contemporary Trade Directory Entries Name: D A Fitton Location: Cowburn Street, Heywood, Lancashire, OL10 2AJ Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	843	-	386060 410308
135	Contemporary Trade Directory Entries Name: Collins Bros Heywood Ltd Location: Twin Mill, Gregge Street, Heywood, Lancashire, OL10 2ED Classification: Textile Manufacturing Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	820	-	386229 410172
135	Contemporary Trade Directory Entries Name: Gibson Hire Location: Twin Mill, Gregge Street, Heywood, OL10 2ED Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	827	-	386225 410185
135	Contemporary Trade Directory Entries Name: Jack Gibson & Sons Location: Twin Mill, Gregge Street, Heywood, Lancashire, OL10 2ED Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	827	-	386225 410185
136	Contemporary Trade Directory Entries Name: Fence & Gate Design Location: Unit 3, Hall Street, Heywood, Lancashire, OL10 1DP Classification: Fencing Manufacturers Status: Active Positional Accuracy: Automatically positioned to the address	A18NE (N)	824	-	385998 410313

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
136	Contemporary Trade Directory Entries Name: M D Recovery Uk Location: Unit 3, Hall Street, Heywood, Lancashire, OL10 1DP Classification: Car Breakdown & Recovery Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A18NE (N)	824	-	385998 410313
136	Contemporary Trade Directory Entries Name: A B Cylinder Head Services Location: Unit 1, Hall Street, Heywood, OL10 1DP Classification: Engine Rebuilding & Reconditioning Status: Active Positional Accuracy: Automatically positioned to the address	A18NE (N)	825	-	386006 410310
136	Contemporary Trade Directory Entries Name: Busy Bins Location: UNIT 4, COWBURN STREET, HEYWOOD, OL10 2AJ Classification: Waste Disposal Services Status: Active Positional Accuracy: Automatically positioned to the address	A18NE (N)	825	-	386006 410310
136	Contemporary Trade Directory Entries Name: M D Autos Location: Unit 3, Hall Street, Heywood, OL10 1DP Classification: Garage Services Status: Active Positional Accuracy: Automatically positioned to the address	A18NE (N)	825	-	386006 410310
137	Contemporary Trade Directory Entries Name: Expert Logistics Location: 908, Pilsworth Road, Heywood, Lancashire, OL10 2TA Classification: Distribution Services Status: Inactive Positional Accuracy: Automatically positioned in the proximity of the address	A17SW (NW)	825	-	384918 409889
138	Contemporary Trade Directory Entries Name: R & B Switchgear Services Ltd Location: Switchgear House The Courtyard, Green Lane, Heywood, Lancashire, OL10 2EX Classification: Marine Engineering Equipment Manufacturers Status: Active Positional Accuracy: Manually positioned within the geographical locality	A19SE (NE)	829	-	386404 409995
138	Contemporary Trade Directory Entries Name: Viewsafe Location: The Courtyard, Green Lane, Heywood, Lancashire, OL10 2EX Classification: Electrical Engineers Status: Inactive Positional Accuracy: Manually positioned to the address or location	A19SE (NE)	830	-	386405 409995
138	Contemporary Trade Directory Entries Name: Oozla Leisure Wear Ltd Location: The Courtyard, Green La, Heywood, Lancashire, OL10 2EX Classification: Clothing & Fabrics - Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	834	-	386410 409995
139	Contemporary Trade Directory Entries Name: Diana Cowpe Ltd Location: Unit 2, Gregge Street Works, Gregge Street, Heywood, OL10 2ED Classification: Textile Manufacturing Status: Active Positional Accuracy: Automatically positioned to the address	A19SW (NE)	835	-	386350 410073
140	Contemporary Trade Directory Entries Name: Biwater Machinery Location: Gregge Street, Heywood, Lancashire, OL10 2DX Classification: Cable & Wire Equipment Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SW (NE)	839	-	386280 410152
141	Contemporary Trade Directory Entries Name: Got 1 Location: 25, Lock Close, Heywood, Lancashire, OL10 2JS Classification: Car Breakdown & Recovery Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A14NE (E)	844	-	386523 409793

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
142	Contemporary Trade Directory Entries Name: Trust Distribution Location: Phoenix Park Industrial Estate, Park Street, Heywood, Lancashire, OL10 2AB Classification: Telecommunications Equipment & Systems Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	847	-	386495 409871
143	Contemporary Trade Directory Entries Name: Squeaky Kleen Location: 60, Tangmere Avenue, Heywood, Lancashire, OL10 2WA Classification: Cleaning Services - Domestic Status: Inactive Positional Accuracy: Automatically positioned to the address	A14SE (E)	854	-	386509 409163
144	Contemporary Trade Directory Entries Name: Green Lane Auto Engineers Location: Unit 6, Hall Street, Heywood, OL10 1DP Classification: Garage Services Status: Active Positional Accuracy: Automatically positioned to the address	A19NW (N)	858	-	386033 410336
144	Contemporary Trade Directory Entries Name: John Lloyds Ltd Location: Longford House, Hall Street, Heywood, Lancashire, OL10 1DP Classification: Asphalt & Coated Macadam Laying Contractors Status: Inactive Positional Accuracy: Automatically positioned to the address	A18NE (N)	863	-	385990 410357
144	Contemporary Trade Directory Entries Name: Clifton Precision Engineering (Heywood) Ltd Location: Hall Street, Heywood, Lancashire, OL10 1DP Classification: Engineers - General Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (N)	879	-	386026 410361
145	Contemporary Trade Directory Entries Name: Chris Hayter Transport Ltd Location: PILSWORTH ROAD, HEYWOOD, OL10 2TA Classification: Road Haulage Services Status: Active Positional Accuracy: Automatically positioned to the address	A17SW (NW)	859	-	384974 410031
146	Contemporary Trade Directory Entries Name: Nwasfleetcare Location: Quay St, Heywood, Lancashire, OL10 2JH Classification: Garage Services Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A19NW (NE)	872	-	386163 410284
146	Contemporary Trade Directory Entries Name: Heywood Auto Tints Location: Quay st, Heywood, Lancashire, OL10 2JH Classification: Window Tinting Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A19NW (NE)	873	-	386173 410279
146	Contemporary Trade Directory Entries Name: Spanners Garage Location: Quay Street, Heywood, Lancashire, OL10 2JH Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	873	-	386173 410279
146	Contemporary Trade Directory Entries Name: Clough Road M.O.T Centre (Heywood) Quay Street Location: Quay St, Heywood, Lancashire, OL10 2JH Classification: Tyre Dealers Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A19NW (NE)	873	-	386173 410279
147	Contemporary Trade Directory Entries Name: Riley & Son E Ltd Location: PREMIER LOCOMOTIVE WORKS, SEFTON STREET, HEYWOOD, OL10 2JF Classification: Engineers - General Status: Active Positional Accuracy: Automatically positioned to the address	A19SW (NE)	885	-	386351 410146

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
147	Contemporary Trade Directory Entries Name: Inspired Lighting Location: Sefton Street, Heywood, OL10 2JF Classification: Lighting Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SW (NE)	885	-	386351 410146
147	Contemporary Trade Directory Entries Name: Riley & Son Electromec Ltd Location: Premier Locomotive Works, Sefton Street, Heywood, Lancashire, OL10 2JF Classification: Mechanical Engineers Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A19NW (NE)	894	-	386327 410183
148	Contemporary Trade Directory Entries Name: Bobst Manchester Location: Unit 1, Pennine Business Park, Pilsworth Road, HEYWOOD, Lancashire, OL10 2TL Classification: Packaging & Wrapping Equipment & Supplies Status: Active Positional Accuracy: Automatically positioned to the address	A12NW (W)	895	-	384785 409757
148	Contemporary Trade Directory Entries Name: General Vacuum Equipment Ltd Location: Unit 1, Pennine Business Park, Pilsworth Road, Heywood, Lancashire, OL10 2TL Classification: Engineers - General Status: Inactive Positional Accuracy: Automatically positioned to the address	A12NW (W)	895	-	384785 409757
149	Contemporary Trade Directory Entries Name: Key Stone Distribution Uk Location: Hareshill Road, Heywood, Lancashire, OL10 2TN Classification: Distribution Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A12NW (W)	895	-	384749 409588
150	Contemporary Trade Directory Entries Name: Syntema (North West) Ltd Location: Unit 3, Lemon Park Industrial Estate, Green Lane, Heywood, Lancashire, OL10 2EW Classification: Coating Specialists Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	897	-	386498 409974
150	Contemporary Trade Directory Entries Name: Avanti Blue Ltd Location: Unit 1-3, Lemon Park Industrial Estate, Green Lane, Heywood, Lancashire, OL10 2EW Classification: Plastics - Extrusion Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	928	-	386525 409989
151	Contemporary Trade Directory Entries Name: V O M Location: Lane End Farm, Lane End, Heywood, OL10 2JE Classification: Oils - Edible Status: Inactive Positional Accuracy: Automatically positioned to the address	A14NE (E)	910	-	386634 409539
152	Contemporary Trade Directory Entries Name: Townhead Chrome Specialist Metal Finishing Location: Unit 506, Phoenix Park Industrial Estate, Phoenix Close, Heywood, Lancashire, OL10 2JG Classification: Metal Finishing Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	910	-	386552 409897
152	Contemporary Trade Directory Entries Name: Manes Control Ltd Location: Unit 504, Phoenix Park Industrial Estate, Phoenix Close, Heywood, OL10 2JG Classification: Control Panels Status: Active Positional Accuracy: Automatically positioned to the address	A19SE (NE)	930	-	386581 409881
153	Contemporary Trade Directory Entries Name: Tyrone Brick Ltd Location: Sefton Street, Heywood, Lancashire, OL10 2JZ Classification: Brick Manufacturers Status: Inactive Positional Accuracy: Automatically positioned in the proximity of the address	A19NW (NE)	926	-	386321 410233

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
154	Contemporary Trade Directory Entries Name: Bettersparkle Ltd Location: 15, Excelsior Gardens, Heywood, Lancashire, OL10 2RJ Classification: Cleaning Services - Domestic Status: Inactive Positional Accuracy: Automatically positioned to the address	A14NE (E)	928	-	386613 409789
155	Contemporary Trade Directory Entries Name: Tamicare Location: Unit 4 Broadfield Business Park, Heywood, Lancashire, OL10 2TA Classification: Printers Textile Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A17SW (NW)	928	-	384882 410025
156	Contemporary Trade Directory Entries Name: Pentagon Location: Green Lane, Heywood, Lancashire, OL10 2EP Classification: Car Body Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	933	-	386480 410067
156	Contemporary Trade Directory Entries Name: Howard Basford Ltd Location: Green La, Heywood, Lancashire, OL10 2EP Classification: Car Body Repairs Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A19SE (NE)	935	-	386466 410090
156	Contemporary Trade Directory Entries Name: Howard Basford Ltd Location: Green La, Heywood, Lancashire, OL10 2EP Classification: Car Body Repairs Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A19SE (NE)	935	-	386466 410090
156	Contemporary Trade Directory Entries Name: Korina Roba Ltd Ta Phoenix Fires Location: Phoenix Brewery, Green Lane, Heywood, Lancashire, OL10 2EP Classification: Fireplaces & Mantelpieces Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	961	-	386508 410076
156	Contemporary Trade Directory Entries Name: Phoenix Fires Location: Green Lane, Heywood, OL10 2EP Classification: Fireplaces & Mantelpieces Status: Active Positional Accuracy: Automatically positioned to the address	A19SE (NE)	961	-	386508 410076
156	Contemporary Trade Directory Entries Name: Hogdoc Motorcycles Location: Green Lane, Heywood, OL10 2EP Classification: Garage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	961	-	386508 410076
157	Contemporary Trade Directory Entries Name: U Value Insulations Location: Unit 3 Broadfield Business Park, Pilsworth Road, Heywood, Lancashire, OL10 2TA Classification: Builders' Merchants Status: Active Positional Accuracy: Manually positioned within the geographical locality	A12NW (W)	946	-	384755 409826
157	Contemporary Trade Directory Entries Name: Metro Sofa Location: Heywood, Lancashire, OL10 2ta Classification: Seating Manufacturers Status: Active Positional Accuracy: Manually positioned within the geographical locality	A17SW (W)	947	-	384757 409834
157	Contemporary Trade Directory Entries Name: P & H Contract Services Location: Pilsworth Road, Heywood, Lancashire, OL10 2TA Classification: Distribution Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A17SW (W)	947	-	384757 409834

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
158	Contemporary Trade Directory Entries Name: Trench Industrial Services Ltd Location: 16, Brayshaw Close, HEYWOOD, Lancashire, OL10 3EE Classification: Plant & Machinery Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A17NE (NW)	952	-	385010 410202
159	Contemporary Trade Directory Entries Name: Gould Design & Manufacture Ltd Location: Sefton Street, Heywood, Lancashire, OL10 2JF Classification: Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	964	-	386297 410303
159	Contemporary Trade Directory Entries Name: Barrett'S Haulage Ltd Location: Sefton Street, Heywood, Lancashire, OL10 2JF Classification: Road Haulage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	964	-	386297 410303
159	Contemporary Trade Directory Entries Name: Fastserv Location: The Old Goods Yard, Sefton Street, Heywood, Lancashire, OL10 2JF Classification: Road Haulage Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	964	-	386297 410303
159	Contemporary Trade Directory Entries Name: Joe Sharp Freight Location: Sefton Street, Heywood, Lancashire, OL10 2JF Classification: Freight Forwarders Status: Active Positional Accuracy: Automatically positioned to the address	A19NW (NE)	964	-	386297 410303
160	Contemporary Trade Directory Entries Name: Keystone Distribution Location: Hareshill Rd, Heywood, Lancashire, OL10 2TN Classification: Distribution Services Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A11NE (W)	973	-	384667 409538
161	Contemporary Trade Directory Entries Name: Industrial Latex Compounds Ltd Location: Burns Mill, Manchester Street, Heywood, Lancashire, OL10 1DN Classification: Foam Products - Rubber & Plastics Status: Inactive Positional Accuracy: Automatically positioned to the address	A18NE (N)	975	-	385954 410486
161	Contemporary Trade Directory Entries Name: Industrial Latex Compounds Location: Burns Mill, Manchester Street, Heywood, Lancashire, OL10 1DN Classification: Manufacturers Status: Inactive Positional Accuracy: Automatically positioned to the address	A18NE (N)	975	-	385954 410486
162	Contemporary Trade Directory Entries Name: Cars4people (Mcr) Ltd Location: 123, Manchester Street, Heywood, Lancashire, OL10 1NL Classification: Mot Testing Centres Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	977	-	386084 410444
162	Contemporary Trade Directory Entries Name: Norden Car Sales Location: 123, Manchester Street, Heywood, Lancashire, OL10 1NL Classification: Car Dealers - Used Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	977	-	386084 410444
163	Contemporary Trade Directory Entries Name: T D G Location: Pilsworth Rd, Heywood, Lancashire, OL10 2TA Classification: Distribution Services Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A17SW (NW)	986	-	384816 410030
164	Contemporary Trade Directory Entries Name: K E Engineering Uk Ltd Location: 5 Broadfield, Seymour St, Heywood, Lancashire, OL10 3AJ Classification: Engineers - General Status: Inactive Positional Accuracy: Manually positioned to the road within the address or location	A17NE (NW)	986	-	385220 410404

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
165	Contemporary Trade Directory Entries Name: Mydent Ltd Location: Unit 406, Phoenix Park Industrial Estate, Phoenix Close, Heywood, OL10 2JG Classification: Car Body Repairs Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	990	-	386621 409941
165	Contemporary Trade Directory Entries Name: Leesononia (UK) Location: Unit 309, Phoenix Park Industrial Estate, Phoenix Close, Heywood, Lancashire, OL10 2JG Classification: Machinery - Industrial & Commercial Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	991	-	386592 409997
165	Contemporary Trade Directory Entries Name: Sound Solutions (Europe) Ltd Location: Unit 309, Phoenix Park Industrial Estate, Phoenix Close, Heywood, Lancashire, OL10 2JG Classification: Distribution Services Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	991	-	386592 409997
165	Contemporary Trade Directory Entries Name: Bamford Horse Boxes Ltd Location: Unit 309, Phoenix Park Industrial Estate, Phoenix Close, Heywood, Lancashire, OL10 2JG Classification: Horse Boxes & Transporting Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	991	-	386592 409997
165	Contemporary Trade Directory Entries Name: P I Technical Services Ltd Location: Unit 310, Phoenix Park Industrial Estate, Phoenix Close, Heywood, Lancashire, OL10 2JG Classification: Electrical Engineers Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	999	-	386607 409988
165	Contemporary Trade Directory Entries Name: Baldwin Technical Services Ltd Location: Unit 310, Phoenix Park Industrial Estate, Phoenix Close, Heywood, Lancashire, OL10 2JG Classification: Electrical Engineers Status: Active Positional Accuracy: Automatically positioned to the address	A19SE (NE)	999	-	386607 409988
166	Contemporary Trade Directory Entries Name: Dalton Properties Location: The Old Mission, Hardfield Street, Heywood, Lancashire, OL10 1DG Classification: Damp & Dry Rot Control Status: Active Positional Accuracy: Manually positioned within the geographical locality	A23SE (N)	994	-	385816 410532
167	Contemporary Trade Directory Entries Name: Juts Discount Tyre Bay Ltd Location: Juts Tyre Bay, Russell Street, Heywood, OL10 1NX Classification: Tyre Dealers Status: Active Positional Accuracy: Automatically positioned to the address	A19NW (NE)	996	-	386139 410439
167	Contemporary Trade Directory Entries Name: H & B Commercial Services Location: H and B Commercial Services, Russell Street, Heywood, OL10 1NX Classification: Commercial Vehicle Servicing, Repairs, Parts & Accessories Status: Inactive Positional Accuracy: Automatically positioned to the address	A19NW (NE)	996	-	386139 410439
168	Contemporary Trade Directory Entries Name: Koco Cleaning Services Location: 11, Cleves Court, Heywood, Lancashire, OL10 3AR Classification: Commercial Cleaning Services Status: Active Positional Accuracy: Automatically positioned to the address	A17NE (NW)	1000	-	385085 410331
169	Contemporary Trade Directory Entries Name: Phoenix Fires Ltd Location: Green Lane, Heywood, Lancashire, OL10 2EP Classification: Fireplaces & Mantelpieces Status: Inactive Positional Accuracy: Automatically positioned to the address	A19SE (NE)	1000	-	386565 410062

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
170	Fuel Station Entries Name: Co-Op Hopwood Location: Middleton Road Coronation Avenue, , Heywood, Greater Manchester, OL10 2LU Brand: TEXACO Premises Type: Petrol Station Status: Open Positional Accuracy: Automatically positioned to the address	A14SW (E)	566	-	386285 409444
171	Fuel Station Entries Name: Heywood Service Station Location: Manchester Street , , Heywood, Greater Manchester, OL10 1NL Brand: Unbranded Premises Type: Not Applicable Status: Obsolete Positional Accuracy: Automatically positioned to the address	A19NW (NE)	977	-	386084 410443
172	Points of Interest - Commercial Services Name: Coupe & Cabriolet Location: Letchworth 122, Manchester Road, Heywood, OL10 2NN Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A13NE (E)	244	7	385968 409522
173	Points of Interest - Commercial Services Name: Green Flag Location: 29 Lenten Grove, Heywood, OL10 2LR Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A14SW (SE)	399	7	386077 409305
174	Points of Interest - Commercial Services Name: Siddall Street Garage Location: Siddall Street, Heywood, OL10 2AS Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A14NW (NE)	514	7	386159 409795
174	Points of Interest - Commercial Services Name: Siddall Street Garage Location: Siddall Street, Heywood, OL10 2AS Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A14NW (NE)	515	7	386160 409796
175	Points of Interest - Commercial Services Name: Lineage Logistics Location: Harehill Road, Heywood, OL10 2TP Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A8NW (SW)	526	7	385434 408973
175	Points of Interest - Commercial Services Name: Lineage Location: 24 Harehill Road, Heywood, OL10 2TD Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A8NW (SW)	526	7	385434 408973
175	Points of Interest - Commercial Services Name: Yearsley Location: Harehill Road, Heywood, OL10 2TP Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A8NW (SW)	526	7	385434 408973
176	Points of Interest - Commercial Services Name: Co-Op Hopwood Location: Middleton Road, Heywood, OL10 2LU Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A14SW (E)	566	7	386285 409444
176	Points of Interest - Commercial Services Name: Car Wash Location: Middleton Road, Coronation Avenue, Heywood, Lancashire, OL10 2LU Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A14SW (E)	566	7	386285 409444

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
177	Points of Interest - Commercial Services Name: Arnold's Location: Unit B, Gregge Street, Heywood, OL10 2ED Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19SW (NE)	751	7	386296 410007
178	Points of Interest - Commercial Services Name: J C Location: Higher Broadfield Farm, Pilsworth Road, Heywood, OL10 2TA Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A17SW (NW)	764	7	384985 409882
179	Points of Interest - Commercial Services Name: Expert Logistics Location: Broadfield Centre, Pilsworth Road, Heywood, OL10 2TA Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A17SE (NW)	793	7	385103 410071
179	Points of Interest - Commercial Services Name: Inter Count Truck & Van Location: Unit 7 Broadfield Distribution Park, Pilsworth Road, Heywood, OL10 2TA Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A17SE (NW)	794	7	385108 410078
180	Points of Interest - Commercial Services Name: U Value Insulation Ltd Location: Unit 3, Pilsworth Road, Heywood, OL10 2TA Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A17SW (NW)	802	7	384962 409918
180	Points of Interest - Commercial Services Name: U Value Insulation Ltd Location: Unit 3 Broadfield Business Park, Pilsworth Road, Heywood, OL10 2TA Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A17SW (NW)	805	7	384960 409920
180	Points of Interest - Commercial Services Name: P & H Contract Services Location: 1 Broadfield Distribution Centre, Heywood, OL10 2TU Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A17SW (NW)	880	7	384885 409940
181	Points of Interest - Commercial Services Name: The Valet Location: 34 Lock Close, Heywood, OL10 2JS Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A14NE (E)	803	7	386495 409746
181	Points of Interest - Commercial Services Name: The Valet Location: 34 Lock Close, Heywood, OL10 2JS Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A14NE (E)	803	7	386495 409746
182	Points of Interest - Commercial Services Name: A B Cylinder Head Services Location: Unit 1, Hall Street, Heywood, OL10 1DP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A18NE (N)	824	7	386006 410310
182	Points of Interest - Commercial Services Name: M D Autos Location: Unit 3, Hall Street, Heywood, OL10 1DP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A18NE (N)	824	7	386006 410310
182	Points of Interest - Commercial Services Name: Hillside Bodyshop Location: Units 1 and 2, Cowburn Street, Heywood, OL10 2AJ Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19NW (NE)	844	7	386060 410308

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
182	Points of Interest - Commercial Services Name: Green Lane Auto Engineers Location: Green Lane Auto Engineers, Hall Street, Heywood, OL10 1DP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19NW (N)	858	7	386033 410336
182	Points of Interest - Commercial Services Name: Greenlane Auto Engineers Location: Hall Street, Heywood, OL10 1DP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19NW (N)	861	7	386036 410338
182	Points of Interest - Commercial Services Name: L & G Auto Electrics Location: Unit 2, Hall Street, Heywood, OL10 1DP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19NW (N)	887	7	386038 410365
183	Points of Interest - Commercial Services Name: Gibson Hire Location: Twin Mill, Gregge Street, Heywood, OL10 2ED Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19NW (NE)	826	7	386224 410184
183	Points of Interest - Commercial Services Name: Jack Gibson & Sons Location: Twin Mill, Gregge Street, Heywood, OL10 2ED Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19NW (NE)	827	7	386225 410185
183	Points of Interest - Commercial Services Name: Express Valet Valeting Location: 2 Gregge Street, Heywood, OL10 2ED Category: Personal, Consumer and other Services Class Code: Vehicle Cleaning Services Positional Accuracy: Positioned to address or location	A19NW (NE)	831	7	386193 410214
184	Points of Interest - Commercial Services Name: Mydent Ltd Location: Unit 406 Phoenix Park Industrial Estate, Phoenix Close, Heywood, OL10 2JG Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19SE (NE)	847	7	386473 409916
185	Points of Interest - Commercial Services Name: Chris Hayter Transport Ltd Location: Unit 8 Broadfield Distribution Park, Pilsworth Road, Heywood, OL10 2TA Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A17SW (NW)	859	7	384974 410031
186	Points of Interest - Commercial Services Name: Joe Sharp Freight Location: Sefton Street, Heywood, OL10 2JF Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A19SW (NE)	885	7	386350 410146
187	Points of Interest - Commercial Services Name: Martin Brower UK Location: Golden West Foods Ltd, Hareshill Road, Heywood, OL10 2TN Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A12NW (W)	895	7	384749 409587
188	Points of Interest - Commercial Services Name: Coolfreight Ltd Location: 11 Brayshaw Close, Heywood, OL10 3EE Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A17NE (NW)	914	7	385036 410174
189	Points of Interest - Commercial Services Name: O P S Environmental Services Ltd Location: 151 Green Lane, Heywood, OL10 2EW Category: Recycling Services Class Code: Recycling, Reclamation and Disposal Positional Accuracy: Positioned to address or location	A19SE (NE)	915	7	386471 410049

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
189	Points of Interest - Commercial Services Name: Pentagon Location: Green Lane, Heywood, OL10 2EP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19SE (NE)	933	7	386480 410067
189	Points of Interest - Commercial Services Name: Pentagon Location: Green Lane, Heywood, OL10 2EP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19SE (NE)	933	7	386480 410067
189	Points of Interest - Commercial Services Name: Hogdoc Motorcycles Location: Unit 2 Phoenix Brewery, Green Lane, Heywood, OL10 2EP Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19SE (NE)	961	7	386508 410076
190	Points of Interest - Commercial Services Name: P & H Contract Services Location: Pillsworth Road, Heywood, OL10 2TA Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A17SW (W)	947	7	384757 409834
191	Points of Interest - Commercial Services Name: Precision Components & Equipment Ltd Location: Railway Street, Heywood, OL10 1LX Category: Construction Services Class Code: Metalworkers Including Blacksmiths Positional Accuracy: Positioned to address or location	A19NW (NE)	951	7	386150 410383
191	Points of Interest - Commercial Services Name: Precision Components & Equipment Ltd Location: Railway Street, Heywood, OL10 1LX Category: Construction Services Class Code: Metalworkers Including Blacksmiths Positional Accuracy: Positioned to address or location	A19NW (NE)	951	7	386150 410383
191	Points of Interest - Commercial Services Name: Bradson Automotive Location: Russell Street, Heywood, OL10 1NX Category: Repair and Servicing Class Code: Vehicle Repair, Testing and Servicing Positional Accuracy: Positioned to address or location	A19NW (NE)	995	7	386137 410439
192	Points of Interest - Commercial Services Name: Barrett's Haulage Ltd Location: Sefton Street, Heywood, OL10 2JF Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A19NW (NE)	964	7	386297 410303
192	Points of Interest - Commercial Services Name: Fastserv Location: The Old Goods Yard, Sefton Street, Heywood, OL10 2JF Category: Transport, Storage and Delivery Class Code: Distribution and Haulage Positional Accuracy: Positioned to address or location	A19NW (NE)	964	7	386297 410303
193	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A13SW (S)	268	7	385579 409189
194	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A14NW (NE)	581	7	386265 409733
194	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A14NW (NE)	582	7	386265 409734

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
195	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A18SE (NE)	613	7	385967 410097
195	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A18SE (NE)	616	7	385969 410099
196	Points of Interest - Manufacturing and Production Name: Factory Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A12NE (NW)	663	7	385042 409776
197	Points of Interest - Manufacturing and Production Name: Tanks Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A14SE (E)	700	7	386396 409325
197	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A14SE (E)	709	7	386405 409322
197	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A14SE (E)	715	7	386410 409320
198	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A17SE (NW)	714	7	385256 410102
198	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A17SE (NW)	721	7	385252 410107
199	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A17SE (NW)	734	7	385028 409895
200	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SW (NE)	751	7	386287 410017
200	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SW (NE)	754	7	386292 410017
200	Points of Interest - Manufacturing and Production Name: Gregge Street Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SW (NE)	779	7	386309 410035

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
200	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A19SW (NE)	790	7	386327 410031
200	Points of Interest - Manufacturing and Production Name: Tanks Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A19SW (NE)	790	7	386327 410031
200	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SW (NE)	825	7	386329 410082
201	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A17SE (NW)	791	7	385037 410001
202	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	834	7	386254 410169
202	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	842	7	386249 410184
203	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	843	7	386045 410314
203	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	843	7	386045 410314
203	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	849	7	386067 410311
203	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	849	7	386067 410311
203	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	850	7	386038 410325
203	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	850	7	386038 410325

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
203	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A18NE (N)	866	7	386004 410356
203	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to address or location	A19NW (N)	882	7	386030 410363
203	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (N)	885	7	386027 410367
204	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	870	7	386172 410276
204	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	870	7	386172 410276
205	Points of Interest - Manufacturing and Production Name: Hareshill Business Park Location: OL10 Category: Industrial Features Class Code: Business Parks and Industrial Estates Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	879	7	384761 409543
206	Points of Interest - Manufacturing and Production Name: Lemonpark Industrial Estate Location: OL10 Category: Industrial Features Class Code: Business Parks and Industrial Estates Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	885	7	386483 409976
206	Points of Interest - Manufacturing and Production Name: Lemonpark Industrial Estate Location: OL10 Category: Industrial Features Class Code: Business Parks and Industrial Estates Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	914	7	386515 409978
206	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	934	7	386488 410057
206	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	934	7	386488 410057
206	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	937	7	386520 410014
206	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	937	7	386520 410014

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
206	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	959	7	386494 410092
206	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	959	7	386494 410092
206	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	980	7	386531 410077
206	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	985	7	386536 410078
207	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SW (NE)	887	7	386337 410163
207	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19SW (NE)	888	7	386337 410164
207	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A19NW (NE)	939	7	386313 410257
207	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A19NE (NE)	948	7	386377 410209
208	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A14NE (E)	896	7	386573 409806
209	Points of Interest - Manufacturing and Production Name: Phoenix Park Industrial Estate Location: OL10 Category: Industrial Features Class Code: Business Parks and Industrial Estates Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	920	7	386536 409954
209	Points of Interest - Manufacturing and Production Name: Phoenix Park Industrial Estate Location: OL10 Category: Industrial Features Class Code: Business Parks and Industrial Estates Positional Accuracy: Positioned to an adjacent address or location	A19SE (NE)	936	7	386552 409957
210	Points of Interest - Manufacturing and Production Name: Pennine Business Park Location: OL10 Category: Industrial Features Class Code: Business Parks and Industrial Estates Positional Accuracy: Positioned to an adjacent address or location	A12NW (W)	924	7	384745 409724

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
211	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A18NE (N)	936	7	386010 410428
211	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	975	7	386108 410430
211	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	975	7	386108 410430
211	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (N)	995	7	386062 410472
211	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (N)	995	7	386062 410472
212	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	947	7	386154 410376
212	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	947	7	386154 410376
212	Points of Interest - Manufacturing and Production Name: Works Location: OL10 Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	993	7	386180 410414
212	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A19NW (NE)	996	7	386185 410415
213	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A11NE (W)	987	7	384662 409634
213	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A11NE (W)	988	7	384662 409638
213	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A11NE (W)	988	7	384661 409630

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
213	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A11NE (W)	988	7	384660 409627
213	Points of Interest - Manufacturing and Production Name: Tank Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to address or location	A11NE (W)	988	7	384663 409642
213	Points of Interest - Manufacturing and Production Name: Tanks Location: OL10 Category: Industrial Features Class Code: Tanks (Generic) Positional Accuracy: Positioned to an adjacent address or location	A11NE (W)	991	7	384661 409648
214	Points of Interest - Manufacturing and Production Name: Works Location: Not Supplied Category: Industrial Features Class Code: Unspecified Works Or Factories Positional Accuracy: Positioned to an adjacent address or location	A23SE (N)	993	7	385940 410508
215	Points of Interest - Public Infrastructure Name: Clayton Cunningham Travel Ltd Location: 9 Sunningdale Drive, Heywood, OL10 2DB Category: Public Transport, Stations and Infrastructure Class Code: Bus and Coach Stations, Depots and Companies Positional Accuracy: Positioned to address or location	A13NE (N)	209	7	385746 409748
216	Points of Interest - Public Infrastructure Name: Sewage Works Location: OL10 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to address or location	A13SW (SW)	420	7	385346 409184
216	Points of Interest - Public Infrastructure Name: Sewage Works Location: OL10 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A12SE (SW)	448	7	385324 409167
217	Points of Interest - Public Infrastructure Name: Texaco Location: Middleton Road, Heywood, OL10 2LU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A14SW (E)	566	7	386285 409444
217	Points of Interest - Public Infrastructure Name: Somerfield Hopwood 3475-1 Location: Middleton Road, Heywood, OL10 2LU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A14SW (E)	566	7	386285 409444
217	Points of Interest - Public Infrastructure Name: Co-Op Hopwood Location: Middleton Road, Coronation Avenue, Heywood, OL10 2LU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A14SW (E)	566	7	386285 409444
217	Points of Interest - Public Infrastructure Name: Star Heywood Location: Middleton Road, Heywood, Lancashire, OL10 2LU Category: Road And Rail Class Code: Petrol and Fuel Stations Positional Accuracy: Positioned to address or location	A14SW (E)	584	7	386302 409440
218	Points of Interest - Public Infrastructure Name: Fire Station Location: Fire Station 129, Middleton Road, Heywood, OL10 2LU Category: Central and Local Government Class Code: Fire Brigade Stations Positional Accuracy: Positioned to address or location	A14SE (E)	680	7	386372 409310

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
218	Points of Interest - Public Infrastructure Name: Heywood Fire Station Location: Fire Station 129, Middleton Road, Heywood, OL10 2LU Category: Central and Local Government Class Code: Fire Brigade Stations Positional Accuracy: Positioned to address or location	A14SE (E)	680	7	386372 409310
218	Points of Interest - Public Infrastructure Name: Heywood Fire Station Location: Middleton Road, Heywood, OL10 2LU Category: Central and Local Government Class Code: Fire Brigade Stations Positional Accuracy: Positioned to address or location	A14SE (E)	681	7	386371 409302
219	Points of Interest - Public Infrastructure Name: Busy Bins Location: Unit 4, Cowburn Street, Heywood, OL10 2AJ Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to address or location	A18NE (N)	824	7	386006 410310
220	Points of Interest - Public Infrastructure Name: Sewage Pumping Station Location: OL10 Category: Infrastructure and Facilities Class Code: Waste Storage, Processing and Disposal Positional Accuracy: Positioned to an adjacent address or location	A9SE (SE)	963	7	386395 408781
221	Points of Interest - Recreational and Environmental Name: Play Area Location: OL10 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A14NW (E)	472	7	386192 409583
221	Points of Interest - Recreational and Environmental Name: Playground Location: Not Supplied Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A14NW (E)	491	7	386215 409535
221	Points of Interest - Recreational and Environmental Name: Playground Location: Coronation Avenue, OL10 Category: Recreational Class Code: Playgrounds Positional Accuracy: Positioned to an adjacent address or location	A14NW (E)	491	7	386215 409536

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
222	Areas of Adopted Green Belt Authority: Rochdale Metropolitan Borough Council Plan Name: Rochdale Unitary Development Plan Status: Adopted Plan Date: 30th June 2006	A13SE (SE)	291	9	385889 409228

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices Environment Agency - Head Office Manchester City Council - Environmental Health Department Oldham Metropolitan Borough Council - Environmental Health Department Rossendale Borough Council - Environmental Health Department Rochdale Metropolitan Borough Council - Environmental Health Department Bury Metropolitan Borough Council - Environmental Health Department	June 2020 October 2017 October 2017 October 2017 October 2017 September 2017	Annually Annual Rolling Update Annual Rolling Update Annual Rolling Update Annually Annual Rolling Update
Discharge Consents Environment Agency - North West Region	April 2022	Quarterly
Enforcement and Prohibition Notices Environment Agency - North West Region	March 2013	
Integrated Pollution Controls Environment Agency - North West Region	January 2009	
Integrated Pollution Prevention And Control Environment Agency - North West Region	April 2022	Quarterly
Local Authority Integrated Pollution Prevention And Control Bury Metropolitan Borough Council - Environmental Health Department Rochdale Metropolitan Borough Council - Environmental Health Department Oldham Metropolitan Borough Council - Environmental Health Department Rossendale Borough Council - Environmental Health Department Manchester City Council - Environmental Health Department	February 2015 July 2014 March 2015 May 2016 September 2014	Variable Variable Variable Variable Variable
Local Authority Pollution Prevention and Controls Bury Metropolitan Borough Council - Environmental Health Department Rochdale Metropolitan Borough Council - Environmental Health Department Oldham Metropolitan Borough Council - Environmental Health Department Rossendale Borough Council - Environmental Health Department Manchester City Council - Environmental Health Department	February 2015 July 2014 March 2015 May 2016 September 2014	Not Applicable Annual Rolling Update Annual Rolling Update Annual Rolling Update Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements Bury Metropolitan Borough Council - Environmental Health Department Rochdale Metropolitan Borough Council - Environmental Health Department Oldham Metropolitan Borough Council - Environmental Health Department Rossendale Borough Council - Environmental Health Department Manchester City Council - Environmental Health Department	February 2015 July 2014 March 2015 May 2016 September 2014	Variable Variable Variable Variable Variable
Nearest Surface Water Feature Ordnance Survey	May 2022	
Pollution Incidents to Controlled Waters Environment Agency - North West Region	January 2000	
Prosecutions Relating to Authorised Processes Environment Agency - North West Region	July 2015	
Prosecutions Relating to Controlled Waters Environment Agency - North West Region	March 2013	
Registered Radioactive Substances Environment Agency - North West Region	June 2016	As notified
River Quality Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points Environment Agency - Head Office	April 2012	
River Quality Chemistry Sampling Points Environment Agency - Head Office	April 2012	
Substantiated Pollution Incident Register Environment Agency - North West Region - Central Area Environment Agency - North West Region - North Area Environment Agency - North West Region - South Area	April 2022 April 2022 April 2022	Quarterly Quarterly Quarterly

Agency & Hydrological	Version	Update Cycle
Water Abstractions Environment Agency - North West Region	July 2022	Quarterly
Water Industry Act Referrals Environment Agency - North West Region	October 2017	
Groundwater Vulnerability Map Environment Agency - Head Office	June 2018	As notified
Bedrock Aquifer Designations Environment Agency - Head Office	January 2018	Annually
Superficial Aquifer Designations Environment Agency - Head Office	January 2018	Annually
Source Protection Zones Environment Agency - Head Office	May 2021	Bi-Annually
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2022	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2022	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	May 2022	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	May 2022	Quarterly
Flood Defences Environment Agency - Head Office	May 2022	Quarterly
OS Water Network Lines Ordnance Survey	April 2022	Quarterly
Surface Water 1 in 30 year Flood Extent Environment Agency - Head Office	May 2018	Annually
Surface Water 1 in 100 year Flood Extent Environment Agency - Head Office	May 2018	Annually
Surface Water 1 in 1000 year Flood Extent Environment Agency - Head Office	May 2018	Annually
Surface Water Suitability Environment Agency - Head Office	February 2016	Annually
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	As notified

Waste	Version	Update Cycle
BGS Recorded Landfill Sites British Geological Survey - National Geoscience Information Service	November 2002	As notified
Historical Landfill Sites Environment Agency - Head Office	April 2022	Quarterly
Integrated Pollution Control Registered Waste Sites Environment Agency - North West Region	January 2009	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries) Environment Agency - North West Region - Central Area Environment Agency - North West Region - North Area Environment Agency - North West Region - South Area	April 2022 April 2022 April 2022	Quarterly Quarterly Quarterly
Licensed Waste Management Facilities (Locations) Environment Agency - North West Region - Central Area Environment Agency - North West Region - North Area Environment Agency - North West Region - South Area	April 2022 April 2022 April 2022	Quarterly Quarterly Quarterly
Local Authority Landfill Coverage Bury Metropolitan Borough Council Lancashire County Council - Waste Management Group Manchester City Council - Planning Department Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council - Environmental Health Department Rossendale Borough Council - Environmental Health Department	February 2003 February 2003 February 2003 February 2003 February 2003 February 2003	Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable Not Applicable
Local Authority Recorded Landfill Sites Bury Metropolitan Borough Council Lancashire County Council - Waste Management Group Manchester City Council - Planning Department Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council - Environmental Health Department Rossendale Borough Council - Environmental Health Department	October 2018 October 2018 October 2018 October 2018 October 2018 October 2018	
Potentially Infilled Land (Non-Water) Landmark Information Group Limited	December 1999	Not Applicable
Potentially Infilled Land (Water) Landmark Information Group Limited	December 1999	
Registered Landfill Sites Environment Agency - North West Region - Central Area Environment Agency - North West Region - North Area Environment Agency - North West Region - South Area	March 2006 March 2006 March 2006	Not Applicable Not Applicable Not Applicable
Registered Waste Transfer Sites Environment Agency - North West Region - Central Area Environment Agency - North West Region - North Area Environment Agency - North West Region - South Area	April 2018 April 2018 April 2018	
Registered Waste Treatment or Disposal Sites Environment Agency - North West Region - Central Area Environment Agency - North West Region - North Area Environment Agency - North West Region - South Area	June 2015 June 2015 June 2015	

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH) Health and Safety Executive	January 2022	Bi-Annually
Explosive Sites Health and Safety Executive	March 2017	Annually
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	August 2001	
Planning Hazardous Substance Enforcements Bury Metropolitan Borough Council Lancashire County Council Manchester City Council - Planning Department Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council Rossendale Borough Council - Planning Department	February 2016 February 2016 February 2016 February 2016 February 2016 February 2016	Variable Variable Variable Variable Variable Variable
Planning Hazardous Substance Consents Bury Metropolitan Borough Council Lancashire County Council Manchester City Council - Planning Department Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council Rossendale Borough Council - Planning Department	February 2016 February 2016 February 2016 February 2016 February 2016 February 2016	Variable Variable Variable Variable Variable Variable

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	As notified
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	December 2015	As notified
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	May 2022	Bi-Annually
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB) Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011 November 2020	As notified
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	Annual Rolling Update
Mining Instability Ove Arup & Partners	June 1998	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	April 2020	As notified
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	Annually
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	Annually

Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	April 2022	Quarterly
Fuel Station Entries Catalist Ltd - Experian	June 2022	Quarterly
Gas Pipelines National Grid	October 2021	Bi-Annually
Points of Interest - Commercial Services PointX	June 2022	Quarterly
Points of Interest - Education and Health PointX	June 2022	Quarterly
Points of Interest - Manufacturing and Production PointX	June 2022	Quarterly
Points of Interest - Public Infrastructure PointX	June 2022	Quarterly
Points of Interest - Recreational and Environmental PointX	June 2022	Quarterly
Underground Electrical Cables National Grid	May 2021	Bi-Annually

Sensitive Land Use	Version	Update Cycle
Ancient Woodland Natural England	February 2021	Bi-Annually
Areas of Adopted Green Belt Bury Metropolitan Borough Council Manchester City Council Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council Rossendale Borough Council - Planning Department	October 2020 October 2020 October 2020 October 2020 October 2020	Quarterly Quarterly Quarterly Quarterly Quarterly
Areas of Unadopted Green Belt Bury Metropolitan Borough Council Manchester City Council Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council Rossendale Borough Council - Planning Department	October 2020 October 2020 October 2020 October 2020 October 2020	Quarterly Quarterly Quarterly Quarterly Quarterly
Areas of Outstanding Natural Beauty Natural England	January 2021	Bi-Annually
Environmentally Sensitive Areas Natural England	January 2017	
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	February 2021	Bi-Annually
Marine Nature Reserves Natural England	July 2019	Bi-Annually
National Nature Reserves Natural England	January 2021	Bi-Annually
National Parks Natural England	February 2018	Bi-Annually
Nitrate Sensitive Areas Natural England	April 2016	Not Applicable
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA) Environment Agency - Head Office	April 2016 June 2017	Bi-Annually
Ramsar Sites Natural England	August 2020	Bi-Annually
Sites of Special Scientific Interest Natural England	February 2021	Bi-Annually
Special Areas of Conservation Natural England	July 2020	Bi-Annually
Special Protection Areas Natural England	February 2021	Bi-Annually

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	 British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
Centre for Ecology and Hydrology	 Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Stantec UK Ltd	

Contact	Name and Address	Contact Details
1	British Geological Survey - Enquiry Service British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	Environment Agency - National Customer Contact Centre (NCCC) PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	Rochdale Metropolitan Borough Council - Environmental Health Department P O Box 32, Telegraph House, Ballie Street, Rochdale, Greater Manchester, OL16 1JH	Telephone: 01706 864139 Fax: 01706 864185 Website: www.rochdale.gov.uk
4	Environment Agency - Head Office Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
5	Ordnance Survey Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 03456 05 05 05 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
6	The Coal Authority - Property Searches 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0345 762 6848 Fax: 01623 637 338 Email: groundstability@coal.gov.uk Website: www2.groundstability.com
7	PointX 7 Abbey Court, Eagle Way, Sowton, Exeter, Devon, EX2 7HY	Website: www.pointx.co.uk
8	Natural England County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
9	Rochdale Metropolitan Borough Council PO Box 15, Town Hall, Rochdale, Greater Manchester, OL16 1AB	Telephone: 01706 647474 Fax: 01706 59475 Website: www.rochdale.gov.uk
10	Bury Metropolitan Borough Council Craig House, Bank Street, Bury, Lancashire, BL9 0DN	Telephone: 0161 253 5000 Fax: 0161 705 5290 Website: www.bury.gov.uk
-	Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.



Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice

Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment

A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant

A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:



Envirocheck reports are compiled from 136 different sources of data.

Client Details

Mr M Holroyd, Curtins Consulting Ltd, Beetham Court, 51-55 Tithebarn Street, Liverpool, L2 2SB

Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385680, 409490
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

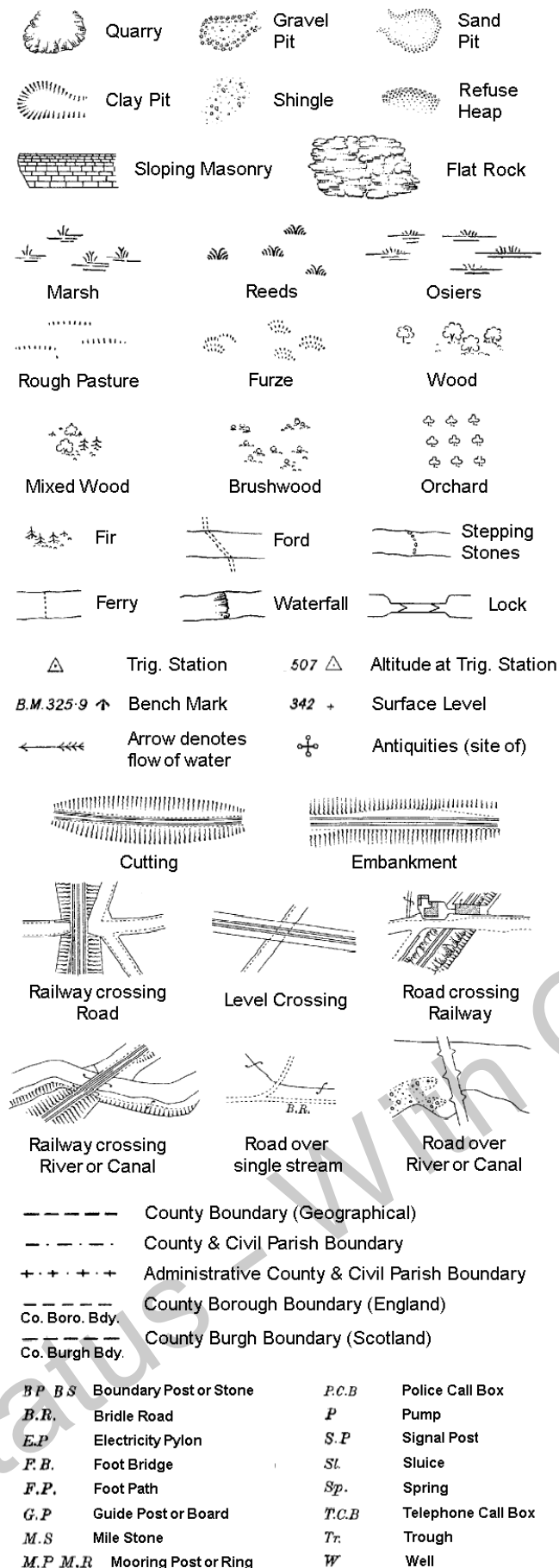
Full Terms and Conditions can be found on the following link:
<http://www.landmarkinfo.co.uk/Terms/Show/515>



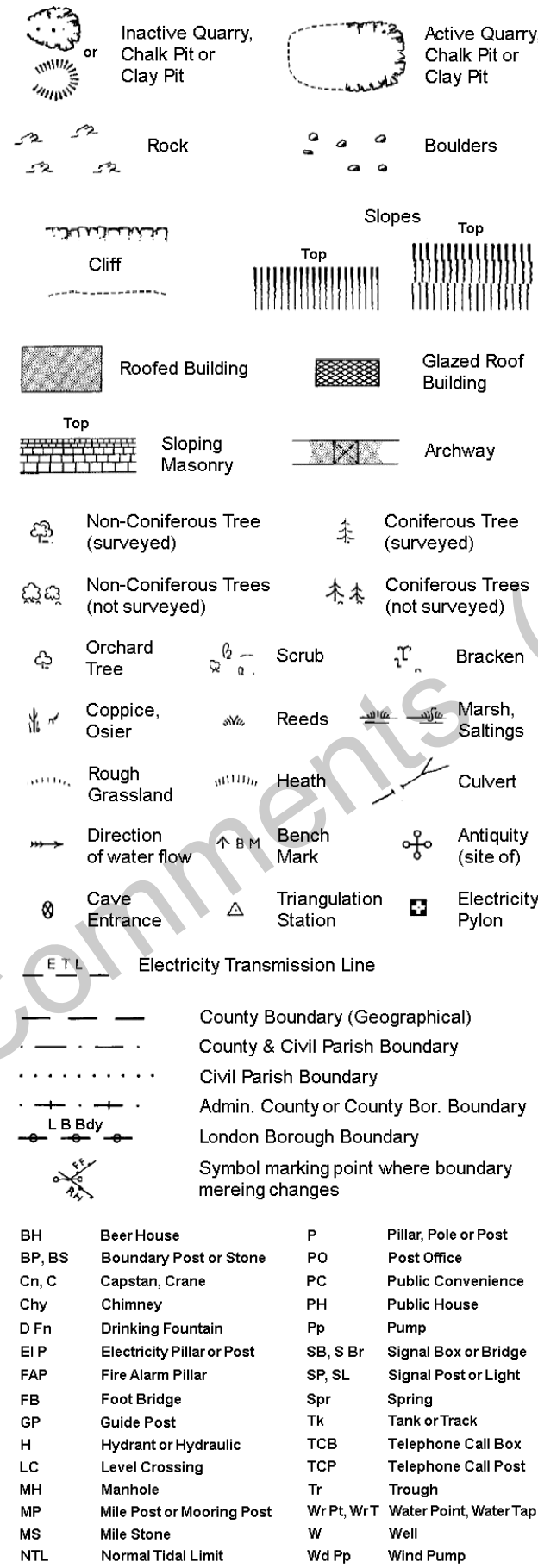
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Historical Mapping Legends

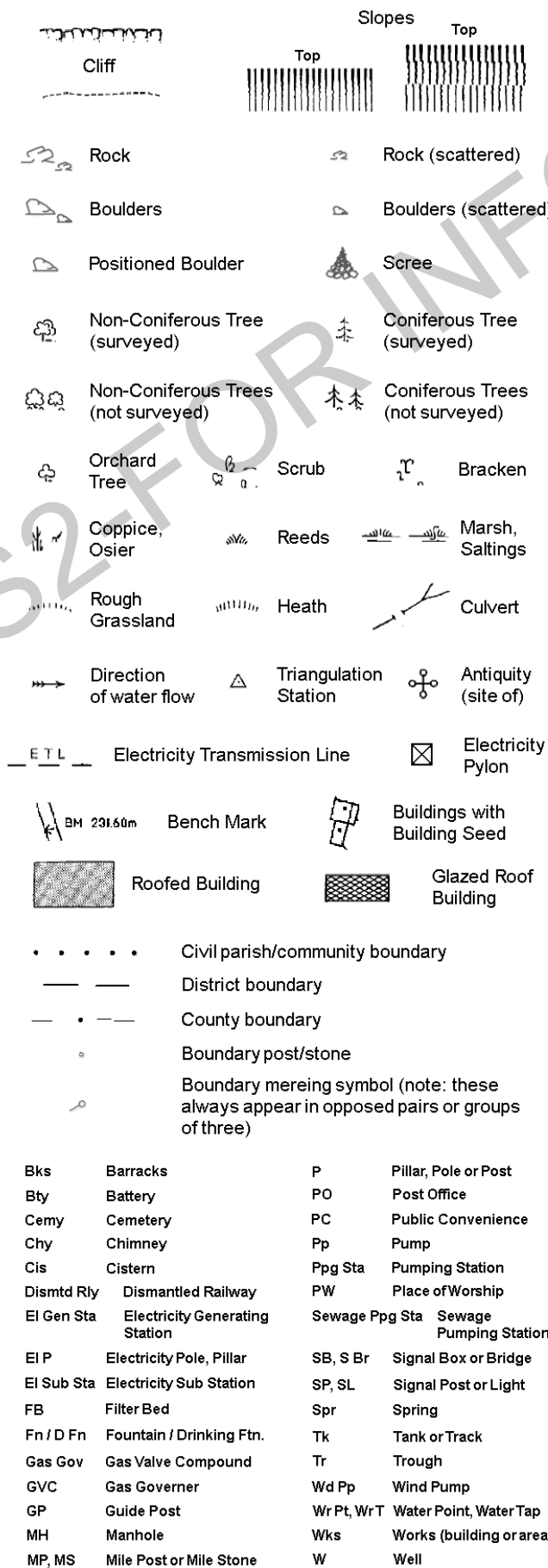
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



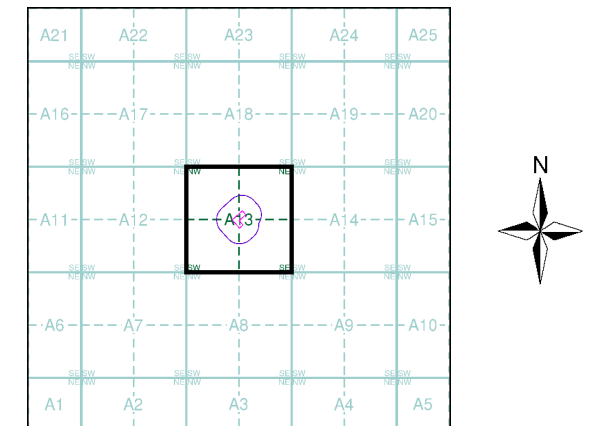
Large-Scale National Grid Data 1:2,500 and 1:1,250



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lancashire And Furness	1:2,500	1893	2
Lancashire And Furness	1:2,500	1910	3
Lancashire And Furness	1:2,500	1929	4
Lancashire And Furness	1:2,500	1937	5
Ordnance Survey Plan	1:1,250	1956	6
Ordnance Survey Plan	1:2,500	1957	7
Ordnance Survey Plan	1:1,250	1965 - 1978	8
Ordnance Survey Plan	1:2,500	1969	9
Ordnance Survey Plan	1:1,250	1970 - 1986	10
Additional SIMs	1:1,250	1972 - 1990	11
Supply of Unpublished Survey Information	1:1,250	1974 - 1975	12
Additional SIMs	1:1,250	1977 - 1986	13
Additional SIMs	1:1,250	1984	14
Large-Scale National Grid Data	1:1,250	1992	15
Large-Scale National Grid Data	1:1,250	1993 - 1994	16
Large-Scale National Grid Data	1:1,250	1996	17
Historical Aerial Photography	1:2,500	2000	18

Historical Map - Segment A13



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT



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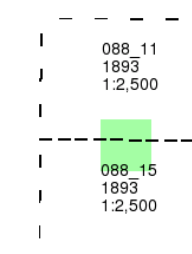
Lancashire And Furness

Published 1893

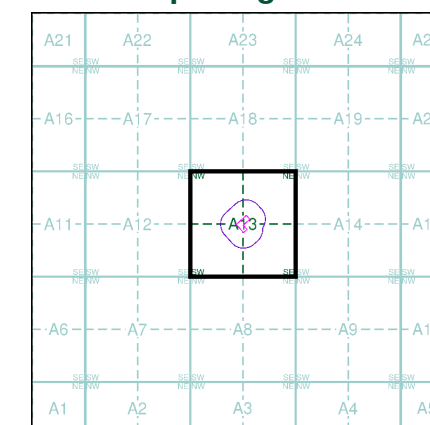
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

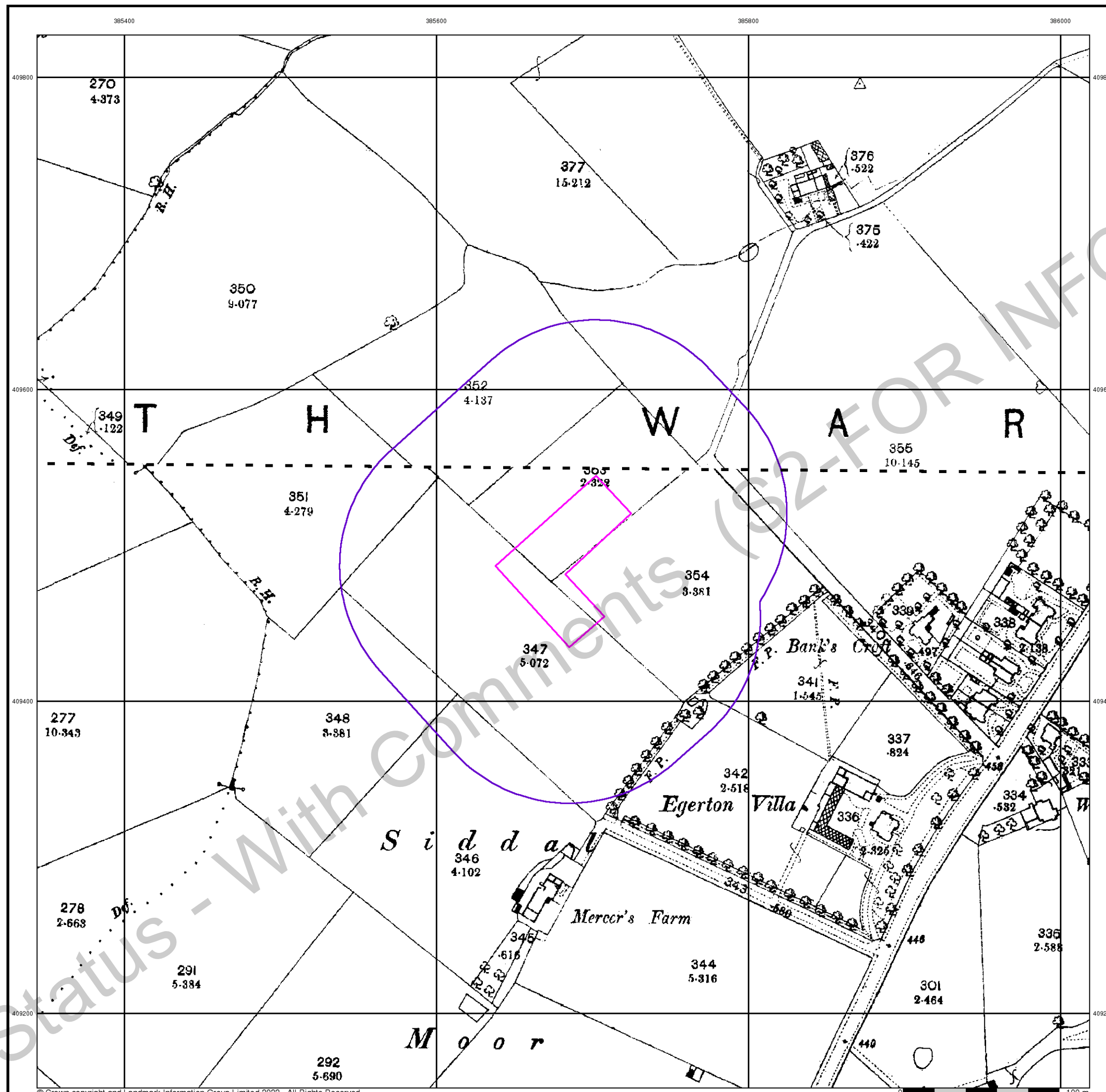
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

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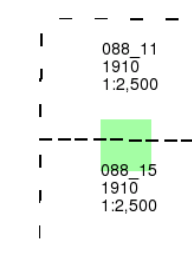
Lancashire And Furness

Published 1910

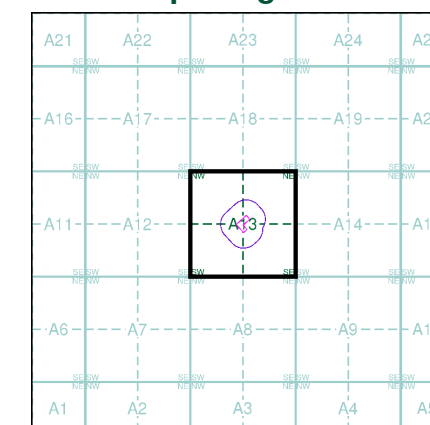
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

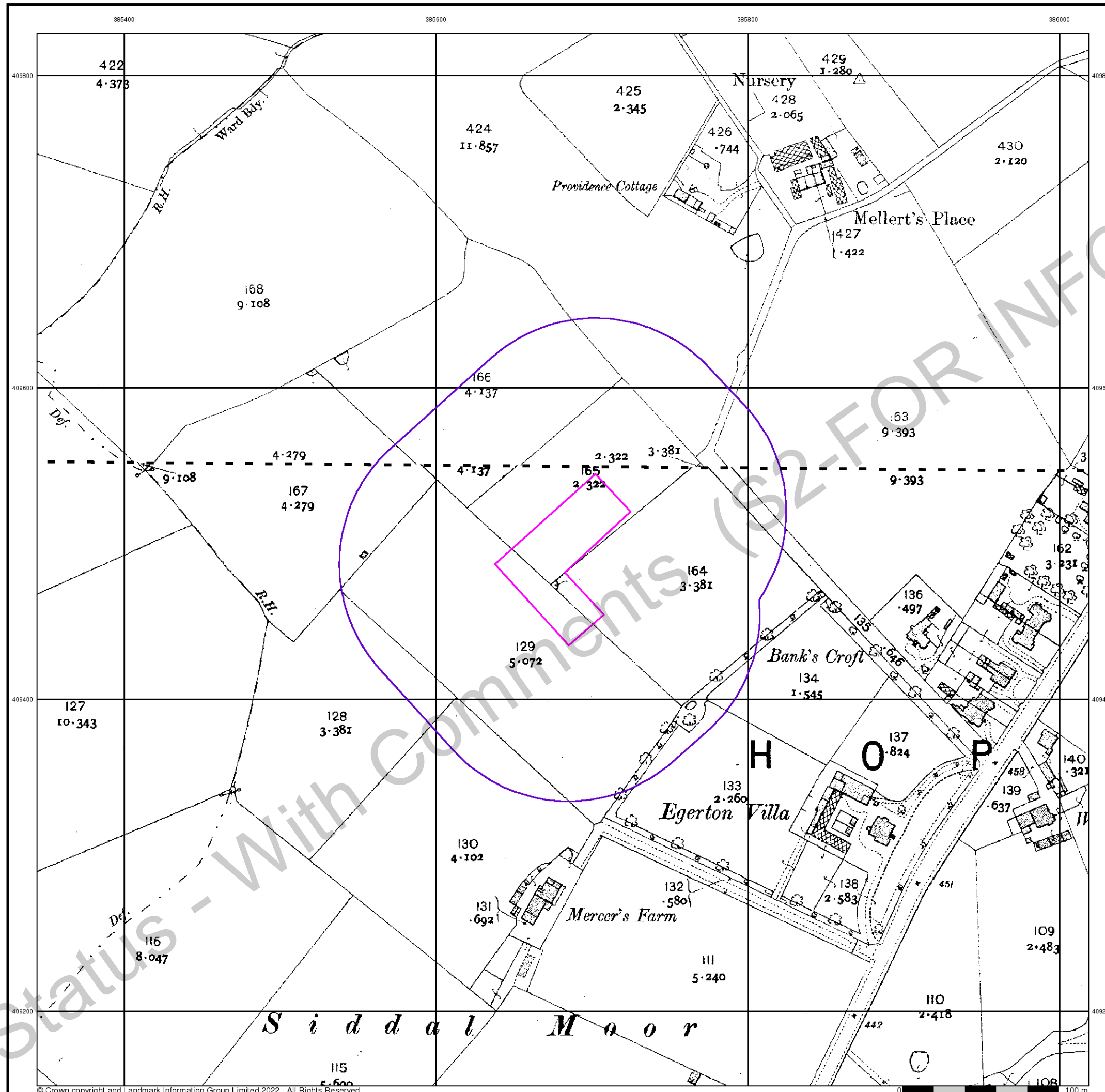
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

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Lancashire And Furness

Published 1929

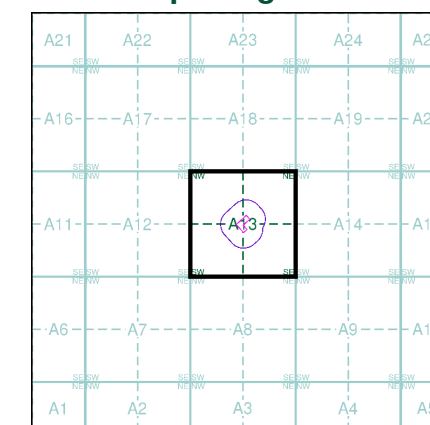
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

088-11
1929
1:2,500
088-15
1929
1:2,500

Historical Map - Segment A13



Order Details

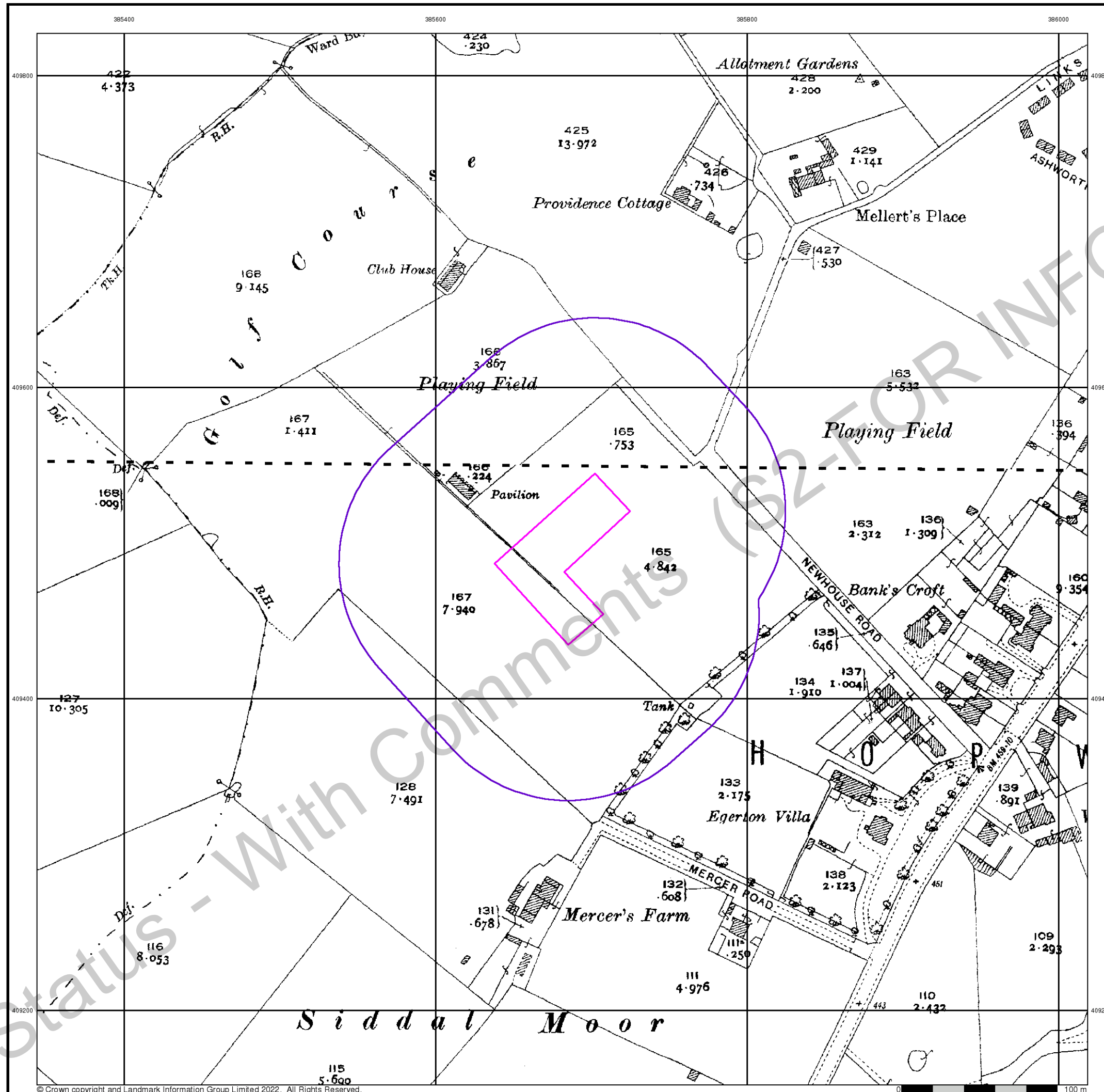
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

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Lancashire And Furness

Published 1937

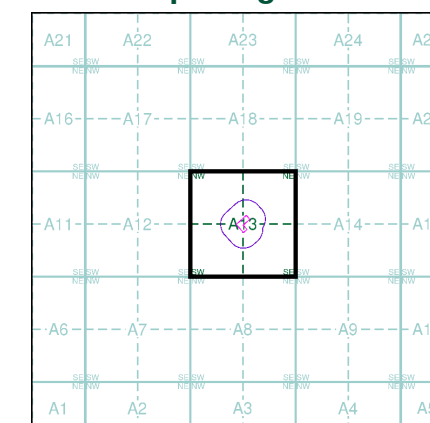
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

088_11
1937
1:2,500
088_15
1937
1:2,500

Historical Map - Segment A13



Order Details

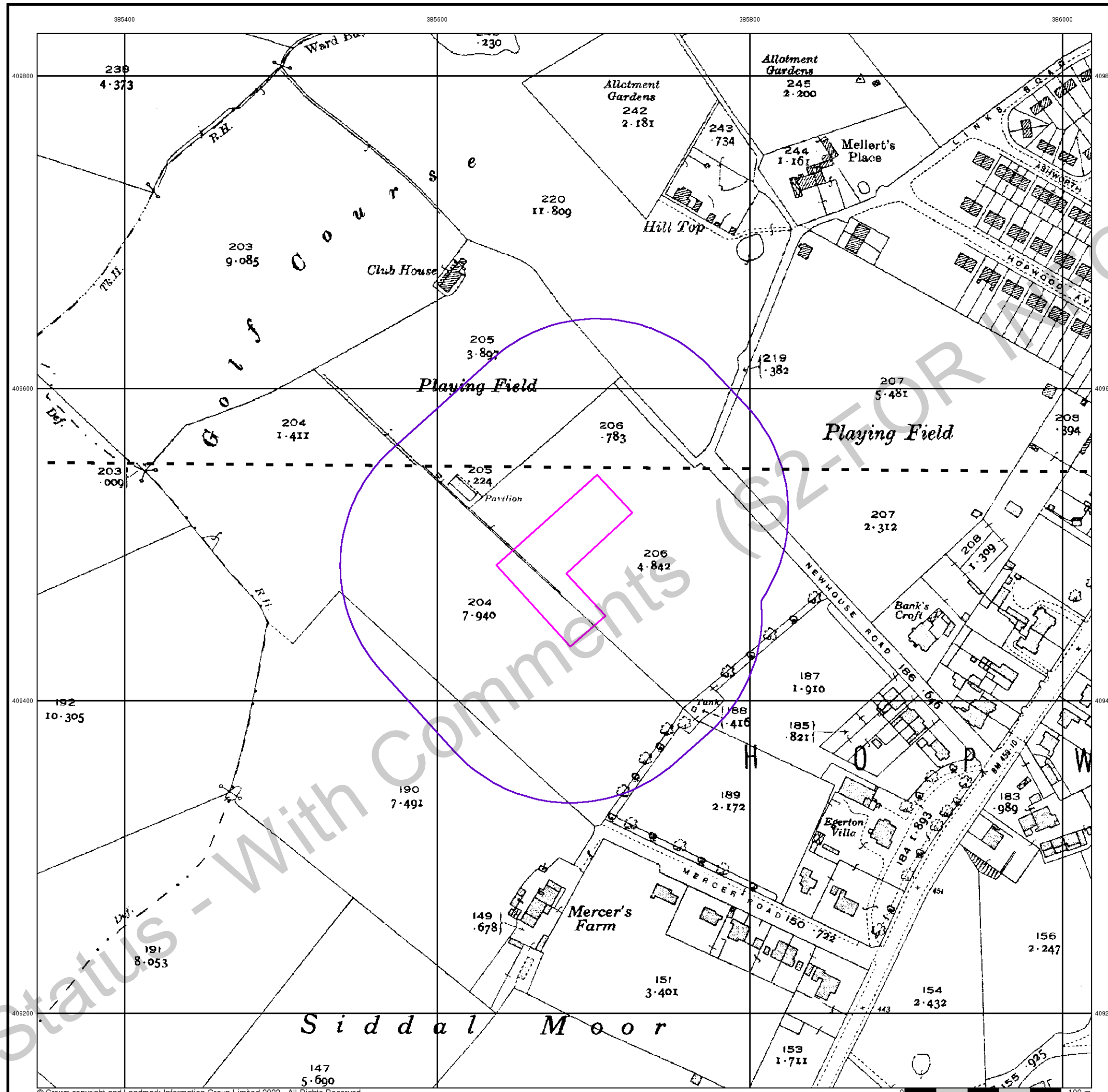
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1956

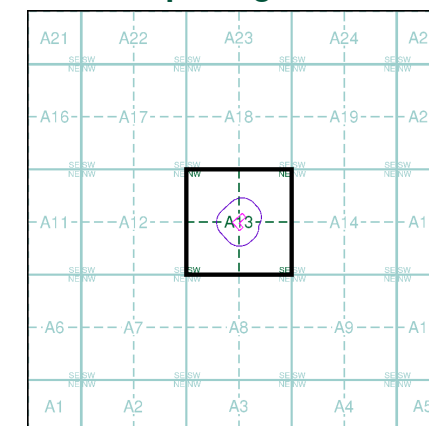
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SD8509NW 1956 1:1,250	SD8509NE 1956 1:1,250	SD8609NW 1956 1:1,250
SD8509SW 1956 1:1,250	SD8509SE 1956 1:1,250	SD8609SW 1956 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

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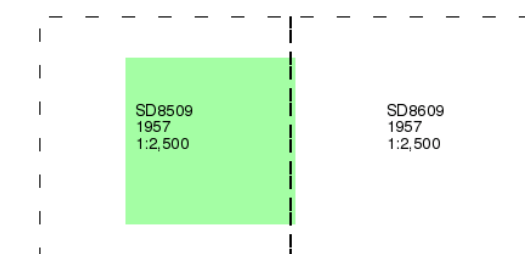
Ordnance Survey Plan

Published 1957

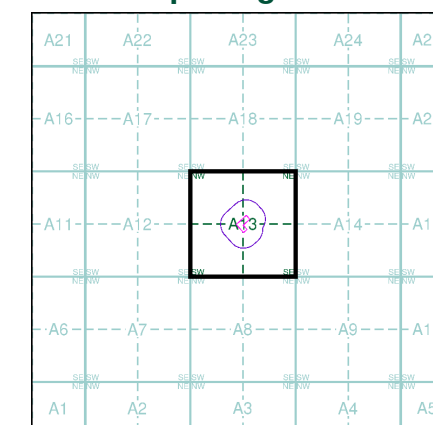
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

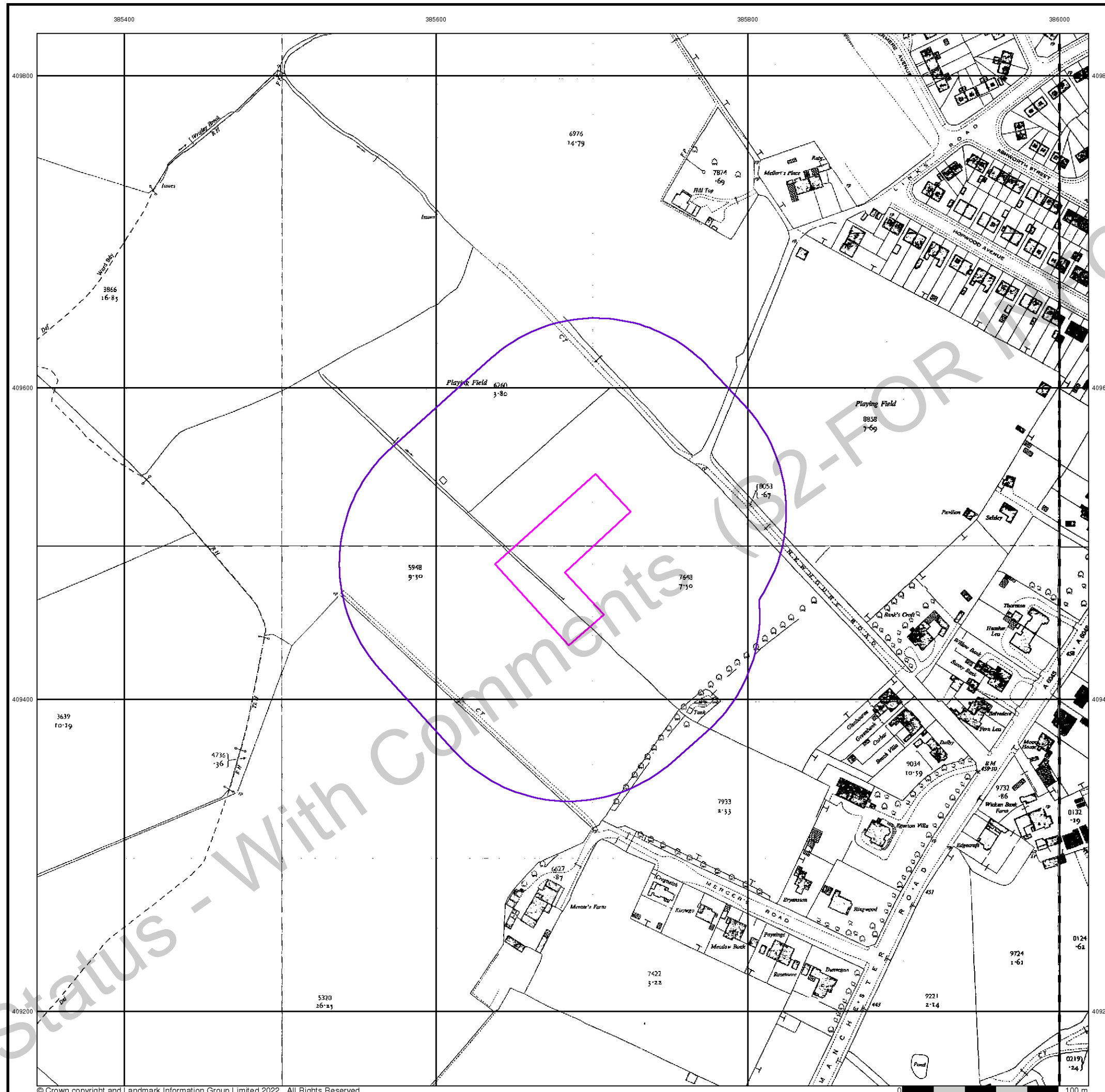
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

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Ordnance Survey Plan

Published 1965 - 1978

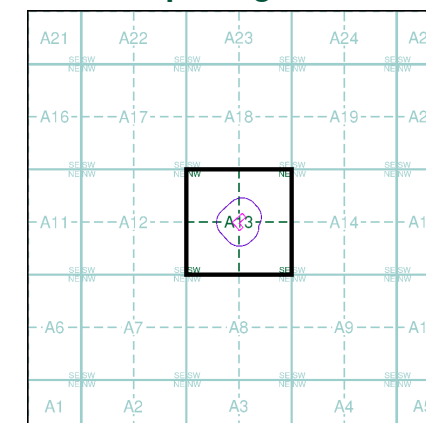
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SD8509NW 1977 1:1,250	SD8509NE 1978 1:1,250	SD8609NW 1970 1:1,250
	SD8509SE 1972 1:1,250	SD8609SW 1965 1:1,250

Historical Map - Segment A13



Order Details

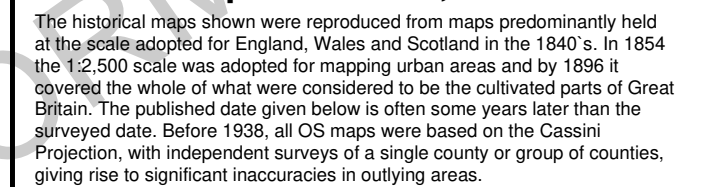
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

Landmark
INFORMATION GROUP

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SD8509
1969
1:2,500

A 5x5 grid diagram with columns labeled A1 to A5 and rows labeled A6 to A10. The grid is divided into 25 cells. The cells are labeled as follows:

- Row A6: A1, A2, A3, A4, A5
- Row A7: A1, A2, A3, A4, A5
- Row A8: A1, A2, A3, A4, A5
- Row A9: A1, A2, A3, A4, A5
- Row A10: A1, A2, A3, A4, A5

A path is highlighted from A1 to A13. The path is shown as a thick black line. The path starts at A1, goes right to A2, then up to A12, then right to A13. A13 is circled in purple.



Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



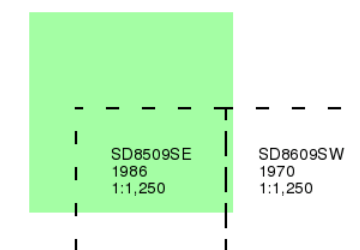
Ordnance Survey Plan

Published 1970 - 1986

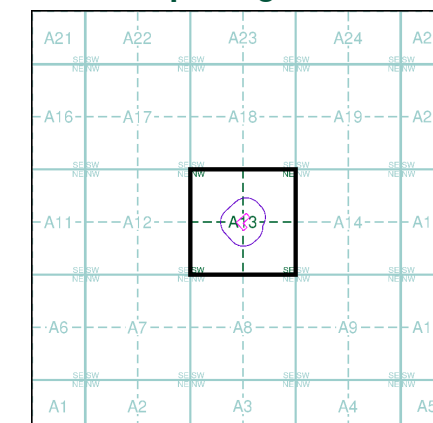
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

Landmark
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Additional SIMs

Published 1972 - 1990

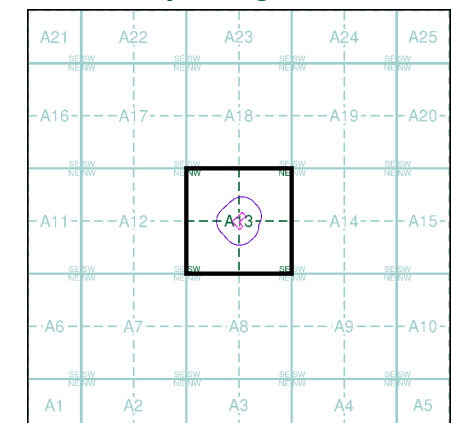
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SD8509NW 1982 1:1,250	SD8509NE 1990 1:1,250	SD8609NW 1983 1:1,250
SD8509SW 1977 1:1,250	SD8509SE 1972 1:1,250	SD8609SW 1990 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

Landmark
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Supply of Unpublished Survey Information

Published 1974 - 1975

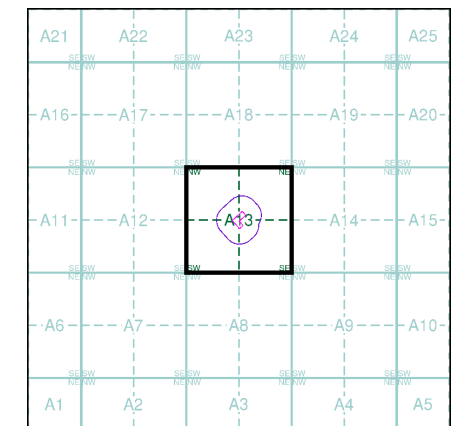
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SD8509NW 1975 1:1,250	SD8509NE 1974 1:1,250	SD8609NW 1975 1:1,250
		SD8609SW 1975 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

Landmark
INFORMATION GROUP

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Additional SIMs

Published 1977 - 1986

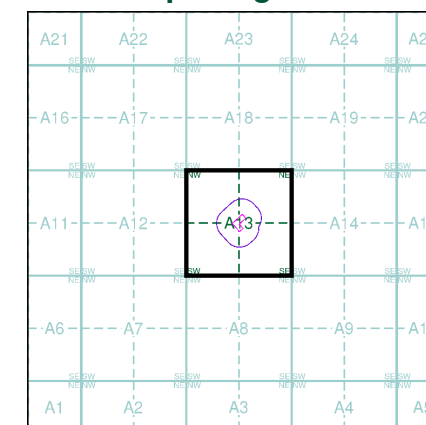
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SD8509NW 1984 1:1,250	SD8609NW 1986 1:1,250
SD8509SE 1977 1:1,250	

Historical Map - Segment A13



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
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Slice: A
Site Area (Ha): 0.4
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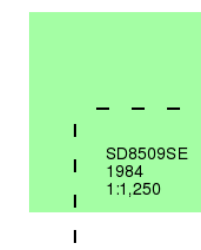
Additional SIMs

Published 1984

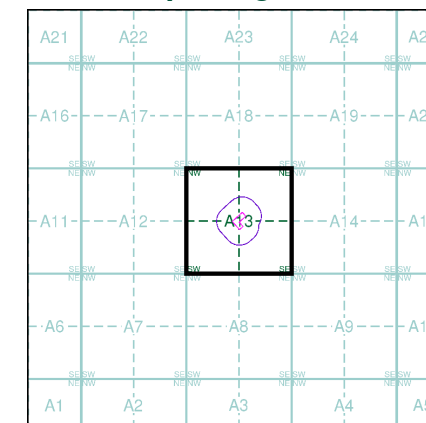
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT



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Large-Scale National Grid Data

Published 1992

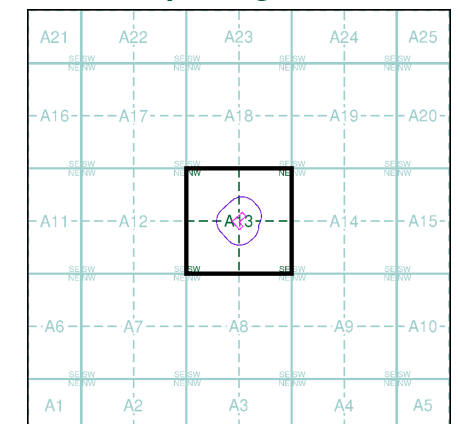
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SD8509NW 1992 1:1,250	SD8509NE 1992 1:1,250	SD8609NW 1992 1:1,250
SD8509SW 1992 1:1,250	SD8509SE 1992 1:1,250	SD8609SW 1992 1:1,250

Historical Map - Segment A13



Order Details

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Large-Scale National Grid Data

Published 1993 - 1994

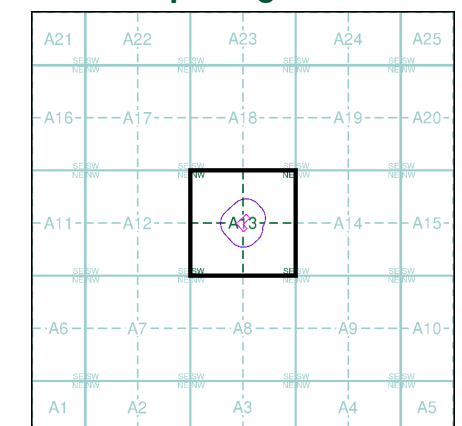
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

	SD8609NW	
	1994	
	1:1,250	
SD8509SE	SD8609SW	
1994	1993	
1:1,250	1:1,250	

Historical Map - Segment A13



Order Details

Order Number: 298633447_1_1
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National Grid Reference: 385690, 409490
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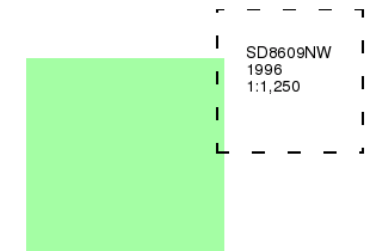
Large-Scale National Grid Data

Published 1996

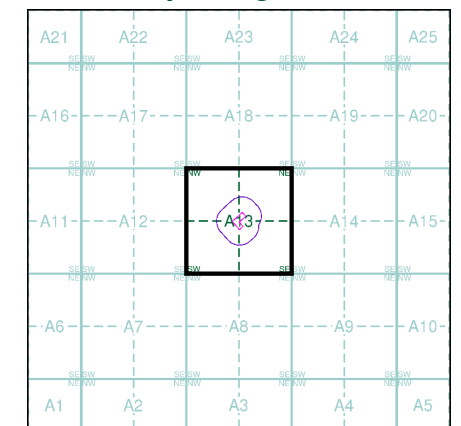
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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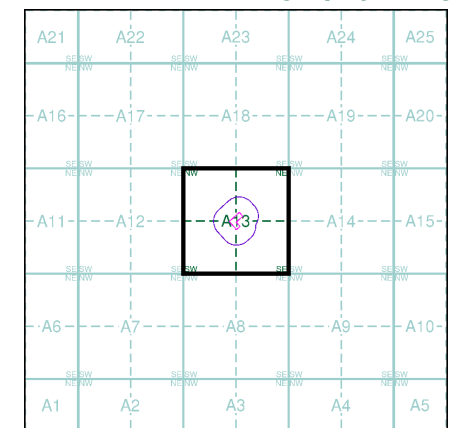


Historical Aerial Photography

Published 2000

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

Order Number: 298633447_1_1
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Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 100

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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

Gravel Pit

Sand Pit

Other Pits

Quarry

Shingle

Orchard

Osiers

Reeds

Marsh

Mixed Wood

Deciduous

Brushwood

Fir

Furze

Rough Pasture

Arrow denotes flow of water

Trigonometrical Station

Site of Antiquities

Bench Mark

Pump, Guide Post, Signal Post

Well, Spring, Boundary Post

•285 Surface Level

Sketched Contour

Instrumental Contour

Main Roads

Fenced

Minor Roads

Fenced

Un-Fenced

Sunken Road

Raised Road

Road over Railway

Railway over River

Railway over Road

Level Crossing

Road over River or Canal

Road over Stream

Road over Stream

County Boundary (Geographical)

County & Civil Parish Boundary

Administrative County & Civil Parish Boundary

Co. Boro. Bdy. County Borough Boundary (England)

Co. Burgh Bdy. County Burgh Boundary (Scotland)

R.D. Bdy. Rural District Boundary

Civil Parish Boundary

Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry

Gravel Pit

Sand Pit

Disused Pit or Quarry

Refuse or Slag Heap

Lake, Loch or Pond

Dunes

Boulders

Coniferous Trees

Non-Coniferous Trees

Orchard

Scrub

Coppice

Bracken

Heath

Rough Grassland

Marsh

Reeds

Saltings

Building

Glasshouse

Sloping Masonry

Pylon

Electricity Transmission Line

Pole

Cutting

Embankment

Standard Gauge Multiple Track

Standard Gauge Single Track

Siding, Tramway or Mineral Line

Narrow Gauge

Geographical County

Administrative County, County Borough or County of City

Municipal Borough, Urban or Rural District, Burgh or District Council

Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries

Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS Boundary Post or Stone

Ch Church

CH Club House

F E Sta Fire Engine Station

FB Foot Bridge

Fn Fountain

GP Guide Post

MP Mile Post

MS Mile Stone

Pol Sta Police Station

PO Post Office

PC Public Convenience

PH Public House

SB Signal Box

Spr Spring

TCB Telephone Call Box

TCP Telephone Call Post

W Well

1:10,000 Raster Mapping

Gravel Pit

Refuse tip or slag heap

Rock

Rock (scattered)

Boulders

Boulders (scattered)

Shingle

Mud

Sand

Sand Pit

Slopes

Top of cliff

General detail

Underground detail

Overhead detail

Narrow gauge railway

Single track railway

Multi-track railway

County boundary (England only)

Civil, parish or community boundary

District, Unitary, Metropolitan, London Borough boundary

Constituency boundary

Area of wooded vegetation

Non-coniferous trees

Non-coniferous trees (scattered)

Coniferous trees

Coniferous trees (scattered)

Positioned tree

Orchard

Coppice or Osiers

Rough Grassland

Heath

Scrub

Marsh, Salt Marsh or Reeds

Water feature

Flow arrows

MHW(S) Mean high water (springs)

MLW(S) Mean low water (springs)

Telephone line (where shown)

Electricity transmission line (with poles)

Bench mark (where shown)

Point feature (e.g. Guide Post or Mile Stone)

Site of (antiquity)

Glasshouse

General Building

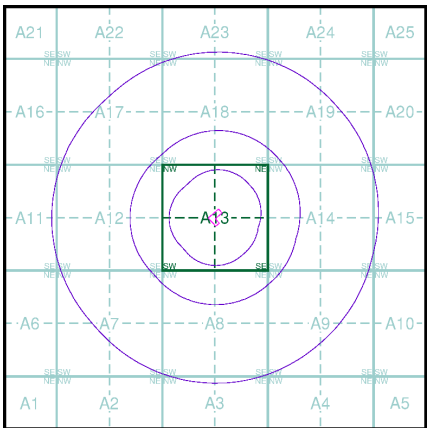
Important Building



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lancashire And Furness	1:10,560	1851	3
Lancashire And Furness	1:10,560	1894	4
Lancashire And Furness	1:10,560	1910	5
Lancashire And Furness	1:10,560	1931 - 1932	6
Lancashire And Furness	1:10,560	1938	7
Ordnance Survey Plan	1:10,000	1955 - 1956	8
Ordnance Survey Plan	1:10,000	1965 - 1968	9
Ordnance Survey Plan	1:10,000	1974 - 1977	10
Manchester	1:25,000	1975	11
Ordnance Survey Plan	1:10,000	1983 - 1988	12
Ordnance Survey Plan	1:10,000	1993	13
10K Raster Mapping	1:10,000	1999	14
10K Raster Mapping	1:10,000	2006	15
VectorMap Local	1:10,000	2021	16

Historical Map - Slice A



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

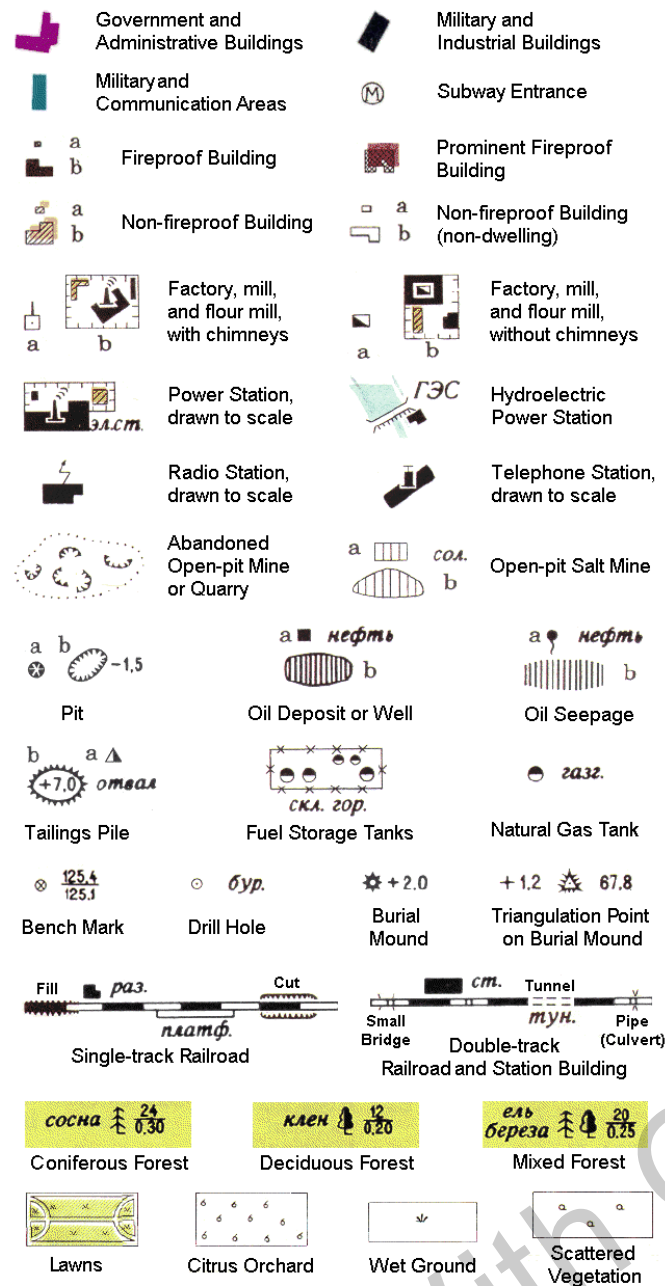


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Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale



243.8 Values for prominent elevations

186.0 Numbers for spot elevations, depth soundings, contour lines, etc.

0.2 Velocity of the current, width of river bed, depth of river

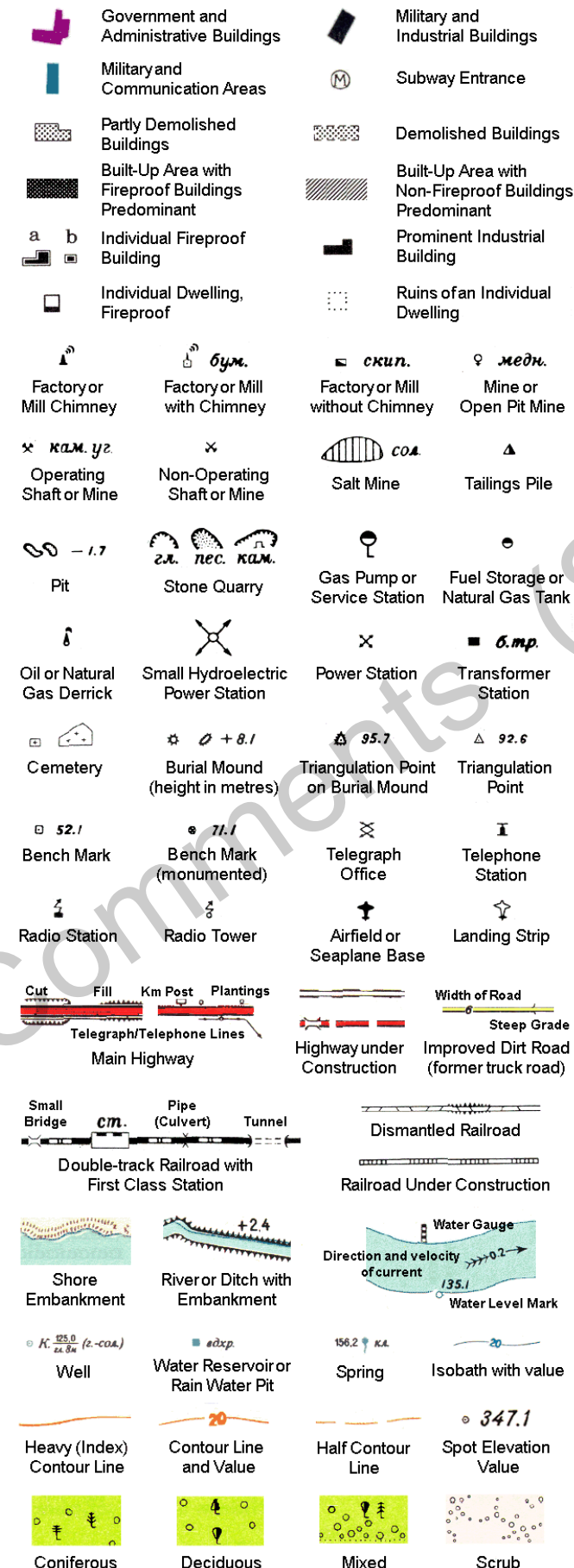
180/12 Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A) З з (Z) П п (P) Ч ч (CH)
Б б (B) И и (I) Р р (R) Ш ш (SH)
В в (V) Й й (Y) С с (S) Щ щ (SHCH)
Г г (G) К к (K) Т т (T) Ъ ъ (-)
Д д (D) Л л (L) У у (U) Ы ы (Y)
Е е (E) М м (M) Ф ф (F) Ь ь (')
Ё ё (YO) Н н (N) Х х (KH) Э э (E)
Ж ж (ZH) О о (O) Ц ц (TS) Ю ю (YU or IU)
Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale



Key to Numbers on Mapping

SD80_Manchester

No.	Description
187	Warehouse (Technical Materials)

SD81_Manchester

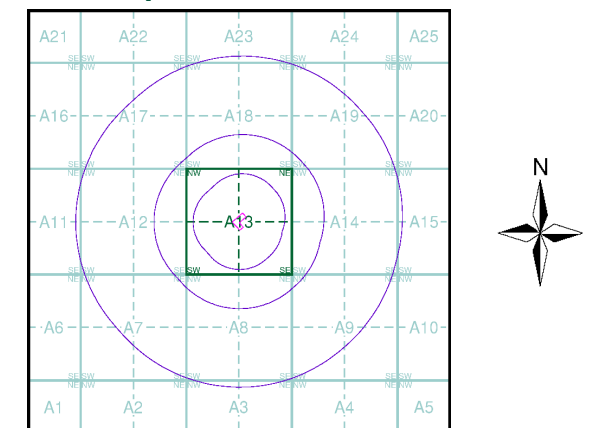
No.	Description
116	Mill (Steel)



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lancashire And Furness	1:10,560	1851	3
Lancashire And Furness	1:10,560	1894	4
Lancashire And Furness	1:10,560	1910	5
Lancashire And Furness	1:10,560	1931 - 1932	6
Lancashire And Furness	1:10,560	1938	7
Ordnance Survey Plan	1:10,000	1955 - 1956	8
Ordnance Survey Plan	1:10,000	1965 - 1968	9
Ordnance Survey Plan	1:10,000	1974 - 1977	10
Manchester	1:25,000	1975	11
Ordnance Survey Plan	1:10,000	1983 - 1988	12
Ordnance Survey Plan	1:10,000	1993	13
10K Raster Mapping	1:10,000	1999	14
10K Raster Mapping	1:10,000	2006	15
VectorMap Local	1:10,000	2021	16

Russian Map - Slice A



Order Details

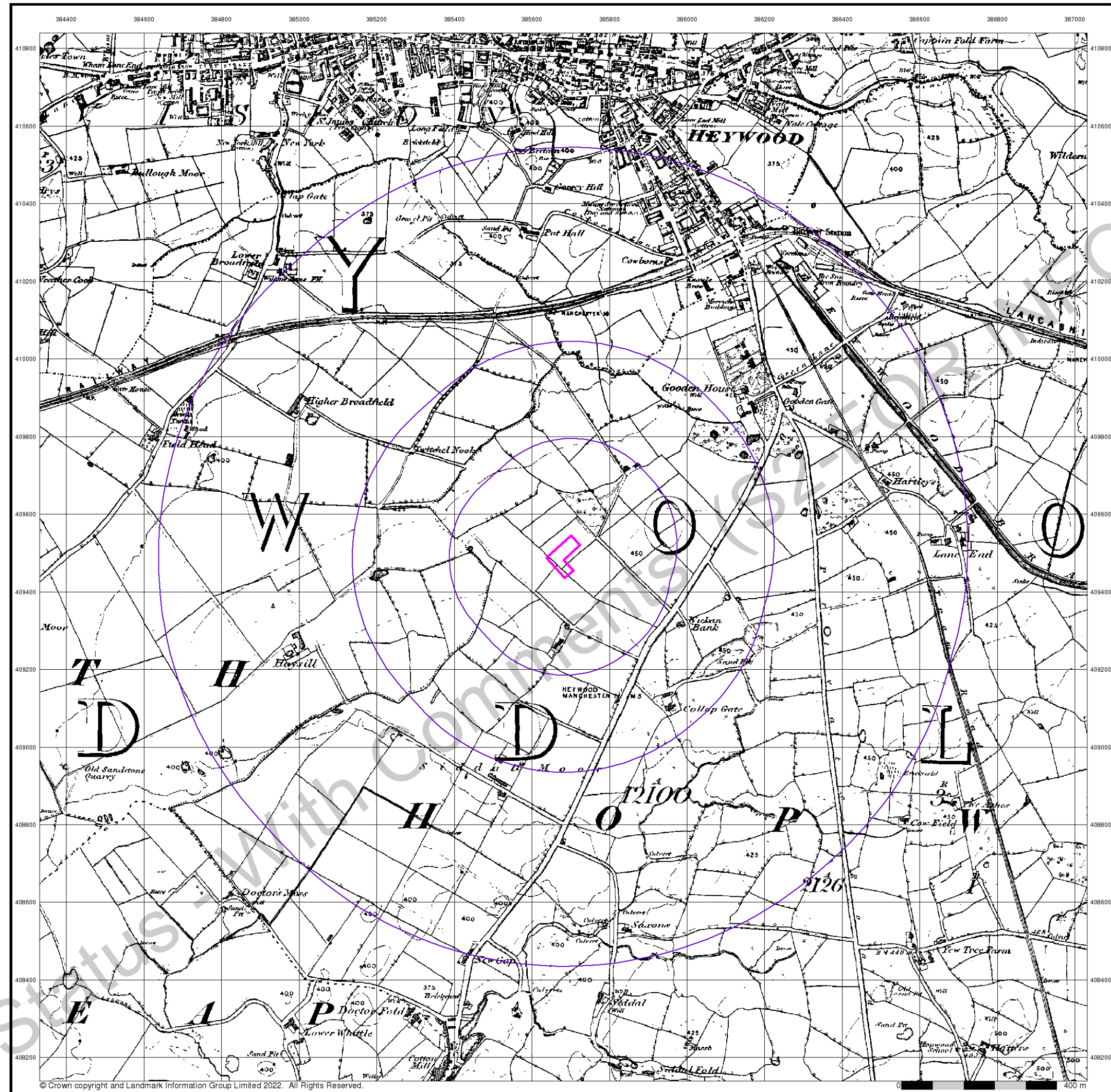
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details

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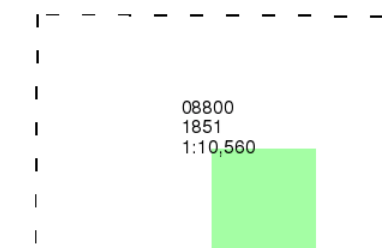
Lancashire And Furness

Published 1851

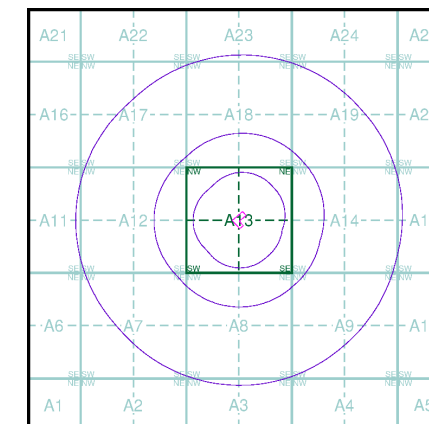
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details

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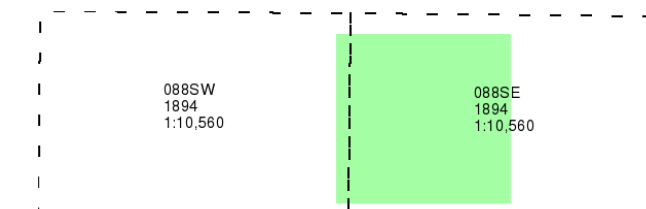
Lancashire And Furness

Published 1894

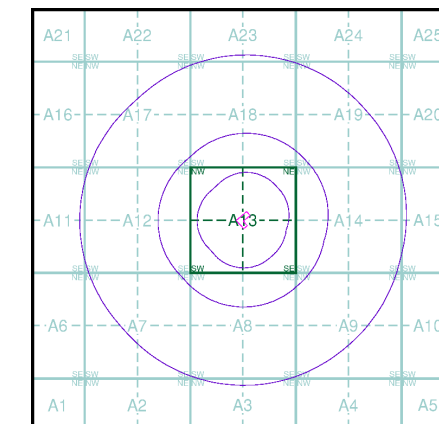
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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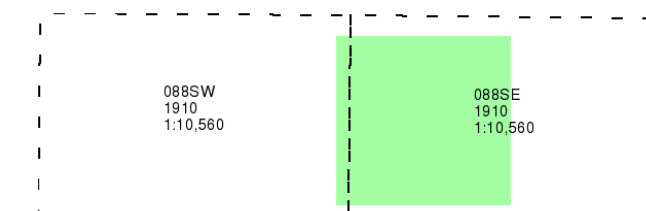
Lancashire And Furness

Published 1910

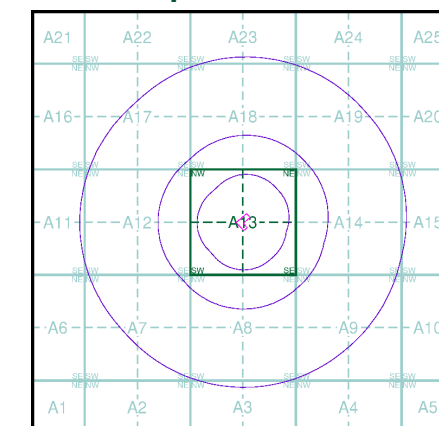
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

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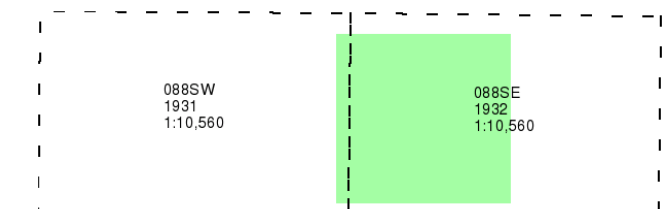
Lancashire And Furness

Published 1931 - 1932

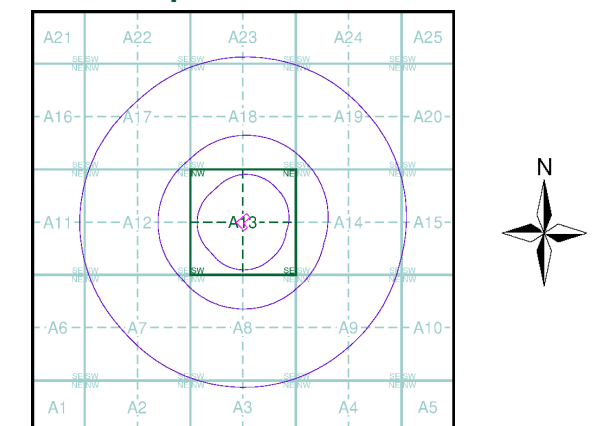
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



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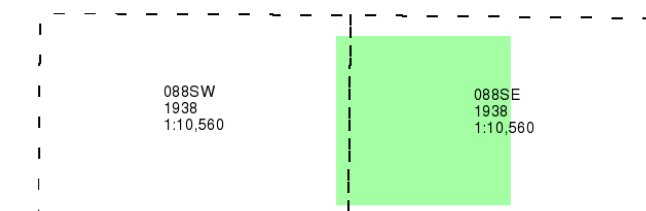
Lancashire And Furness

Published 1938

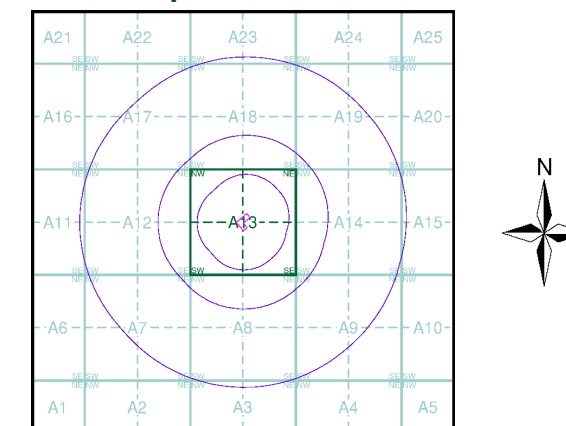
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

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Ordnance Survey Plan

Published 1955 - 1956

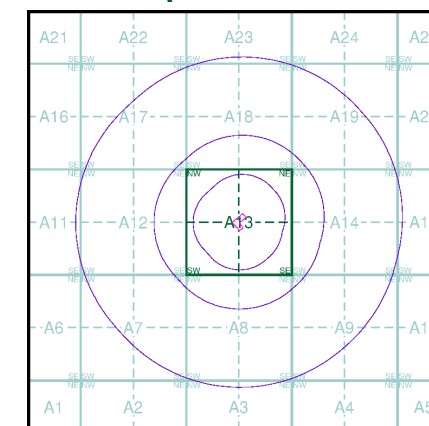
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SD81SW	SD81SE
1956	1956
1:10,560	1:10,560
SD80NW	SD80NE
1955	1956
1:10,560	1:10,560

Historical Map - Slice A



Order Details

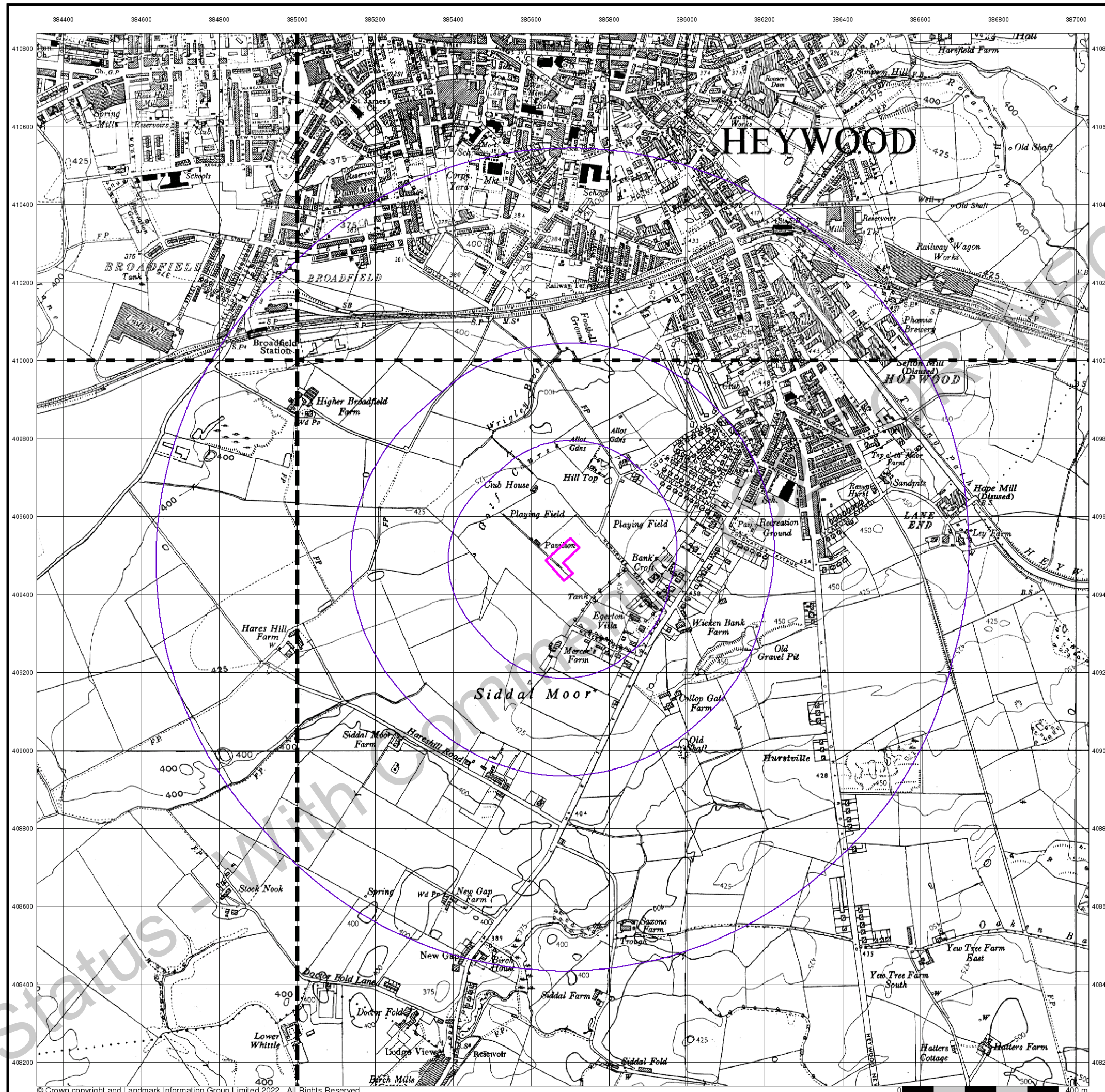
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

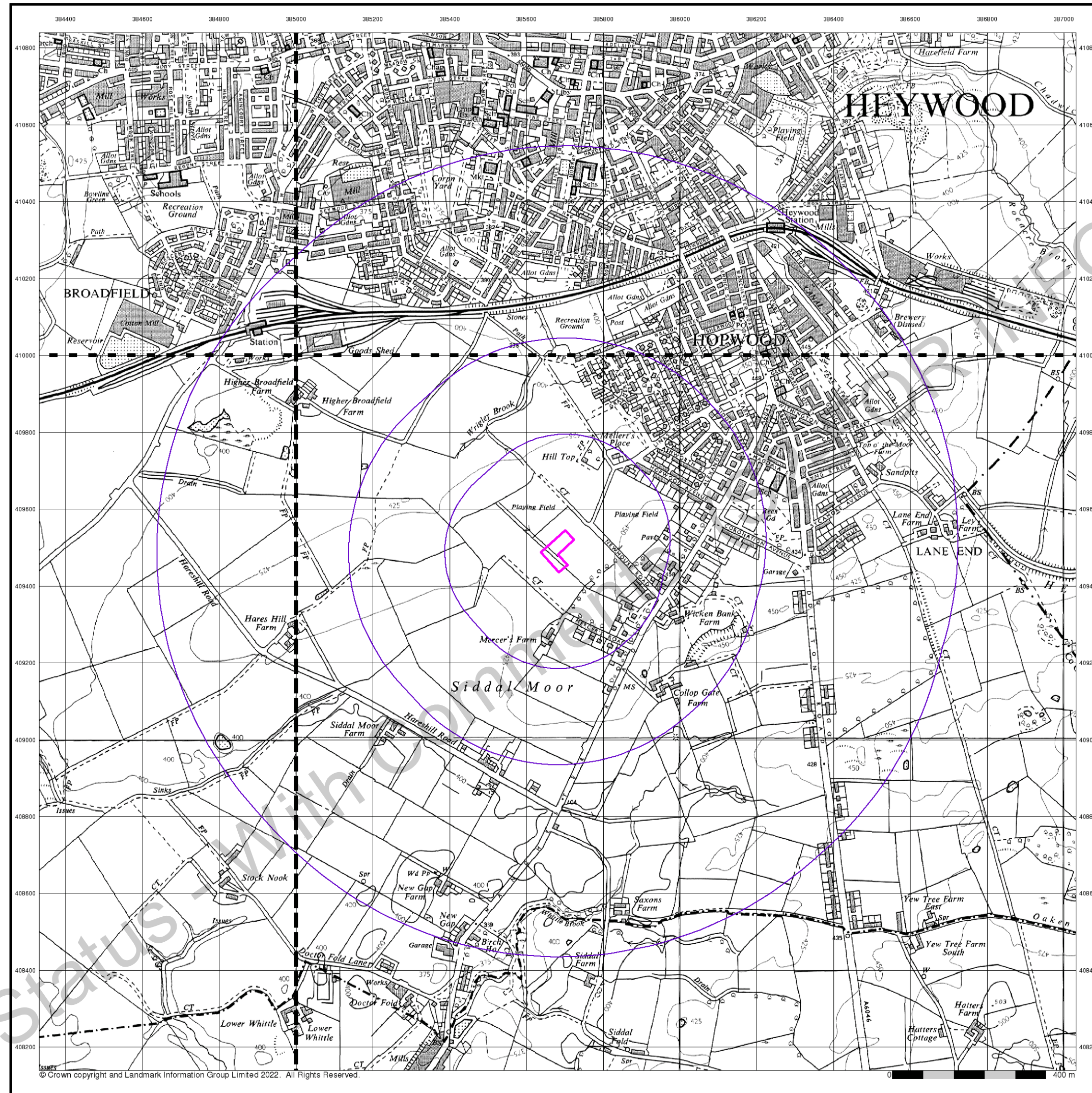
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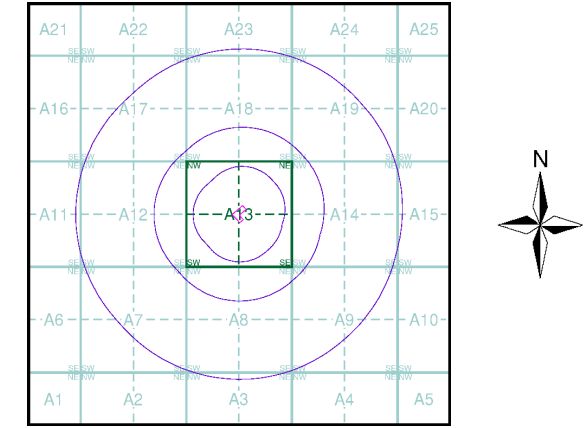
Ordnance Survey Plan
Published 1965 - 1968
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SD81SW	SD81SE
1967	1968
1:10,560	1:10,560
SD80NW	SD80NE
1965	1965
1:10,560	1:10,560

Historical Map - Slice A



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT



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Ordnance Survey Plan

Published 1974 - 1977

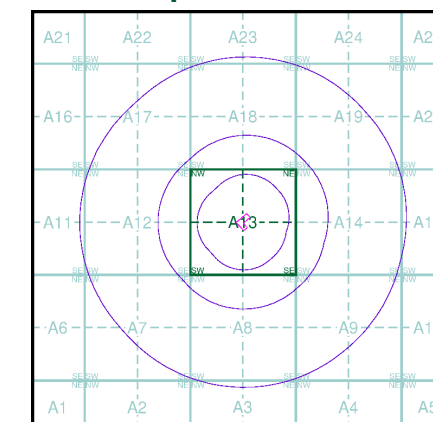
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SD81SE	1977	1:10,000
SD80NW	1974	1:10,000
SD80NE	1977	1:10,000

Historical Map - Slice A



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

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Manchester

Published 1975

Source map scale - 1:25,000

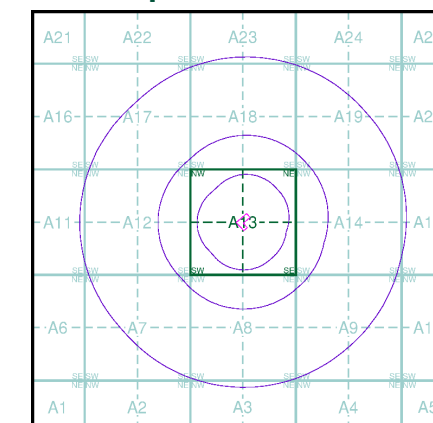
These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.

They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)

SD81
1975
1:25,000
SD80
1975
1:25,000

Russian Map - Slice A



Order Details

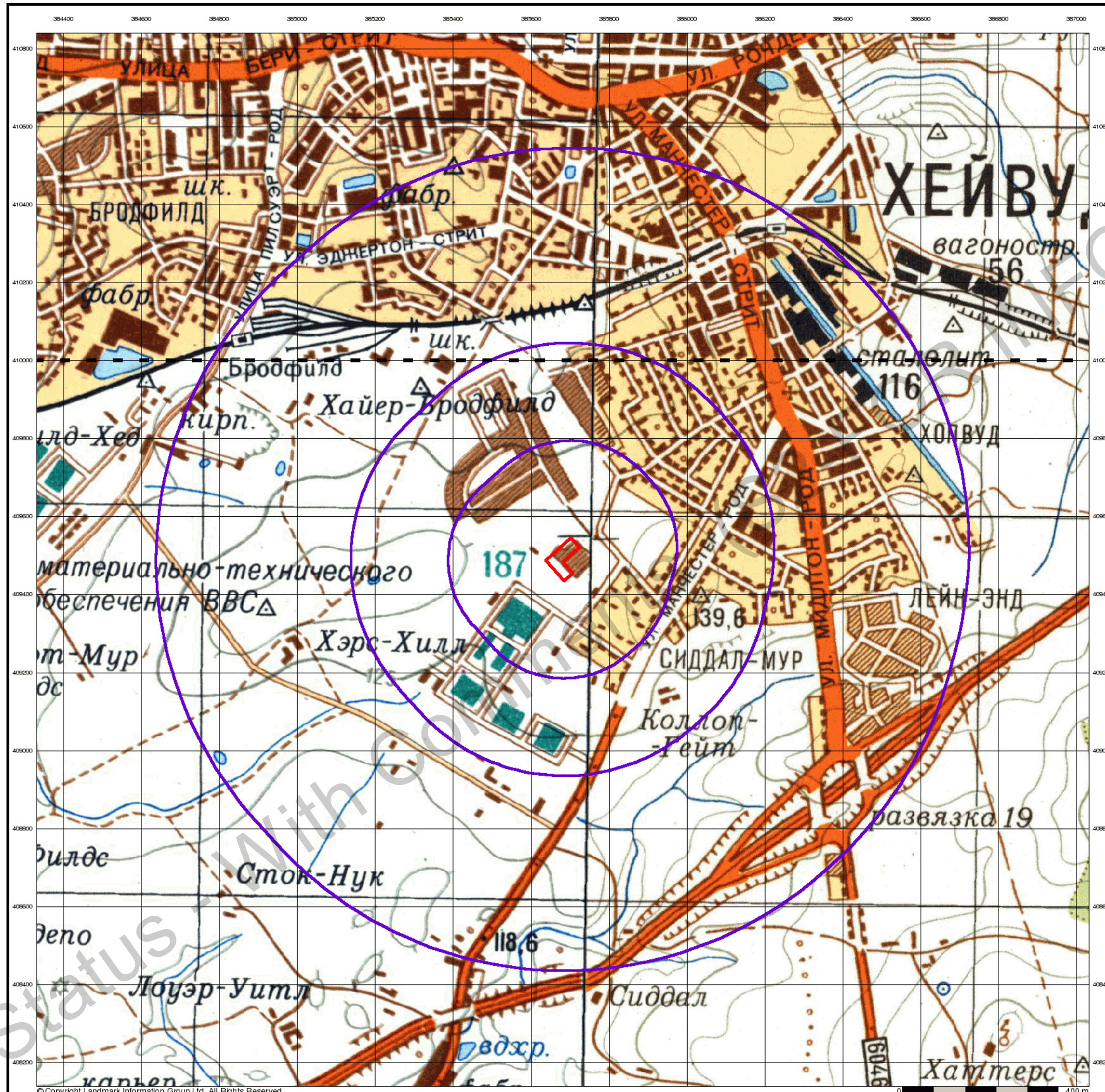
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

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Ordnance Survey Plan

Published 1983 - 1988

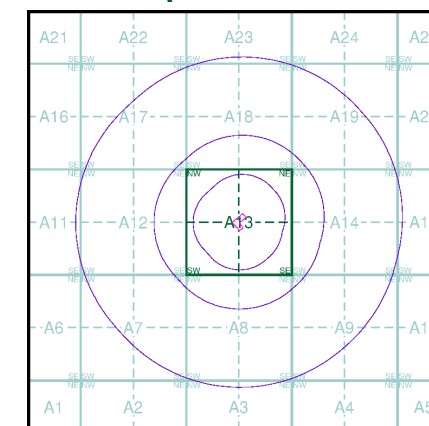
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SD81SW	SD81SE
1984	1988
1:10,000	1:10,000
SD80NW	SD80NE
1983	1984
1:10,000	1:10,000

Historical Map - Slice A



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

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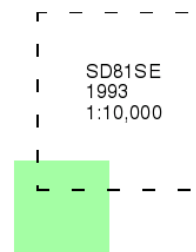
Ordnance Survey Plan

Published 1993

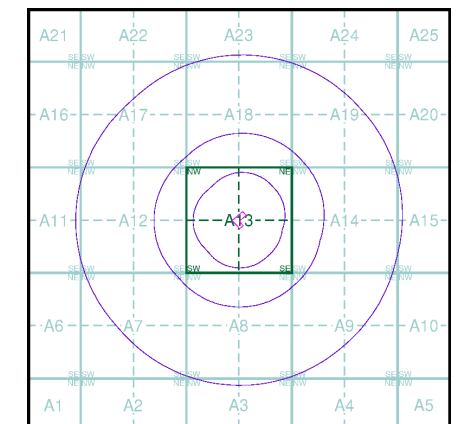
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

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10k Raster Mapping

Published 1999

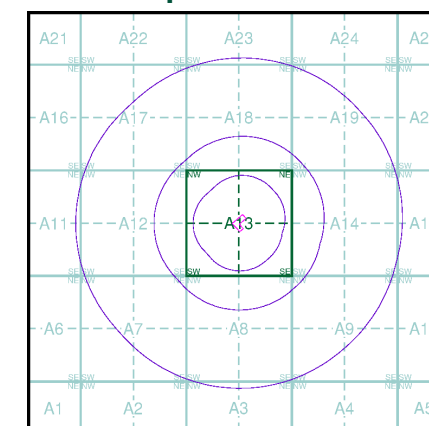
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SD81SW	SD81SE
1999	1999
1:10,000	1:10,000
SD80NW	SD80NE
1999	1999
1:10,000	1:10,000

Historical Map - Slice A



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

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10k Raster Mapping

Published 2006

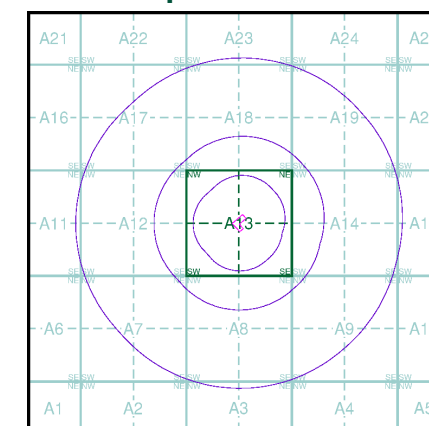
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SD81SW	SD81SE
2006	2006
1:10,000	1:10,000
SD80NW	SD80NE
2006	2006
1:10,000	1:10,000

Historical Map - Slice A



Order Details

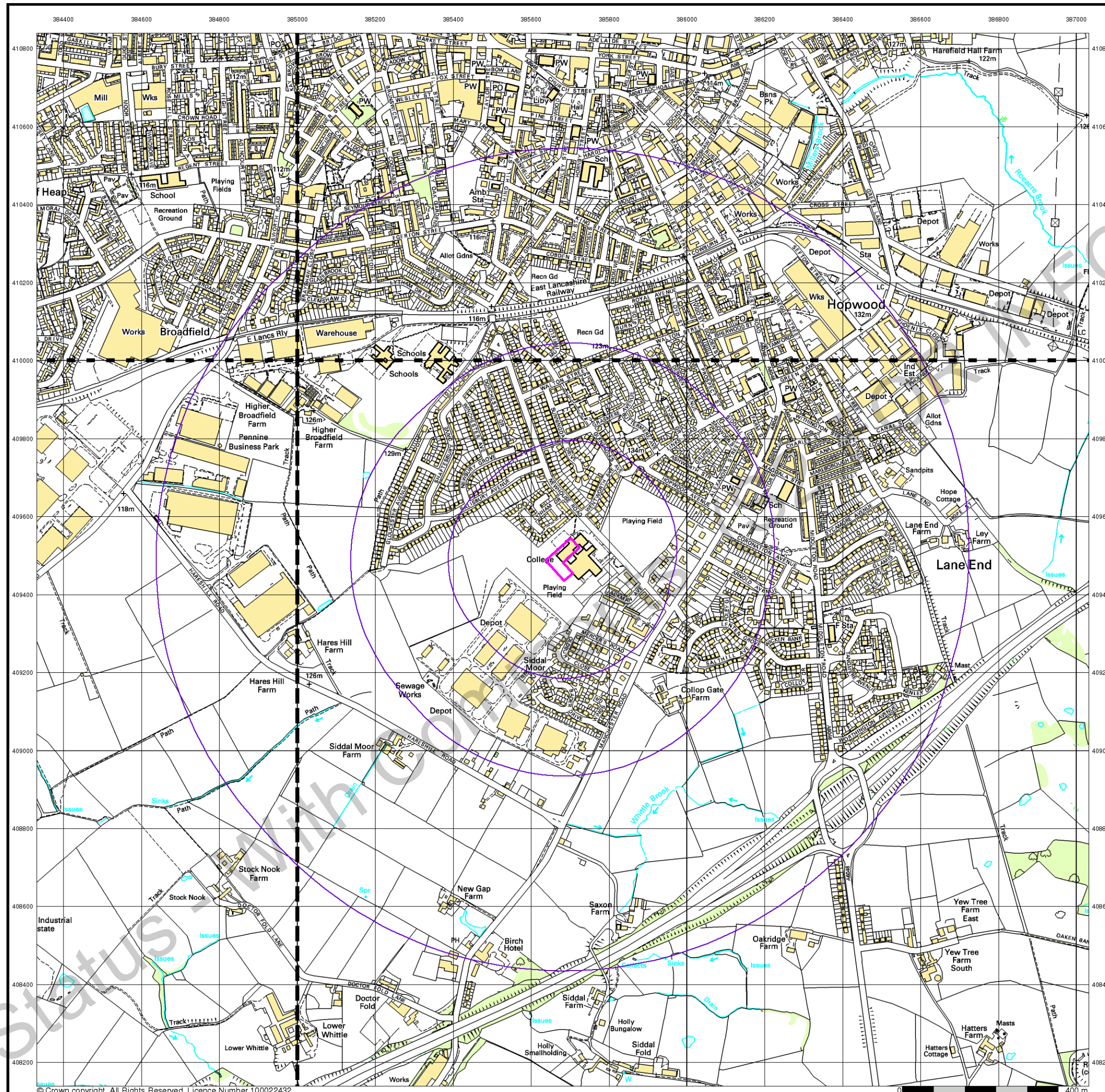
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National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
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VectorMap Local

Published 2021

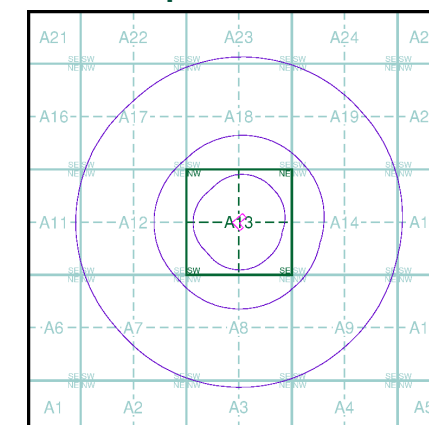
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities), 1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

SD81SW	SD81SE
2021	2021
Variable	Variable
SD80NW	SD80NE
2021	2021
Variable	Variable

Historical Map - Slice A



Order Details

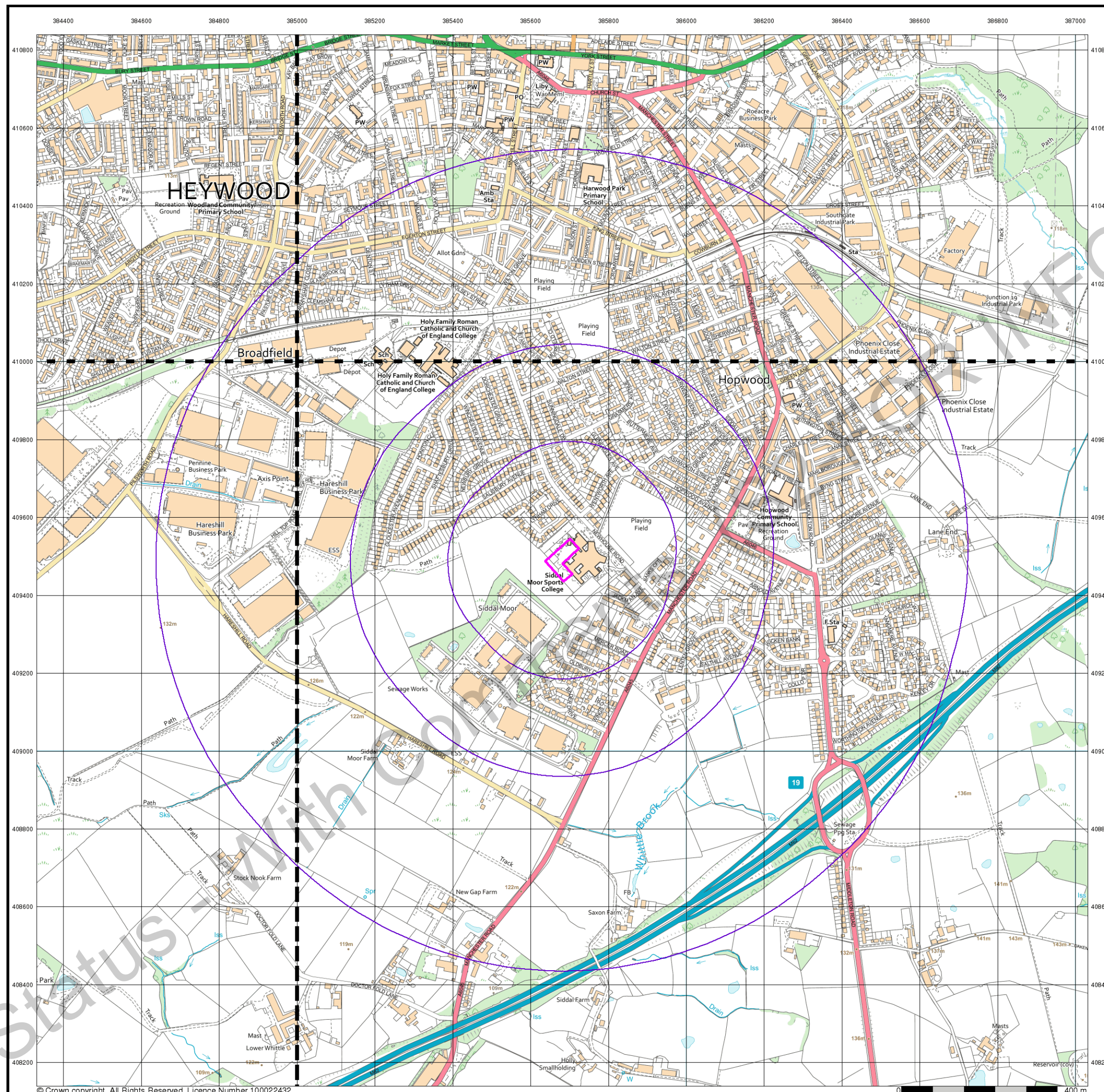
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
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Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MGR	Made Ground (Undivided)	Artificial Deposit	Not Supplied - Holocene
	WMGR	Infilled Ground	Artificial Deposit	Not Supplied - Holocene
	SLIP	Landslide Deposit	Unknown/Unclassified Entry	Not Supplied - Quaternary

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Not Supplied - Holocene
	TILLD	Till, Devensian	Diamicton	Not Supplied - Devensian
	GFICD	Glaciofluvial Ice Contact Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	GFDUD	Glaciofluvial Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	GFSD	Glaciofluvial Sheet Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	HMGDD	Hummocky (Moundy) Glacial Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	LDE	Lacustrine Deposits	Sand and Gravel	Not Supplied - Quaternary
	HEAD	Head	Clay, Silt, Sand and Gravel	Not Supplied - Quaternary
	PEAT	Peat	Peat	Not Supplied - Quaternary
	RTDU	River Terrace Deposits (Undifferentiated)	Sand and Gravel	Not Supplied - Quaternary
	RTD1	River Terrace Deposits, 1	Sand and Gravel	Not Supplied - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	PLCM	Pennine Lower Coal Measures Formation	Mudstone, Siltstone and Sandstone	Not Supplied - Westphalian
	OL	Old Lawrence Rock	Sandstone	Not Supplied - Westphalian
	WH	Woodhead Hill Rock	Sandstone	Not Supplied - Westphalian

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	HER	Helpet Edge Rock	Sandstone	Not Supplied - Westphalian
	GAS	Great Arc Sandstone	Sandstone	Not Supplied - Westphalian
	ROSSE	Rossendale Formation	Mudstone and Siltstone	Not Supplied - Namurian
	RR	Rough Rock	Sandstone	Not Supplied - Namurian
		Faults		
		Rock Segments		



Geology 1:50,000 Maps

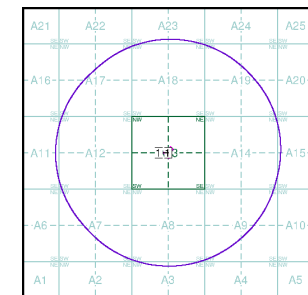
This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.

The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID: 1
Map Sheet No: 085
Map Name: Manchester
Map Date: 2010
Bedrock Geology: Available
Superficial Geology: Not Available
Artificial Geology: Not Available
Faults: Not Supplied
Landslip: Not Available
Rock Segments: Not Supplied

Geology 1:50,000 Maps - Slice A



Order Details:

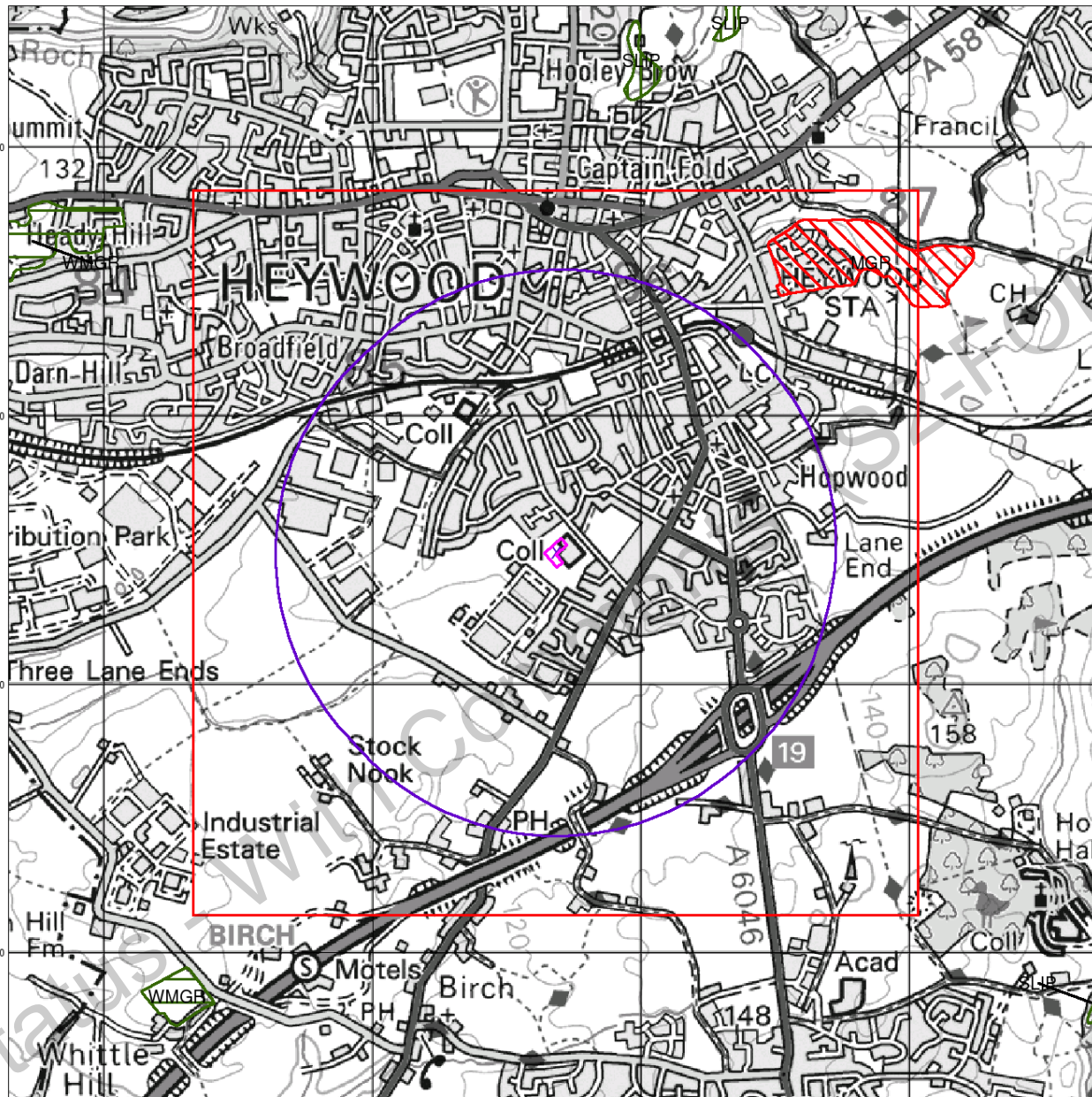
Order Number: 298633447_1_1
Customer Reference: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

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Artificial Ground and Landslip

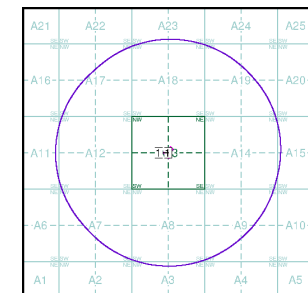
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



Order Details:

Order Number: 298633447_1_1
 Customer Reference: B079809.300
 National Grid Reference: 385690, 409490
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Page 2 of 5



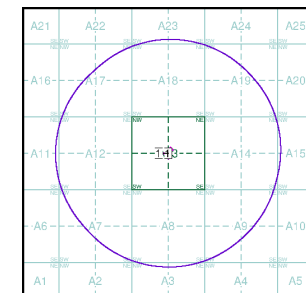
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



Order Details:

Order Number: 298633447_1_1
Customer Reference: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details:

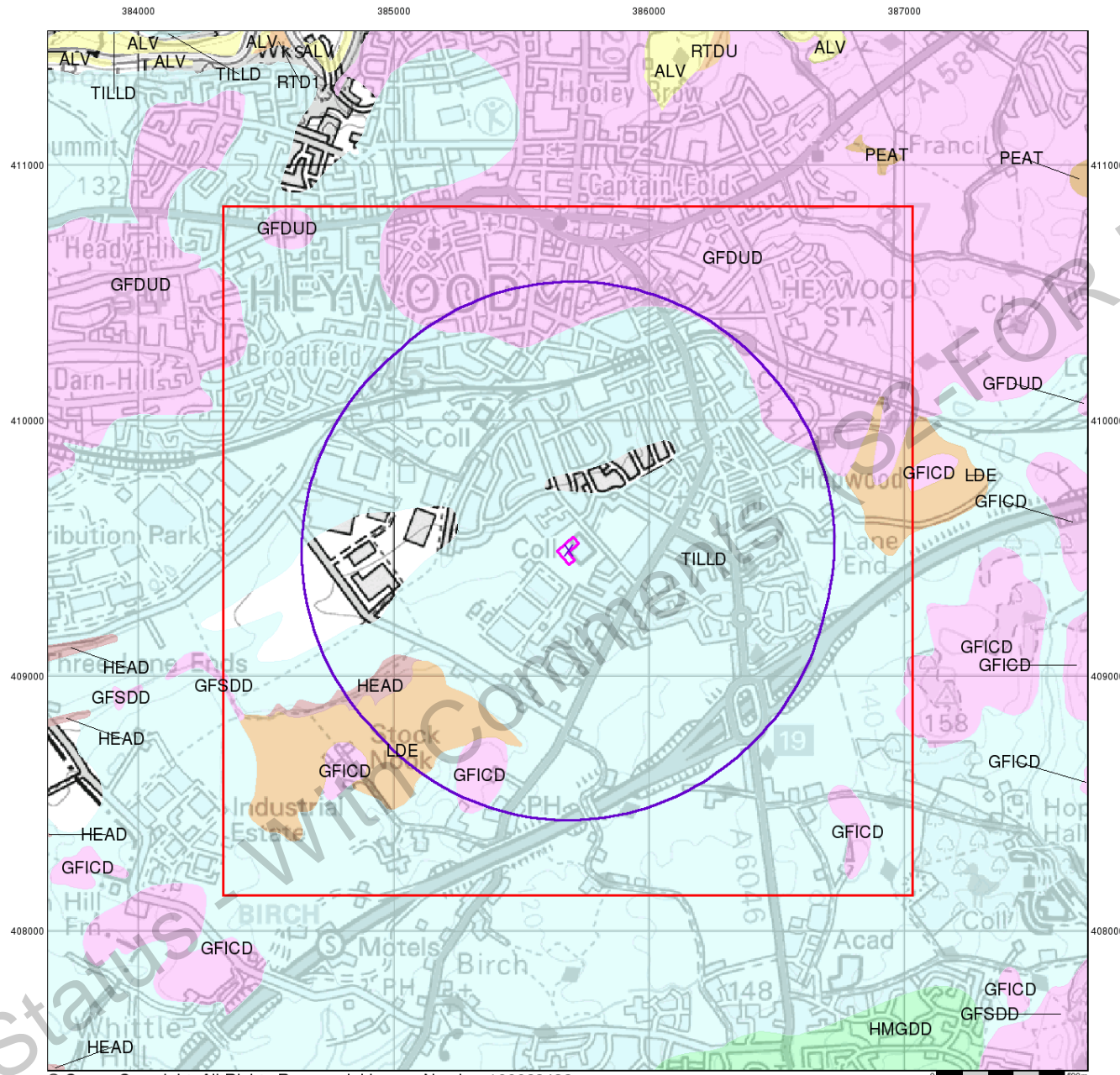
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Bedrock and Faults

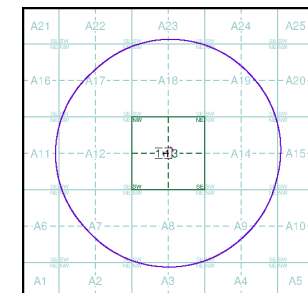
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



Order Details:

Order Number: 298633447_1_1
Customer Reference: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details:

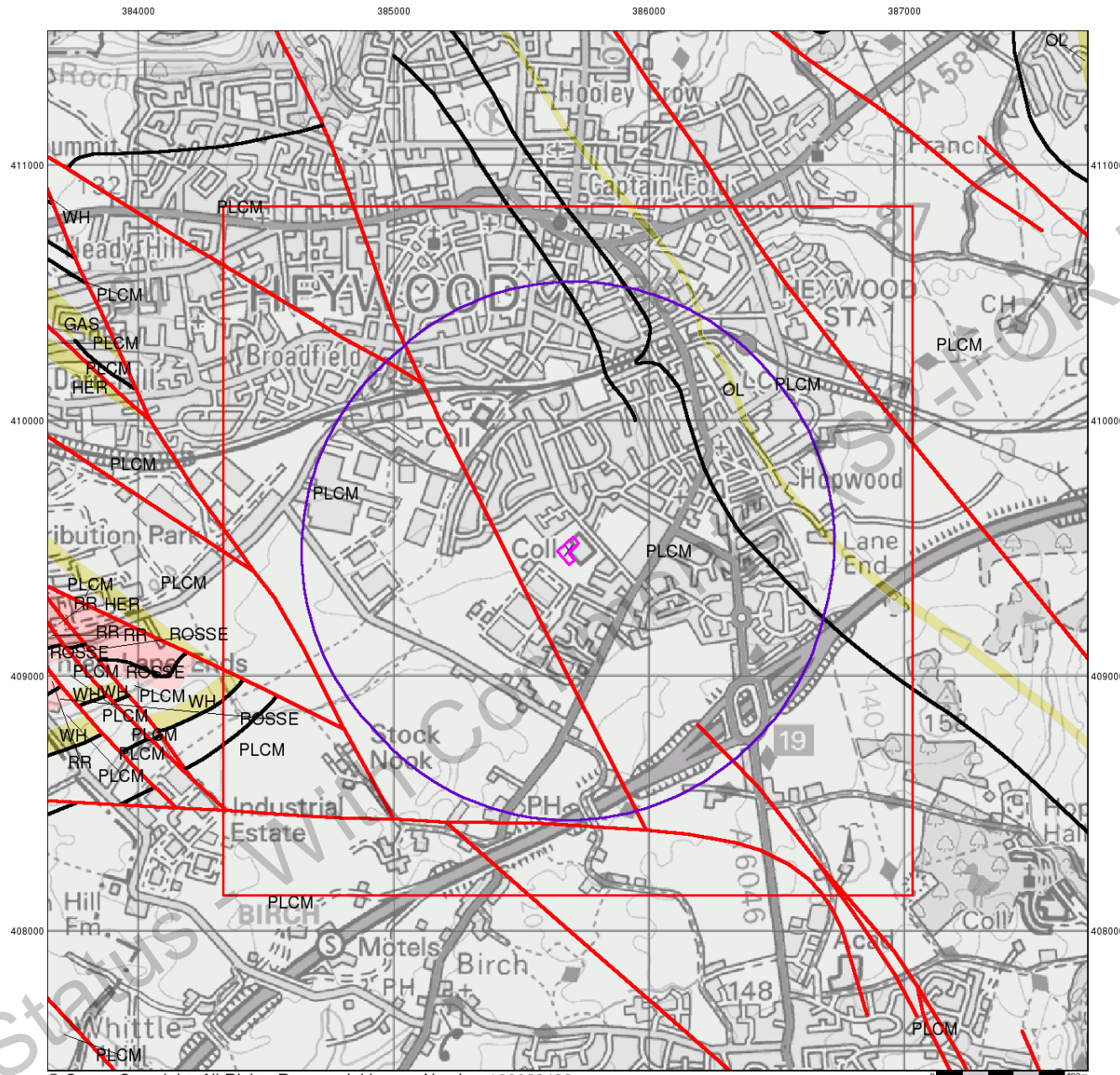
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Landmark
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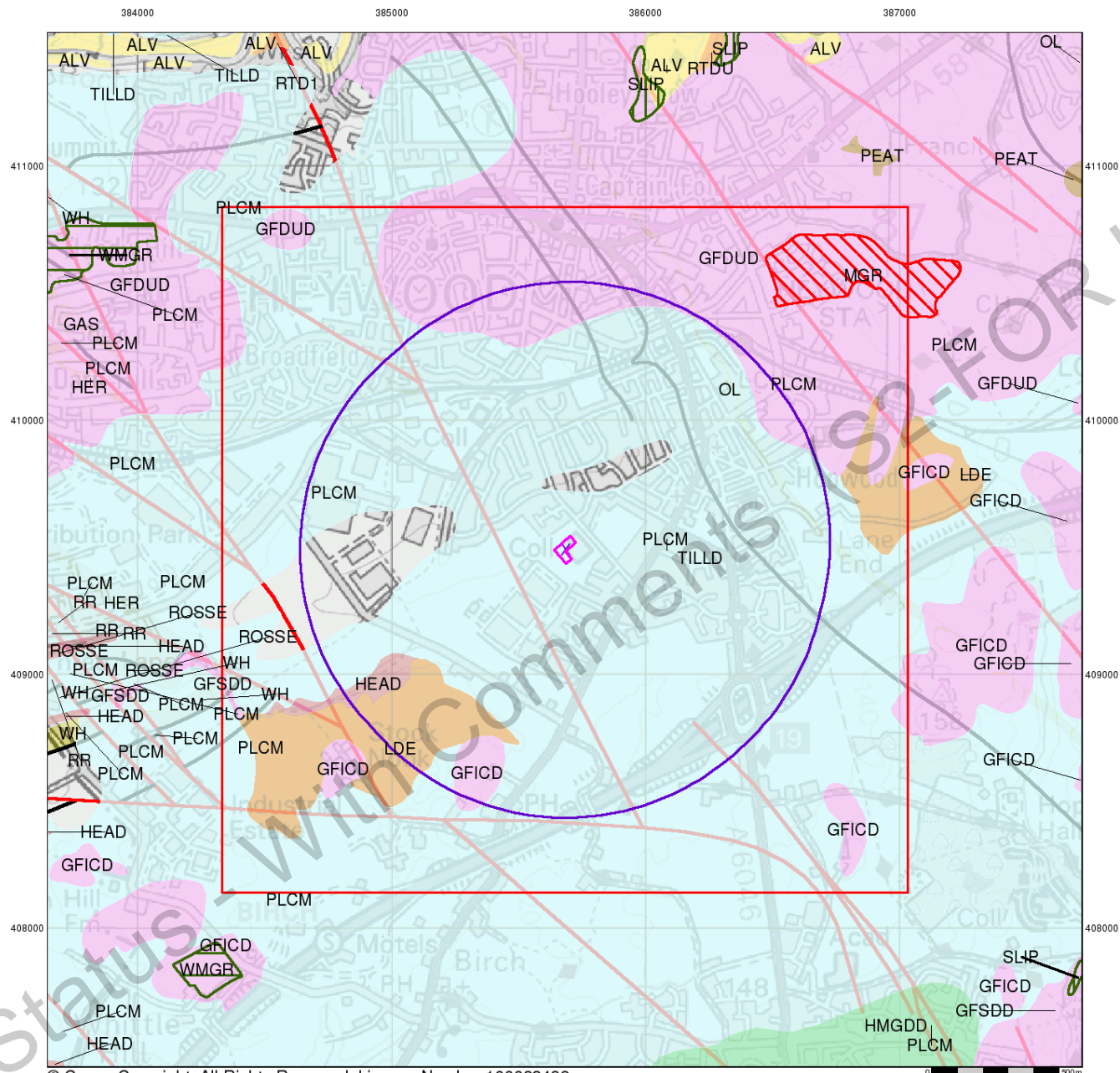
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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

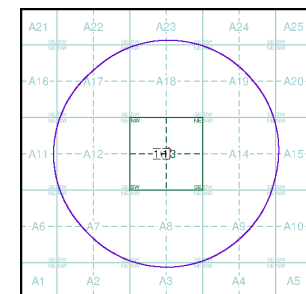
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number: 298633447_1_1
Customer Reference: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details:

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Groundwater Vulnerability

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Bedrock Aquifers

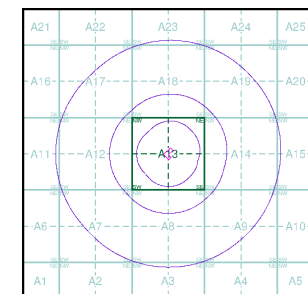
- High Vulnerability, Principal Aquifer
- High Vulnerability, Secondary Aquifer
- Medium Vulnerability, Principal Aquifer
- Medium Vulnerability, Secondary Aquifer
- Low Vulnerability, Principal Aquifer
- Low Vulnerability, Secondary Aquifer

Superficial Aquifers

- High Vulnerability, Principal Aquifer
- High Vulnerability, Secondary Aquifer
- Medium Vulnerability, Principal Aquifer
- Medium Vulnerability, Secondary Aquifer
- Low Vulnerability, Principal Aquifer
- Low Vulnerability, Secondary Aquifer

- Unproductive Aquifer
- Soluble Rock

Site Sensitivity Context Map - Slice A



Order Details

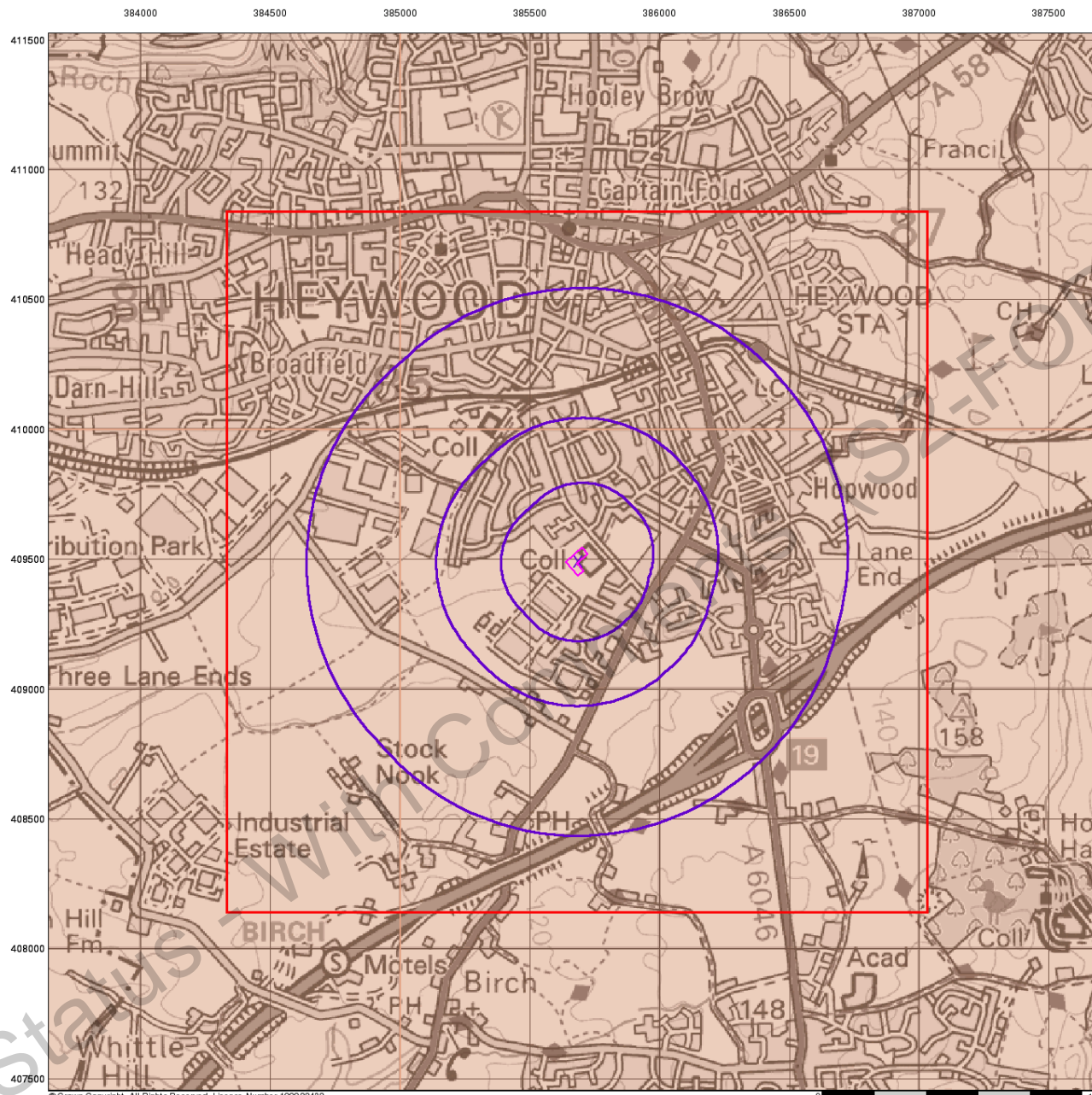
Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
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0 1 km



Bedrock Aquifer Designation

General

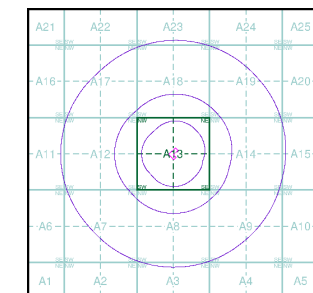
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

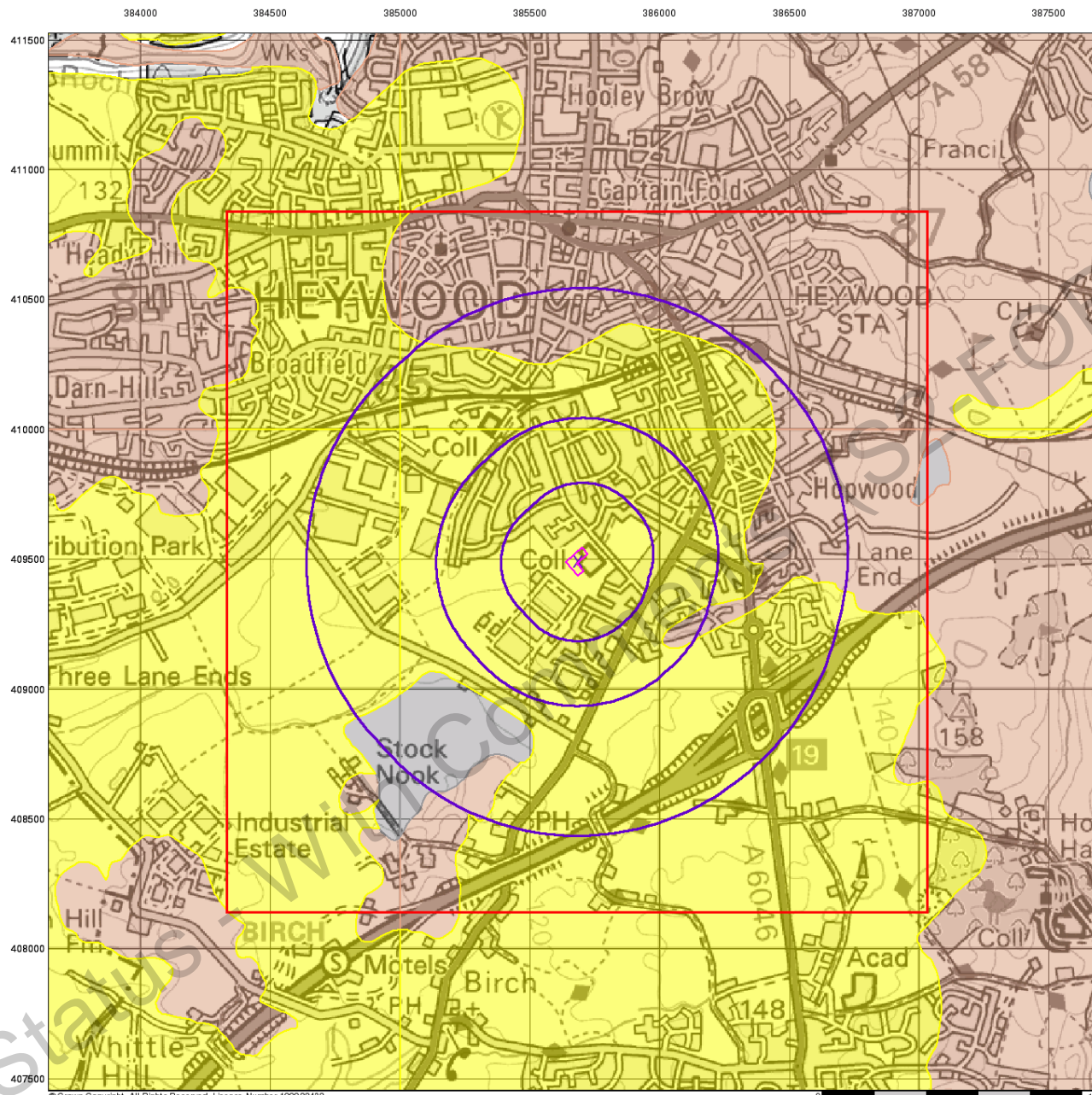
Order Number: 298633447_1_1
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Superficial Aquifer Designation

General

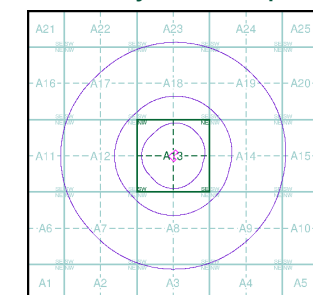
- ◆ Specified Site
- Specified Buffer(s)
- X Bearing Reference Point
- Slice
- B Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

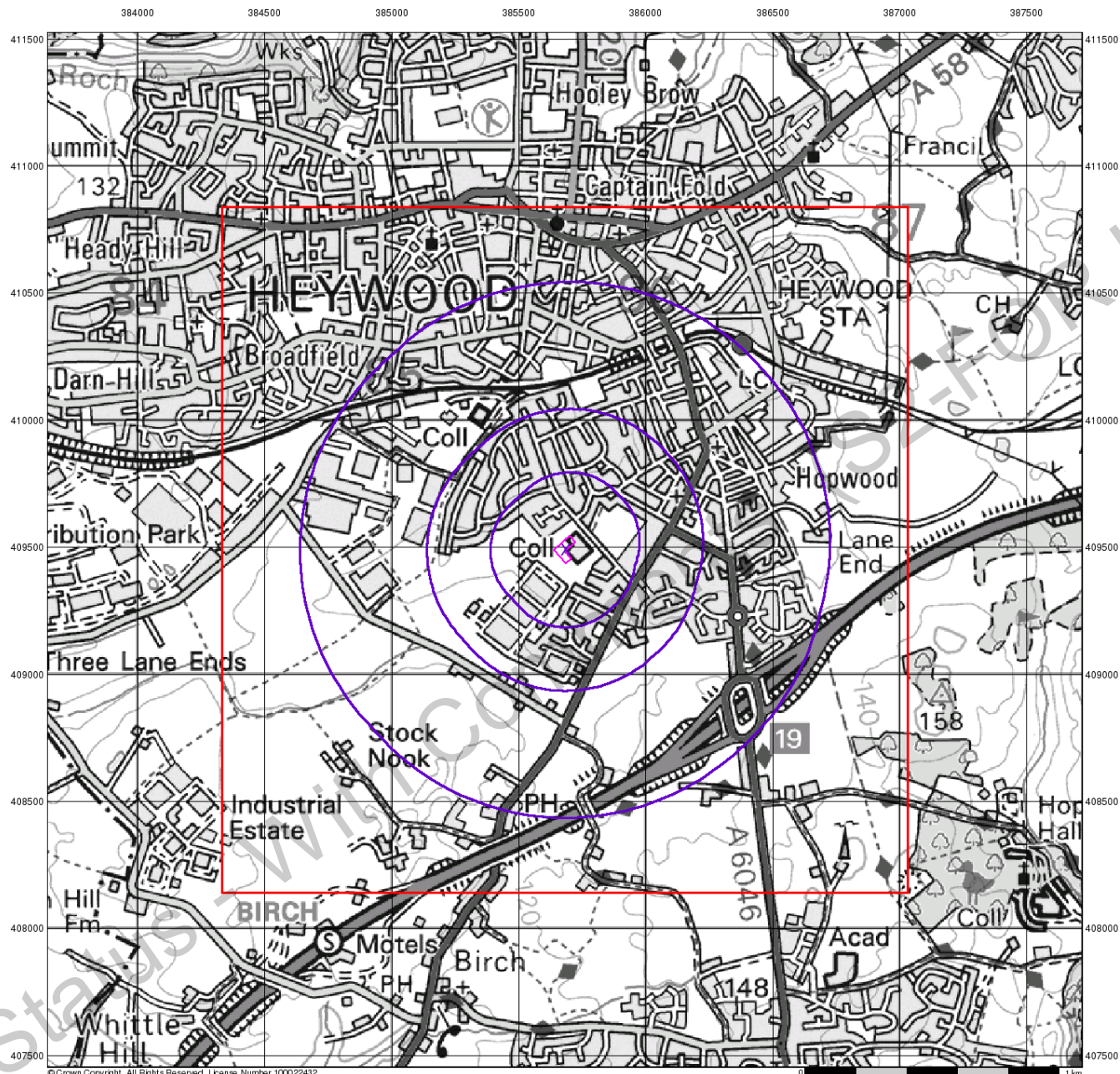
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 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
 Site Area (Ha): 0.4
 Search Buffer (m): 1000

Site Details

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Source Protection Zones

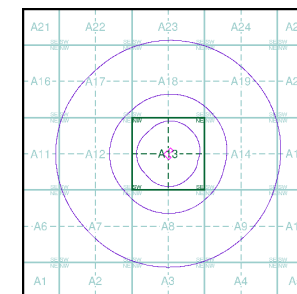
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



Order Details

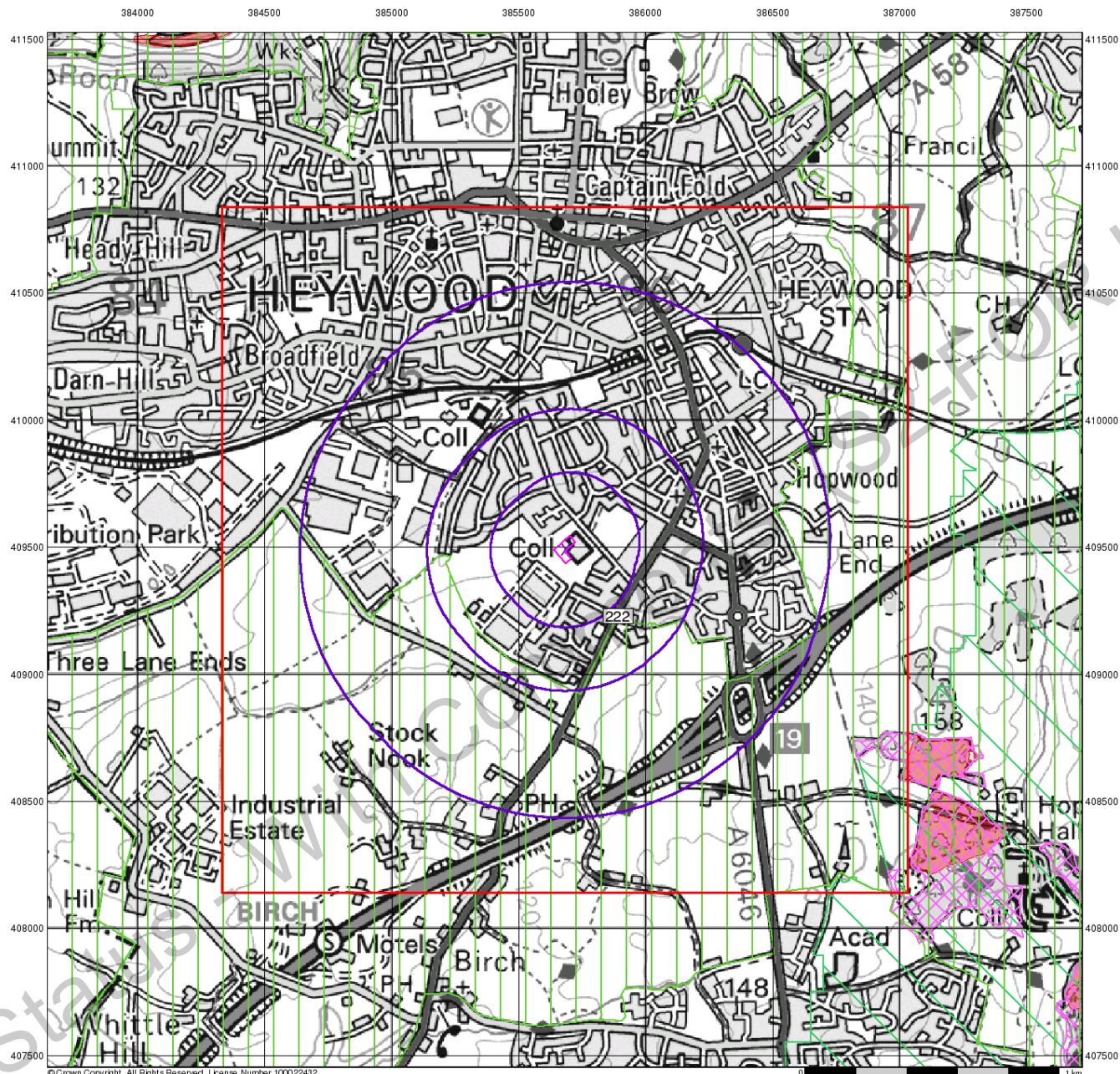
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 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
 Site Area (Ha): 0.4
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Sensitive Land Uses

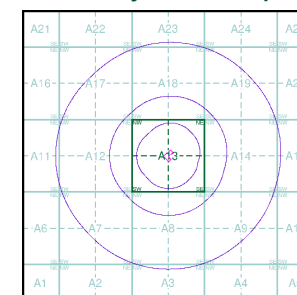
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



Order Details

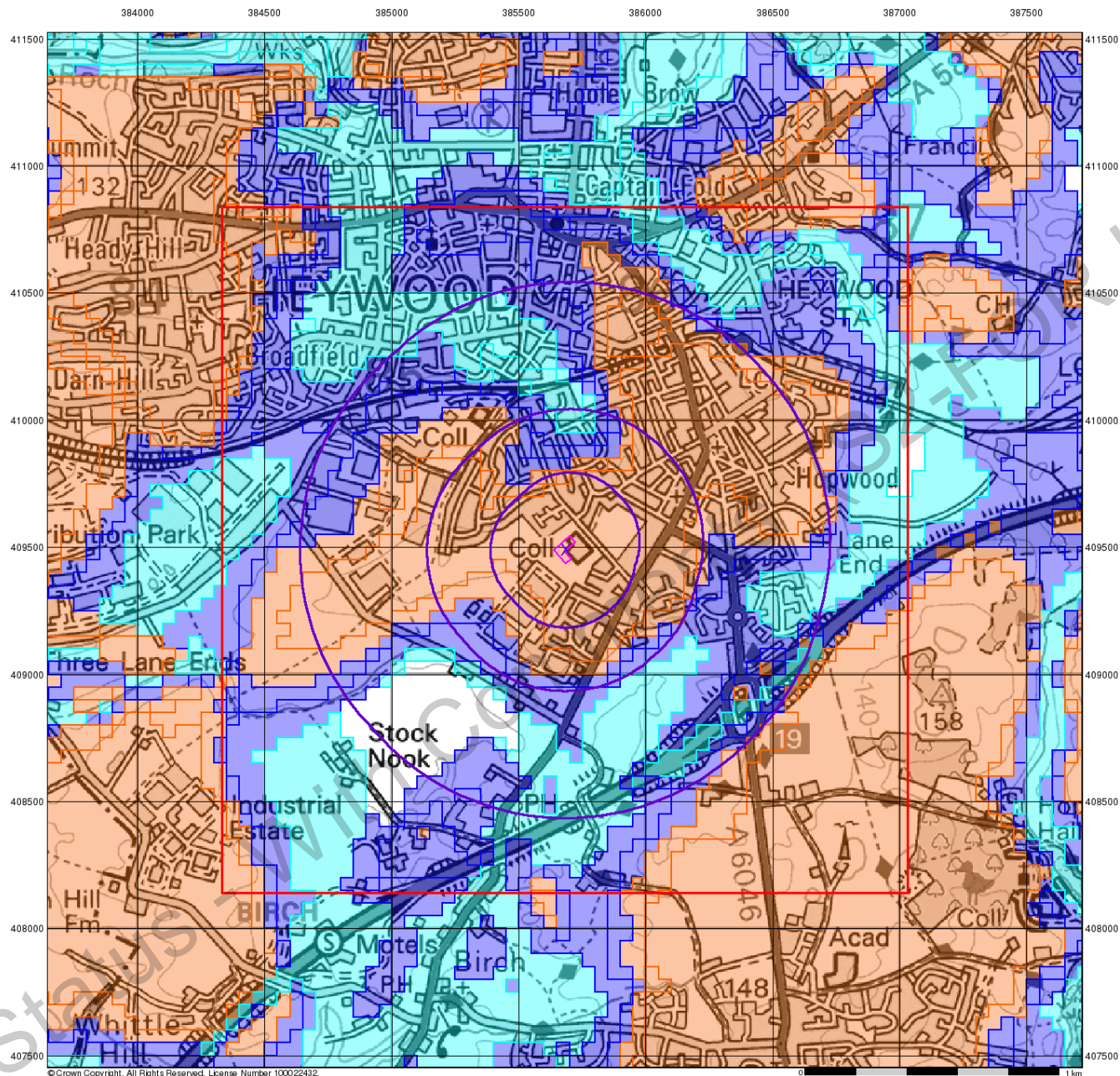
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 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
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BGS Flood GFS Data

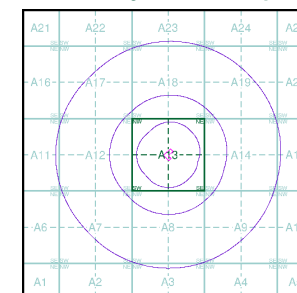
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 298633447_1_1
 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
 Site Area (Ha): 0.4
 Search Buffer (m): 1000

Site Details

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General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral
- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

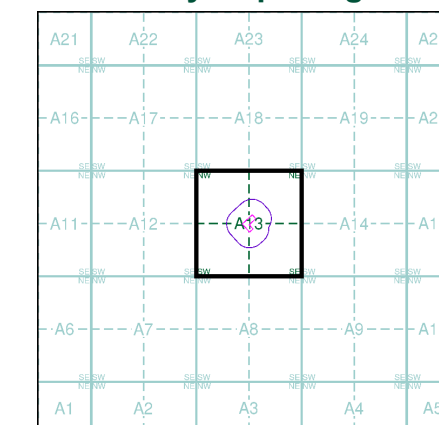
Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Geological

- BGS Recorded Mineral Site

Site Sensitivity Map - Segment A13

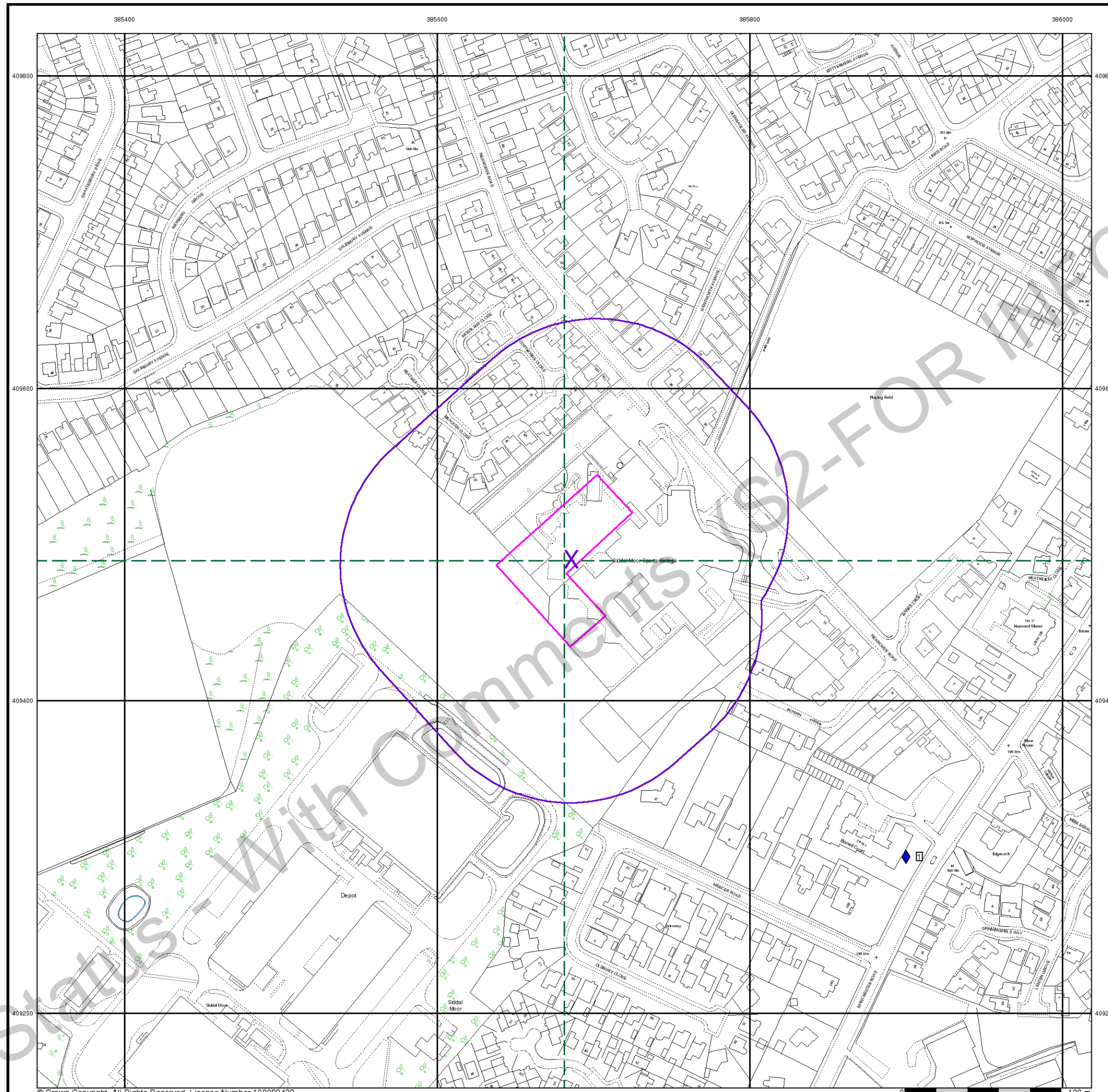


Order Details

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 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
 Site Area (Ha): 0.4
 Plot Buffer (m): 100

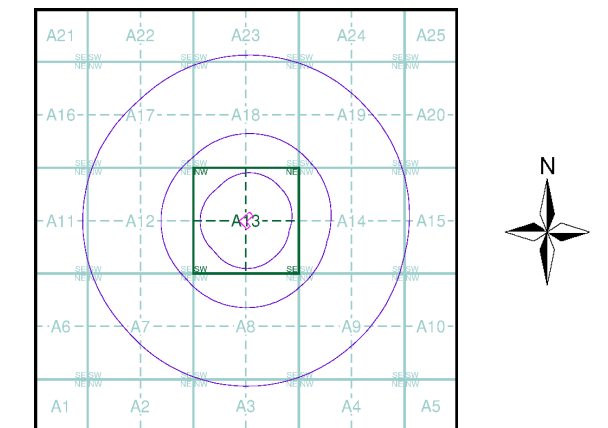
Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT



- General**
- Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
 - Several of Type at Location
- Agency and Hydrological**
- Contaminated Land Register Entry or Notice (Location)
 - Discharge Consent
 - Enforcement or Prohibition Notice
 - Integrated Pollution Control
 - Integrated Pollution Prevention Control
 - Local Authority Integrated Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control Enforcement
 - Pollution Incident to Controlled Waters
 - Prosecution Relating to Authorised Processes
 - Prosecution Relating to Controlled Waters
 - Registered Radioactive Substance
 - River Network or Water Feature
 - River Quality Sampling Point
 - Substantiated Pollution Incident Register
 - Water Abstraction
 - Water Industry Act Referral
- Hazardous Substances**
- COMAH Site
 - Explosive Site
 - NIHHS Site
 - Registered Hazardous Substance Consent
 - Planning Hazardous Substance Enforcement
 - BGS Recorded Mineral Site
- Waste**
- BGS Recorded Landfill Site (Location)
 - EA Historic Landfill (Buffered Point)
 - EA Historic Landfill (Polygon)
 - Integrated Pollution Control Registered Waste Site
 - Licensed Waste Management Facility (Landfill Boundary)
 - Licensed Waste Management Facility (Location)
 - Local Authority Recorded Landfill Site (Location)
 - Local Authority Recorded Landfill Site
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Water)
 - Potentially Infilled Land (Water)
 - Potentially Infilled Land (Water)
 - Registered Landfill Site (Location)
 - Registered Landfill Site (Point Buffered to 100m)
 - Registered Landfill Site (Point Buffered to 250m)
 - Registered Waste Transfer Site (Location)
 - Registered Waste Transfer Site
 - Registered Waste Treatment or Disposal Site (Location)
 - Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice A

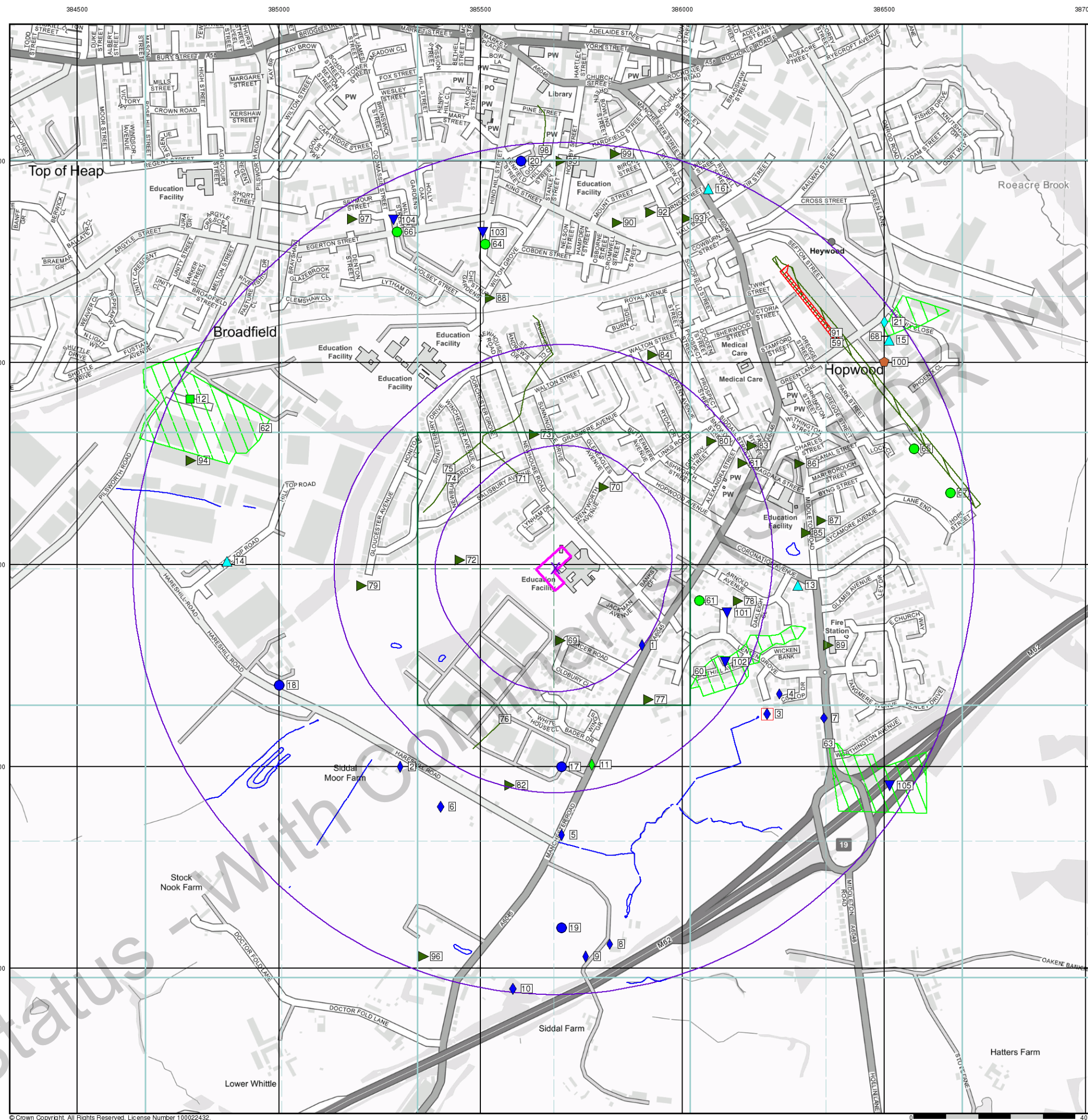


Order Details

Order Number: 298633447_1_1
 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
 Site Area (Ha): 0.4
 Search Buffer (m): 1000

Site Details

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Industrial Land Use Map

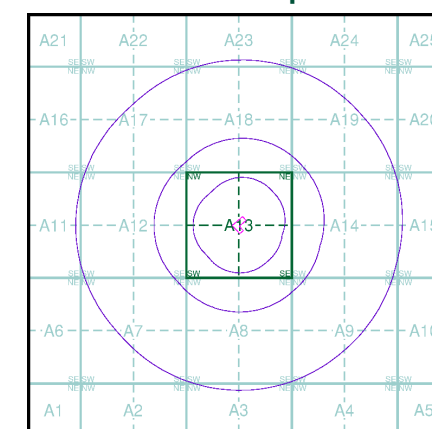
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

Industrial Land Use Map - Slice A



Order Details

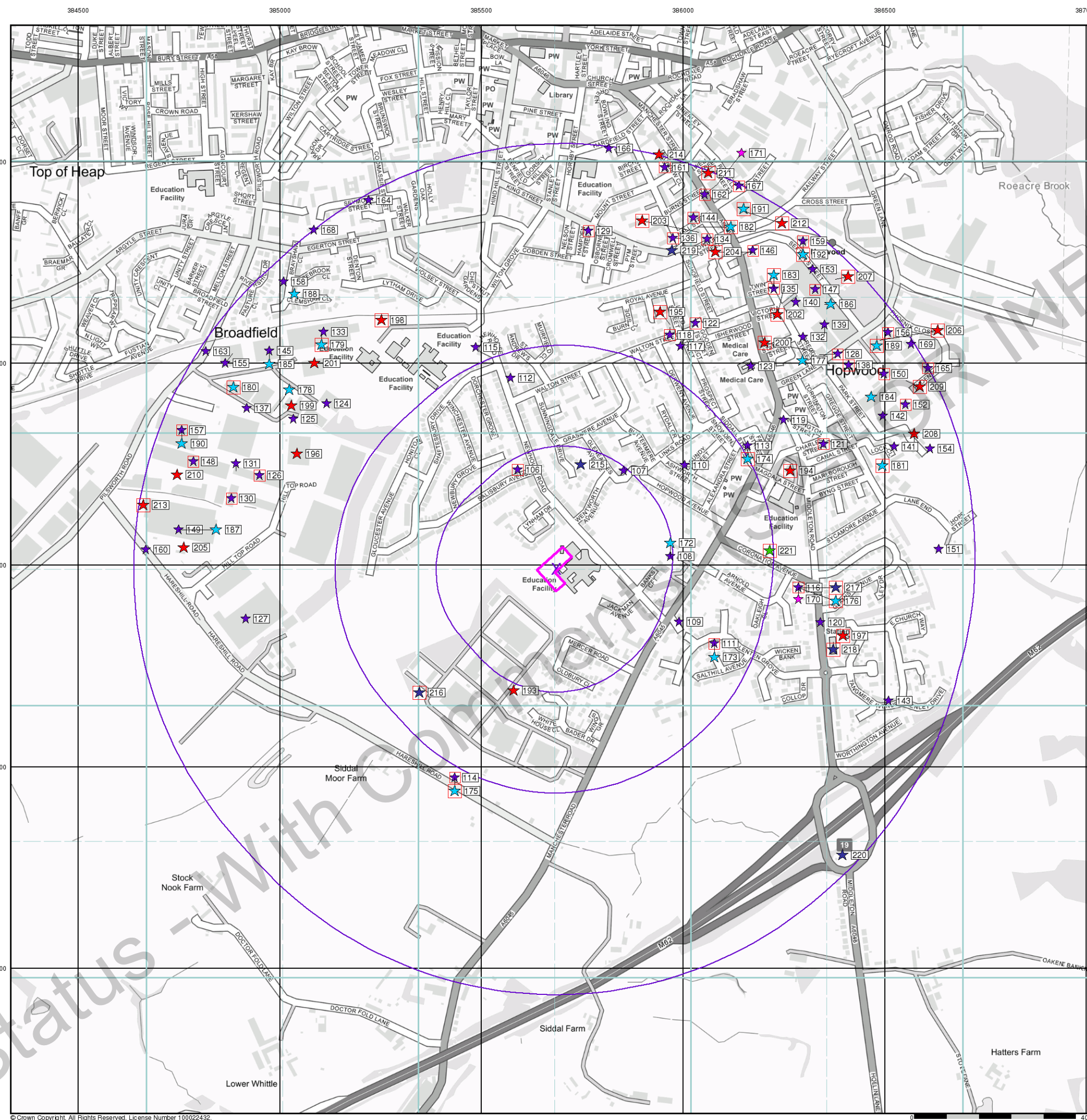
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Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
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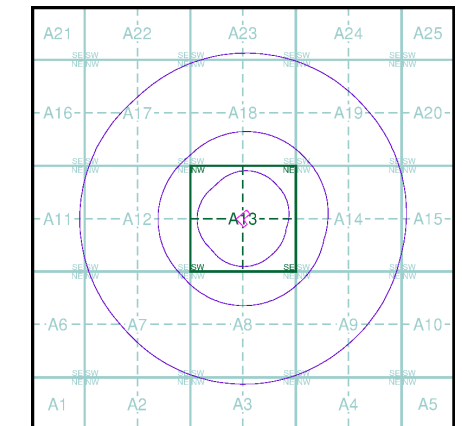
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A

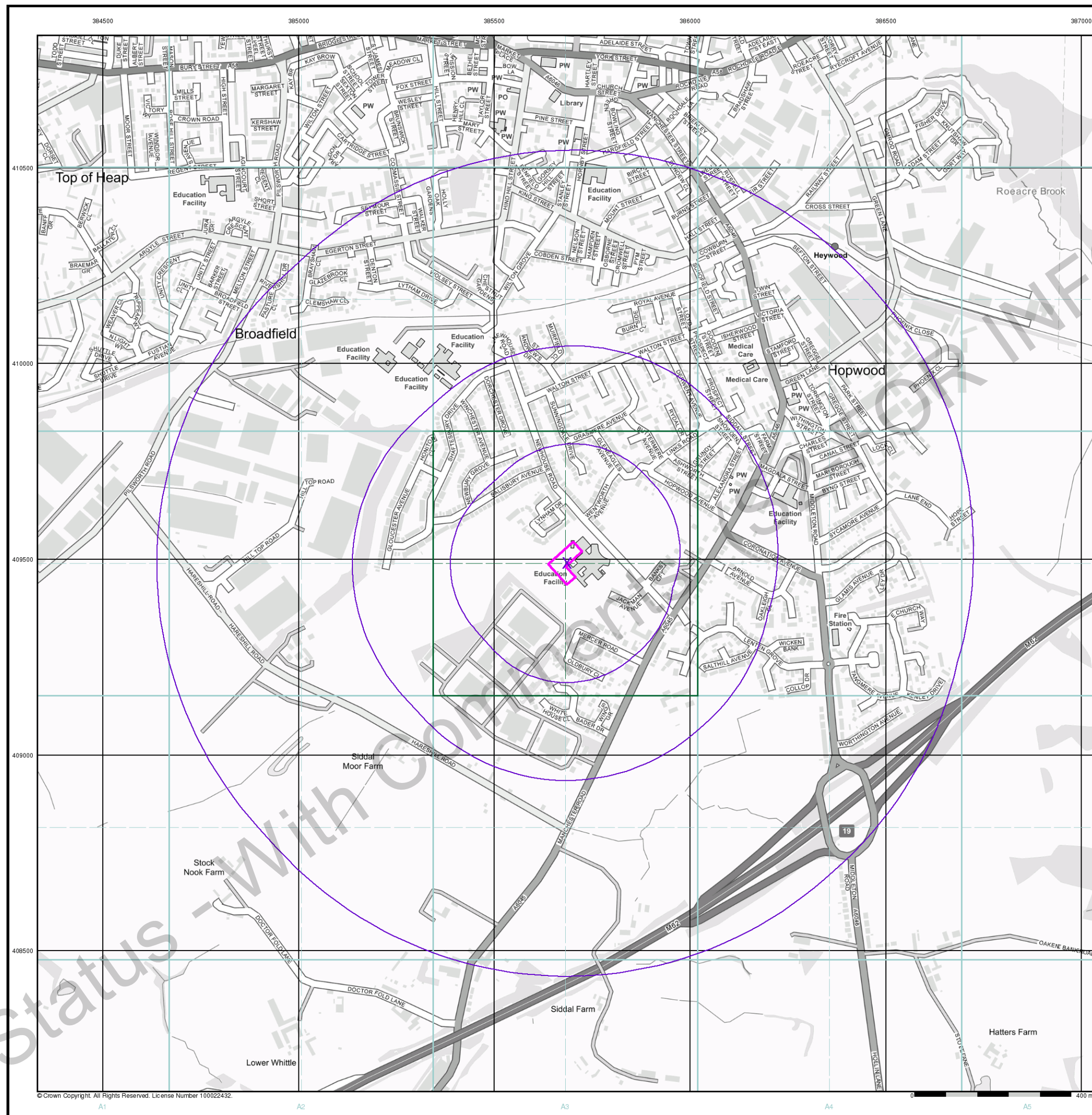


Order Details

Order Number: 298633447_1_1
 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
 Site Area (Ha): 0.4
 Search Buffer (m): 1000

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT



General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point
-  Map ID
-  Several of Type at Location

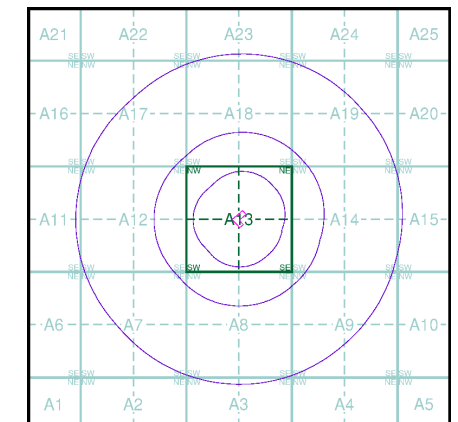
Agency and Hydrological (Boreholes)

-  BGS Borehole Depth 0 - 10m
-  BGS Borehole Depth 10 - 30m
-  BGS Borehole Depth 30m +
-  Confidential
-  Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A

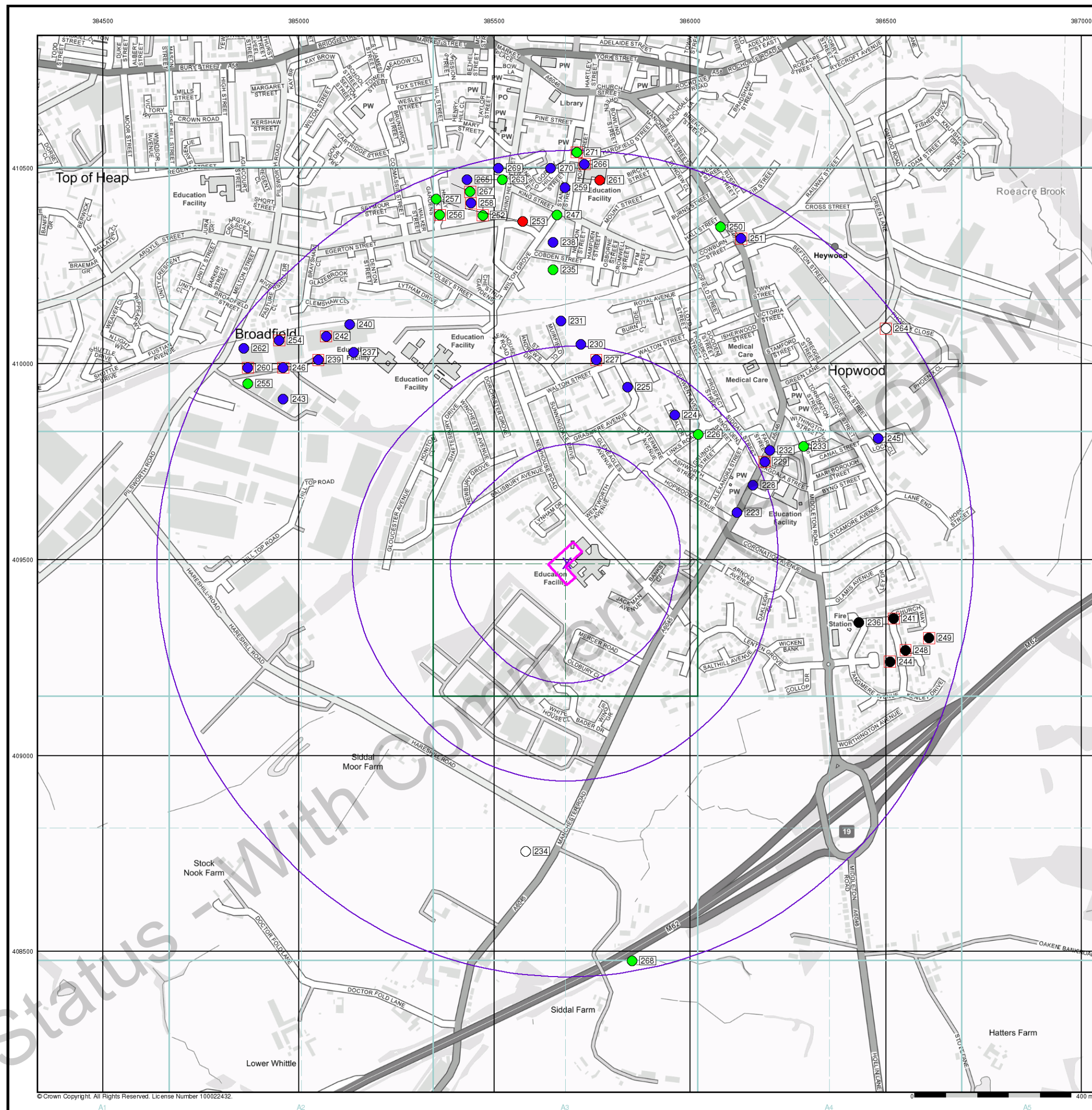


Order Details

Order Number: 298633447_1_1
 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
 Site Area (Ha): 0.4
 Search Buffer (m): 1000

Site Details

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General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

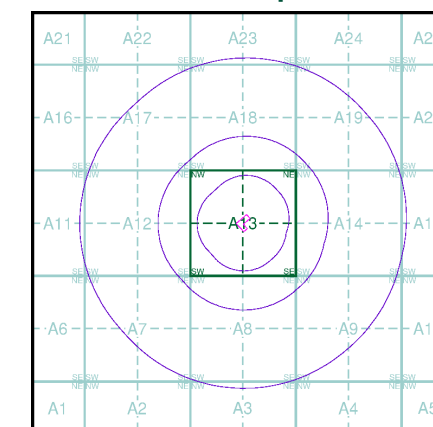
OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

Contours (height in meters)

- Standard Contour
- Master Contour
- Spot Height
- MLW Mean Low Water
- MHW Mean High Water

OS Water Network Map - Slice A

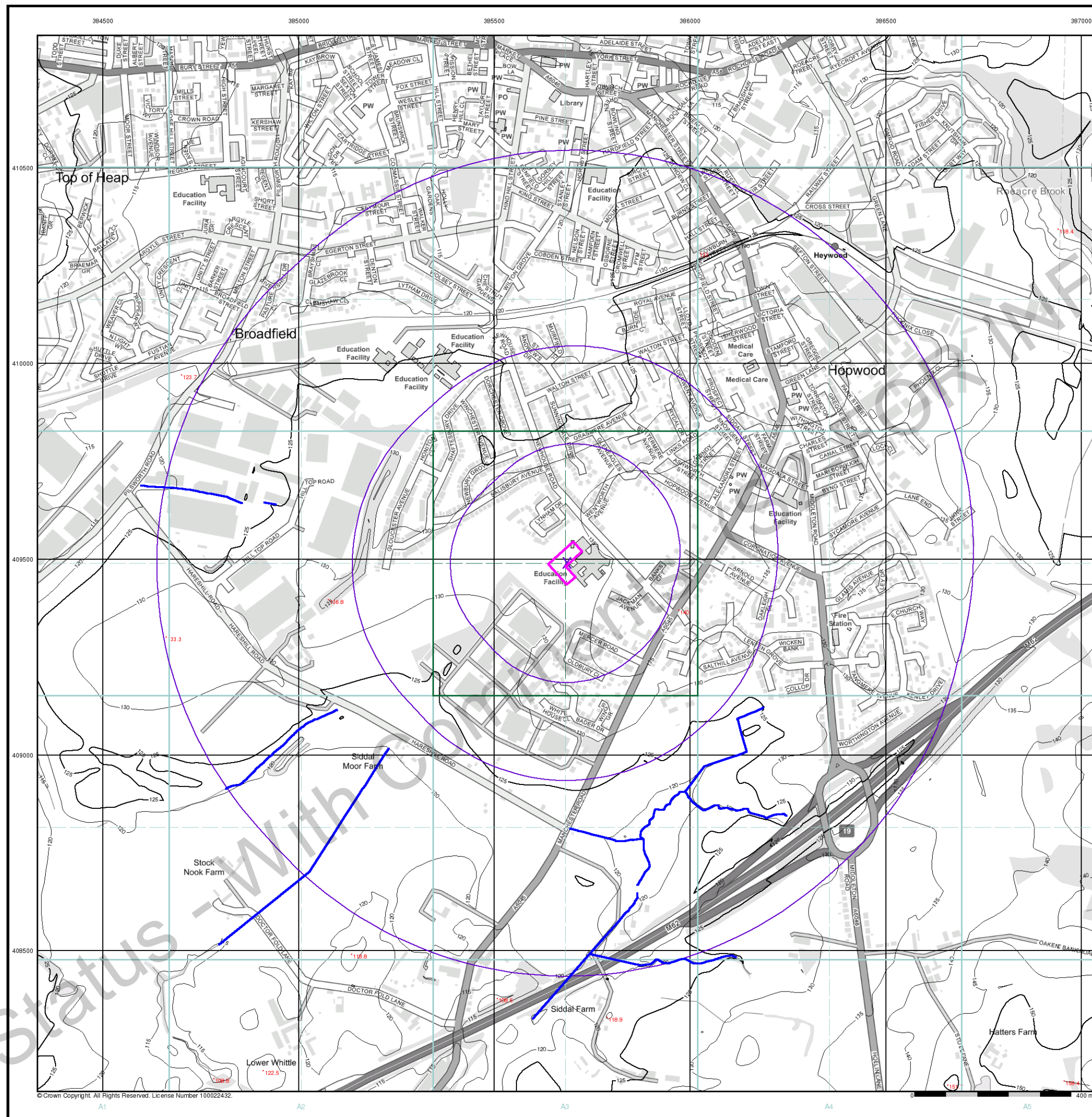


Order Details

Order Number: 298633447_1_1
 Customer Ref: B079809.300
 National Grid Reference: 385690, 409490
 Slice: A
 Site Area (Ha): 0.4
 Search Buffer (m): 1000

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Risk of Flooding from Surface Water

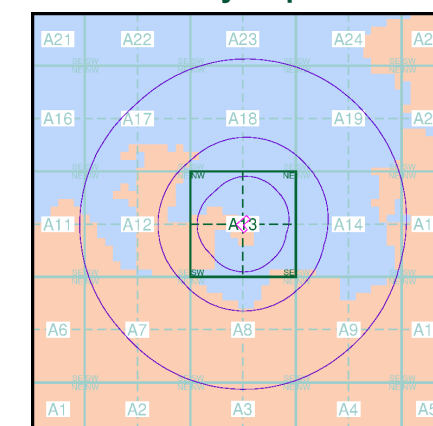
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EANRW Suitability Map - Slice A



Order Details

Order Number: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details

Newhouse Academy, Newhouse Road, HEYWOOD, OL10 2NT

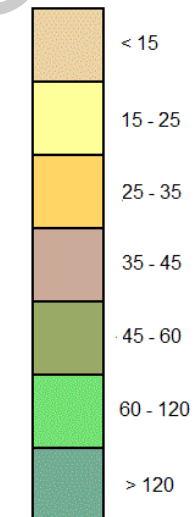


General

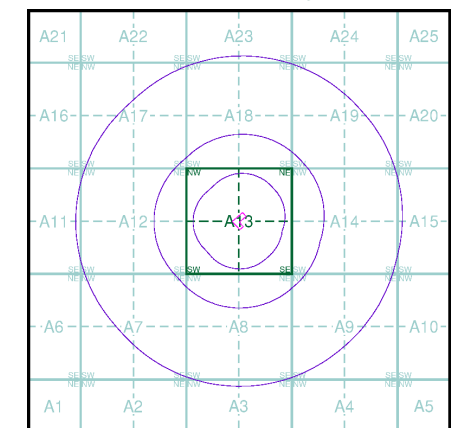
Specified Site Specified Buffer(s) Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg



Estimated Soil Chemistry Arsenic - Slice A



Order Details

Order Details: 298633447_1_1
Customer Ref: B079809.300
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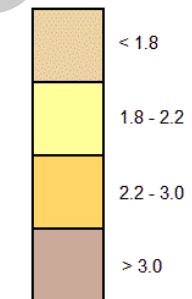


General

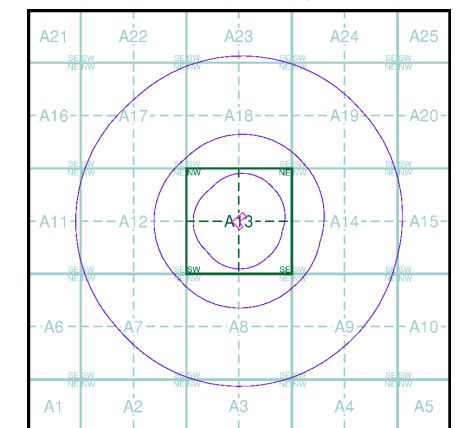
Specified Site Specified Buffer(s) Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg



Estimated Soil Chemistry Cadmium - Slice A



Order Details

Order Details: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

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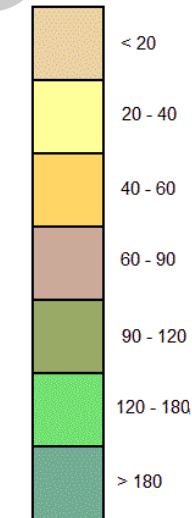


General

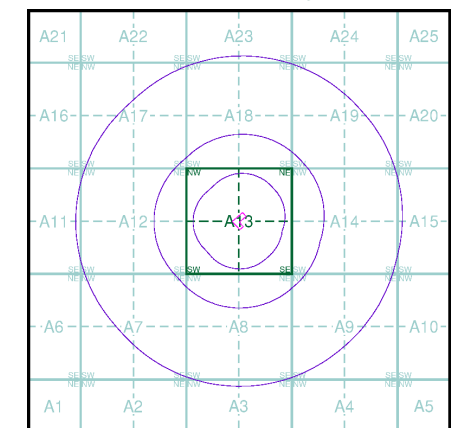
Specified Site Specified Buffer(s) Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg



Estimated Soil Chemistry Chromium - Slice A



Order Details

Order Details: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
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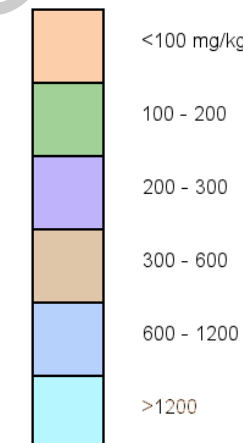


General

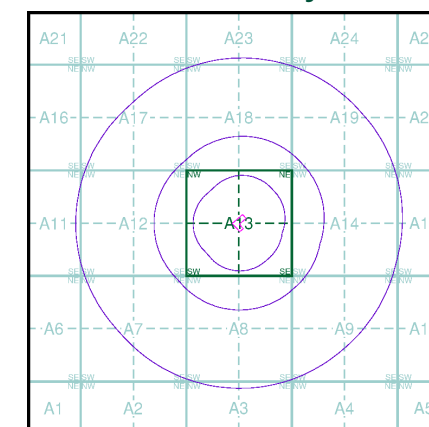
Specified Site Specified Buffer(s) Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg



Estimated Soil Chemistry Lead - Slice A



Order Details

Order Details: 298633447_1_1
Customer Ref: B079809.300
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Slice: A
Site Area (Ha): 0.4
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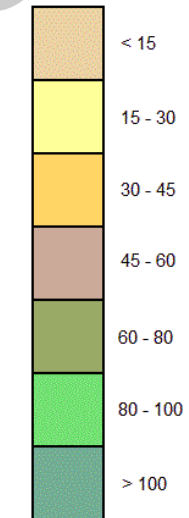


General

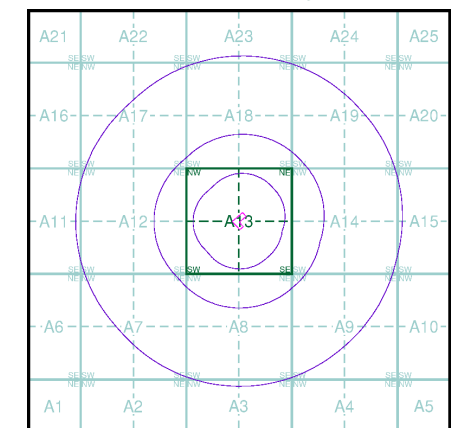
Specified Site Specified Buffer(s) Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg



Estimated Soil Chemistry Nickel - Slice A



Order Details

Order Details: 298633447_1_1
Customer Ref: B079809.300
National Grid Reference: 385690, 409490
Slice: A
Site Area (Ha): 0.4
Search Buffer (m): 1000

Site Details

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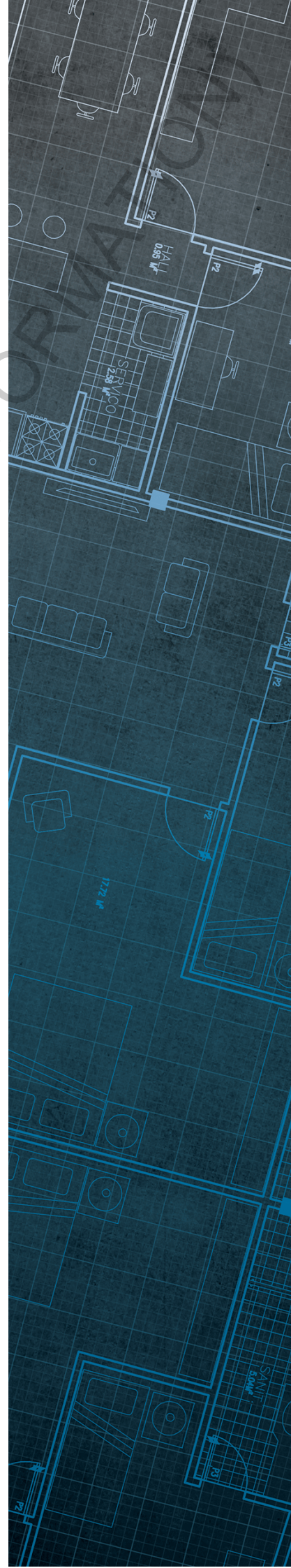
The Coal
Authority

Consultants Coal Mining Report

Newhouse Academy
Newhouse Road
Heywood
Rochdale
OL10 2NT

Date of enquiry: 20 July 2022
Date enquiry received: 20 July 2022
Issue date: 20 July 2022

Our reference: 51003284015001
Your reference: EBMA3454



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

Curtins

Enquiry address

Newhouse Academy
Newhouse Road
Heywood
Rochdale
OL10 2NT

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

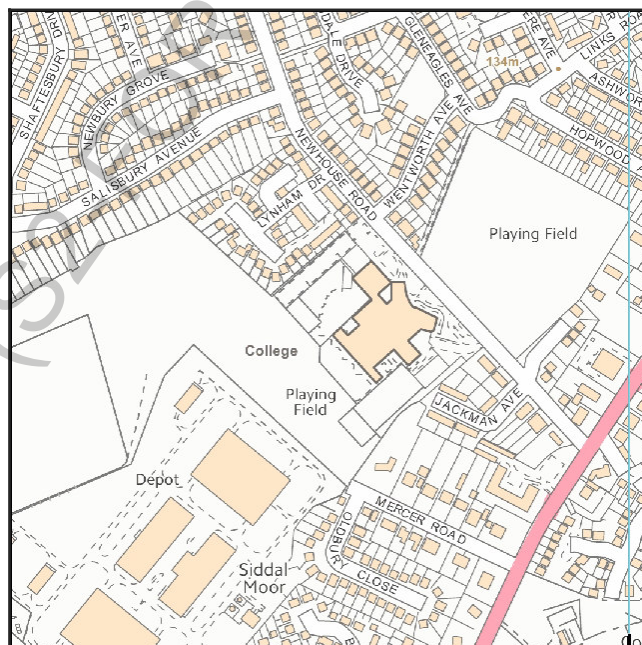
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

16820		
-------	--	--

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

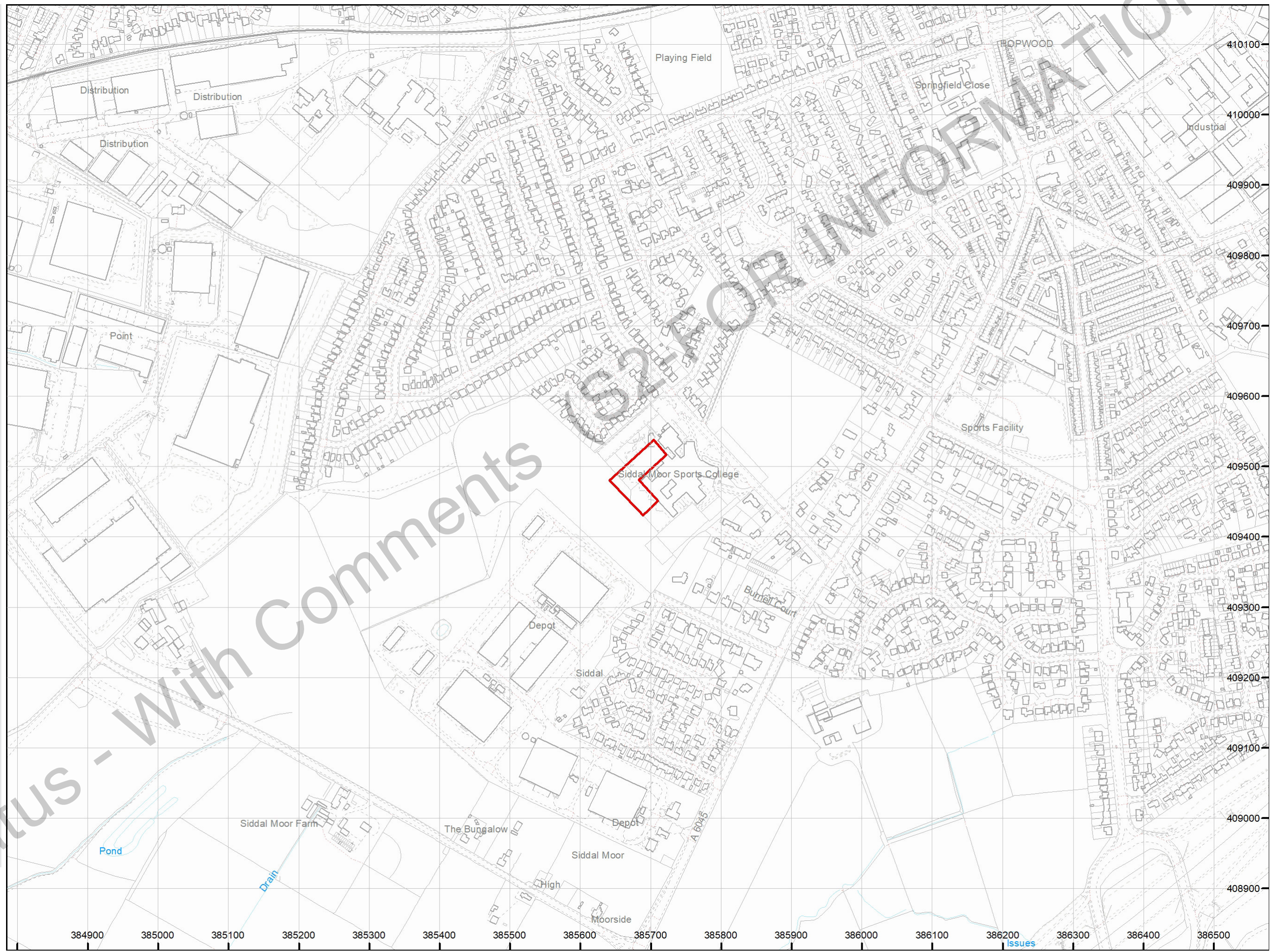
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown 

How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com



Appendix C – Exploratory Hole Logs

- Geobore S Rotary Boreholes RC01 to RC03
- Lankelma CPT Report

								Rotary Core Log		Borehole No. RC01 Sheet 1 of 6	
Project Name: Newhouse Academy				Project No. 079809		Co-ords: -		Hole Type RC			
Location: Heywood				Level: 133.87		Scale 1:25		Logged By JP			
Client: Morgan Sindall				Dates: 26/07/2022 - 28/07/2022							
Well	Water Strikes	Depth (m)	Type / Fl	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.40	ES				0.15	133.72		TOPSOIL: Grass cover over soft dark brown sandy clay with frequent rootlets.	
							0.60	133.27		MADE GROUND: Loose dark brown slightly clayey gravelly fine to medium sand with cobbles and or boulders. Gravel is angular to subangular fine to coarse of brick, concrete and mudstone. Cobbles and or boulders of angular to subangular brick.	
		0.90 - 1.20	B				0.90	132.97		MADE GROUND: Loose blackish brown mottled light brown and blueish grey slightly gravelly clayey fine to medium sand. Gravel is angular to subangular fine to coarse of brick and mudstone. Rare lenses of light brown clayey sand and lenses of blueish grey clay.	1
		1.00	D							Loose light brown mottled grey clayey slightly gravelly fine to medium SAND. Gravel is subangular to subrounded mudstone. From 1.20 to 1.65m: SPT 2,2/2,2,2,2 N value = 8	
							2.00	131.87		Loose dark brown clayey slightly gravelly fine to medium SAND. Gravel is subangular to subrounded mudstone. With rare lenses, up to 5mm wide, of orange fine to medium sand. From 2.00 to 2.45m: SPT 2,2/2,2,2,2 N value = 8	2
		3.00	D							From 2.7 to 2.8m: Cobble of rounded granite.	3
							3.50	130.37		Medium dense dark brown clayey slightly gravelly fine to medium SAND. Gravel is subangular to subrounded mudstone. With rare lenses, up to 5mm wide, of orange fine to medium sand. From 3.50 to 3.95m: SPT 3,3/3,4,4,4 N value = 15	4
							5.00	128.87		Continued on next sheet	5

Remarks
Service inspection pit hand excavated from GL to 1.20m.
Groundwater strikes unable to be recorded due to use of water flush.
No elevated ground gas concentrations (CO2, CH4, CO, H2S) recorded. No reduced O2 concentrations recorded.
Rotary cored from ground level to 20.00m bgl., with rotary open hole follow-on.
Ground level estimated from topographic survey.

							Rotary Core Log			Borehole No. RC01 Sheet 2 of 6		
Project Name: Newhouse Academy				Project No. 079809		Co-ords: -			Hole Type RC			
Location: Heywood				Level: 133.87			Scale 1:25					
Client: Morgan Sindall				Dates: 26/07/2022 - 28/07/2022			Logged By JP					
Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD						
		6.00	D				6.50	127.37		Firm light grey mottled orange slightly sandy gravelly CLAY. Gravel is angular fine to coarse mudstone. Weathered bedrock <i>From 5.00 to 5.45m: SPT 5,5/6,6,8,7 N value = 27</i>	6	
		6.50 - 8.00	NR	7	7	0				Very weak to weak dark grey thinly laminated MUDSTONE. Fractures are subhorizontal 0-5° very closely spaced planar rough. Assumed clay infill washed out. <i>From 6.50 to 7.89m: No Recovery</i>	7	
			10									
		8.00 - 9.50	NR								<i>From 8.00 to 8.1m: SPT 25/50 Penetrating 55mm after seating blows, 95mm in total and refused.</i> <i>From 8.00 to 8.64m: No Recovery</i> <i>From 8.00 to 8.64m: Recovered as not intact medium to coarse gravel of MUDSTONE.</i> <i>From 8.80 to 9.50m: No Recovery</i>	8
											Medium strong to weak dark grey thinly laminated MUDSTONE. Fractures are subhorizontal 0-10° extremely closely to closely spaced planar to stepped rough. <i>From 8.80 to 9.50m: No Recovery</i>	9
		9.50					9.50	124.37		<i>From 9.88 to 9.93m: Inclined 55° planar smooth with iron oxide discolouration.</i>	10	
Continued on next sheet												

Remarks

Service inspection pit hand excavated from GL to 1.20m.
 Groundwater strikes unable to be recorded due to use of water flush.
 No elevated ground gas concentrations (CO2, CH4, CO, H2S) recorded. No reduced O2 concentrations recorded.
 Rotary cored from ground level to 20.00m bgl., with rotary open hole follow-on.
 Ground level estimated from topographic survey.

							Rotary Core Log			Borehole No. RC01 Sheet 3 of 6	
Project Name: Newhouse Academy				Project No. 079809		Co-ords: -			Hole Type RC		
Location: Heywood				Level: 133.87			Scale 1:25			Logged By JP	
Client: Morgan Sindall				Dates: 26/07/2022 - 28/07/2022							
Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00	19	100	53	22				From 10.09 to 10.18m: Subvertical fracture 80-90° stepped rough with iron oxide discolouration. From 10.27 to 10.36m: Inclined 65° planar smooth with iron oxide discolouration.	
			NI							From 10.27 to 10.36m: Recovered as not intact medium to coarse gravel of MUDSTONE. From 11.00 to 11.11m: Subvertical fracture 85-90° undulating smooth with iron oxide discolouration. From 11.00 to 11.72m: No Recovery	11
		11.00 - 12.50	NR	52	17	0					
			10								
			NI							From 12.04 to 12.70m: Recovered as not intact medium to coarse gravel of MUDSTONE.	12
		12.50 - 13.00		100	40	40				From 12.50 to 12.62m: SPT 25/50 Penetrating 115mm after seating blows, 275mm in total and refused.	
			13								
		13.00 - 14.00		72	45	25				From 13.49 to 13.79m: Subvertical fracture 80-90° planar rough with iron oxide discolouration. At 13.54m: Singular crinoid fossil occurrence, 1mm.	13
			27								
		14.00 - 15.50	NI	100	75	71				From 14.46 to 14.66m: Recovered as not intact medium to coarse gravel of MUDSTONE.	14
										Continued on next sheet	15

Remarks

Service inspection pit hand excavated from GL to 1.20m.
 Groundwater strikes unable to be recorded due to use of water flush.
 No elevated ground gas concentrations (CO2, CH4, CO, H2S) recorded. No reduced O2 concentrations recorded.
 Rotary cored from ground level to 20.00m bgl., with rotary open hole follow-on.
 Ground level estimated from topographic survey.

								Rotary Core Log		Borehole No. RC02 Sheet 1 of 6		
Project Name: Newhouse Academy				Project No. 079809		Co-ords: -		Hole Type RC				
Location: Heywood				Level: 133.60		Scale 1:25		Logged By RT				
Client: Morgan Sindall				Dates: -								
Well	Water Strikes	Depth (m)	Type / Fl	Coring			Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD						
							0.12	133.48		Light brown friable TOPSOIL with frequent rootlets	1	
							1.00	132.60		MADE GROUND: Dark brown very gravelly very sandy clay. Gravel is fine to coarse sub-angular brick and concrete fragments, sand is fine to coarse.		
			1.10 - 1.20 ES								MADE GROUND: Soft light grey very silty slightly sandy gravelly clay. Sand is fine to coarse. Gravel is fine to medium sub-rounded to sub-angular brick and concrete fragments.	2
			1.20 - 1.65 U						1.20m SPT Result - 1/2/2/2/3/4 N=11			
			1.20 - 2.25 B									
			1.80 - 2.25 U				1.80	131.80		Firm light brown very silty very sandy very gravelly CLAY. Sand is fine to coarse. Gravel is sub-rounded to sub-angular sandstone, mudstone, slate and quartzite	3	
							2.25	131.35		1.80m SPT Result - 2/3/3/3/4/4 N=14		
			3.00 - 3.30 ES							Light brown very clayey sandy GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub-rounded to angular mudstone and sandstone.	4	
			3.30 - 3.75 U				3.30	130.30		Light brown/grey very sandy very silty GRAVEL. Sand is fine to coarse. Gravel is fine to coarse sub-rounded to angular mudstone and sandstone.		
							3.80	129.80		Extremely weak, thinly laminated, light brownish grey mudstone. (PENNINE LOWER COAL MEASURES)	5	
		3.80 - 4.80	NI					3.80m to 3.97m recovered as non-intact core of brownish grey gravel of angular mudstone.				
			26	100	40	0		3.97m to 4.11m Fractures are 0-20 degrees, very closely spaced, planar, smooth with iron oxide discolouration between fractures.				
			NI					4.11m to 4.32m Fractures are 10-30 degrees, very closely spaced, planar, smooth with iron oxide discolouration between fractures.				
		4.80 - 5.25	U						4.54m to 4.70m recovered as non-intact core of brownish grey gravelly clay of mudstone.			
									4.80m to 7.80m Fractures are 0-20 degrees, very closely spaced, planar, smooth, with grey clay infill and iron oxide discolouration between fractures.			
Continued on next sheet												

Remarks

Service inspection pit hand excavated from GL to 1.20m.

Groundwater strikes unable to be recorded due to use of water flush.

No elevated ground gas concentrations (CO₂, CH₄, CO, H₂S) recorded. No reduced O₂ concentrations recorded.

Rotary cored from ground level to 16.80m bgl., with rotary open hole follow-on.

Ground level estimated from topographic survey.

								Rotary Core Log		Borehole No. RC02 Sheet 2 of 6		
Project Name: Newhouse Academy				Project No. 079809		Co-ords: -		Hole Type RC				
Location: Heywood				Level: 133.60		Scale 1:25		Logged By RT				
Client: Morgan Sindall				Dates: -								
Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD						
1		4.80 - 6.30	26	100	55	7	6.30	127.30		Very weak to weak, thinly laminated, light grey mudstone. (PENNINE LOWER COAL MEASURES)	6	
		6.30 - 7.80	19.3	100	88	24					7	
		7.80 - 9.30	NI	100	91	20	7.80	125.80			Weak to medium strong, thinly laminated, dark grey mudstone. (PENNINE LOWER COAL MEASURES) 7.80m to 7.94m recovered as non-intact core of grey gravelly clay of mudstone. 7.95m to 8.09m Fractures 70-80 degrees, very closely spaced, undulating, rough with some iron oxide discolouration. 8.15m to 8.29m Fractures 0-20 degrees, very close to extremely closely spaced, planar, smooth. 8.29m to 8.36m Fractures 0-20 degrees, extremely closely spaced, undulating, rough with grey clay infill between fractures. 8.38m to 9.30m Fractures 10-30 degrees, planar, rough with grey clay infill between fractures.	8
			34									9
	NR				9.63	123.97		Medium strong to strong, thinly laminated, dark grey mudstone. (PENNINE LOWER COAL MEASURES)	10			
Continued on next sheet												

Remarks

Service inspection pit hand excavated from GL to 1.20m.

Groundwater strikes unable to be recorded due to use of water flush.

No elevated ground gas concentrations (CO2, CH4, CO, H2S) recorded. No reduced O2 concentrations recorded.

Rotary cored from ground level to 16.80m bgl., with rotary open hole follow-on.

Ground level estimated from topographic survey.

AGS

							Rotary Core Log			Borehole No. RC02 Sheet 3 of 6	
Project Name: Newhouse Academy				Project No. 079809		Co-ords: -			Hole Type RC		
Location: Heywood				Level: 133.60			Scale 1:25				
Client: Morgan Sindall				Dates: -			Logged By RT				
Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.30 - 10.80	13	88	88	29				10.06m to 10.22m 1 No. Fracture 30-45 degrees, undulating, rough with grey clay infill between fractures.	
		10.80 - 12.30	25	100	33	8				10.70m to 10.80m Fractures 45-55 degrees, undulating, rough with grey clay infill between fractures. 10.80m to 12.00m Fractures 10-20 degrees, closely spaced, planar, rough with grey clay infill between fractures.	11
	NI										
		12.30 - 13.80	13	100	87	45	12.30	121.30		Strong, thinly laminated, dark grey mudstone. (PENNINE LOWER COAL MEASURES) 12.50m to 12.99m Fractures 0-10 degrees, closely to medium spaced, planar, smooth, clean with minor grey clay infill between fractures.	
	13.80 - 15.30	6	100	76	74				13.55m to 13.75m Fractures 10-20 degrees, planar, smooth with minor grey clay infill between fractures. 13.75m to 13.80m 1 No. Fracture 70-75 degrees, undulating, rough, with grey clay infill between fractures. 13.80m to 13.91m recovered as non-intact core of artificially fractured mudstone (drilling induced). 13.91m to 14.08m Fractures 0-10 degrees, closely to very closely spaced, planar, smooth. 14.08m to 15.15m Fractures 10-20 degrees, closely to medium spaced, planar, smooth.	14	

Remarks

Service inspection pit hand excavated from GL to 1.20m.
Groundwater strikes unable to be recorded due to use of water flush.
No elevated ground gas concentrations (CO2, CH4, CO, H2S) recorded. No reduced O2 concentrations recorded.
Rotary cored from ground level to 16.80m bgl., with rotary open hole follow-on.
Ground level estimated from topographic survey.

Rotary Core Log

Borehole No.

RC02

Sheet 5 of 6

Project Name: Newhouse Academy

Project No.
079809

Co-ords: -

Hole Type
RC

Location: Heywood

Level: 133.60

Scale
1:25

Client: Morgan Sindall

Dates: -

Logged By
RT

[illegible]

Remarks

Service inspection pit hand excavated from GL to 1.20m.
Groundwater strikes unable to be recorded due to use of water flush.
No elevated ground gas concentrations (CO₂, CH₄, CO, H₂S) recorded. No reduced O₂ concentrations recorded.
Rotary cored from ground level to 16.80m bgl., with rotary open hole follow-on.
Ground level estimated from topographic survey.

Continued on next sheet





							Rotary Core Log		Borehole No. RC03 Sheet 2 of 6				
Project Name: Newhouse Academy				Project No. 079809		Co-ords: -		Hole Type RC					
Location: Heywood				Level: 134.32		Scale 1:25		Logged By JP					
Client: Morgan Sindall				Dates: 29/07/2022 - 08/02/2022									
Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description			
				TCR	SCR	RQD							
		5.00 - 6.50	NR	97	76	0	6.50	127.82		From 5.00 to 5.09m: No Recovery			
			25										
			NI							From 5.68m to 5.84m: Not-intact, recovered as sandy gravel of mudstone.			
			25										
			NI							From 6.20m to 6.40m: Not-intact, recovered as sandy gravel of mudstone.			
		6.50 - 8.00	NI	100	46	21				Weak to medium strong thinly laminated and crossbedded light grey MUDSTONE. Fractures are subhorizontal 0-10° very closely to medium spaced planar smooth. From 6.50 to 7.00m: Recovered as not intact medium to coarse gravel of MUDSTONE.		7	
			11										
			NI										From 7.44 to 7.66m: Recovered as not intact medium to coarse gravel of MUDSTONE.
			15										From 7.74 to 7.86m: Subvertical fracture 80-90° planar rough.
			NI										From 7.86 to 8.00m: Recovered as not intact medium to coarse gravel of MUDSTONE.
		8.00 - 9.50	11	100	100	43				From 8.00 to 8.22m: Subvertical fracture 80-90° planar rough.		8	
			NI							From 9.10 to 9.13m: Subhorizontal fracture 0-20° stepped rough		9	
					From 9.32 to 9.38m: Inclined fracture 45-50° undulating rough.	10							
				From 9.50 to 9.63m: Recovered as not intact medium to coarse gravel of MUDSTONE.									
				From 9.71 to 9.74m: Inclined fracture 45-50° undulating rough.									
Continued on next sheet													

Remarks

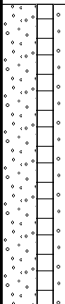
Service inspection pit hand excavated from GL to 1.20m.

Groundwater strikes unable to be recorded due to use of water flush.

No elevated ground gas concentrations (CO₂, CH₄, CO, H₂S) recorded. No reduced O₂ concentrations recorded.

Rotary cored from ground level to 18.61m bgl., with rotary open hole follow-on.

Ground level estimated from topographic survey.

								Rotary Core Log		Borehole No. RC03 Sheet 3 of 6	
Project Name: Newhouse Academy				Project No. 079809		Co-ords: -		Hole Type RC			
Location: Heywood				Level: 134.32		Scale 1:25		Logged By JP			
Client: Morgan Sindall				Dates: 29/07/2022 - 08/02/2022							
Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00		100	91	65				From 10.01 to 10.24m: Subvertical fracture 80-90° undulating rough.	
		11.00 - 12.50	8	100	100	78				From 10.64 to 10.74m: Subvertical 80-90° planar smooth.	11
		12.50 - 14.00		94	94	87					12
		14.00 - 15.50		93	93	50	14.00	120.32	Weak to medium strong thinly laminated dark grey MUDSTONE. Fractures are subhorizontal 0-10° very to extremely closely planar rough and subvertical 80-90° medium spaced planar and stepped smooth, with orange staining and occasional clay infill.	13	
Continued on next sheet											14
Remarks Service inspection pit hand excavated from GL to 1.20m. Groundwater strikes unable to be recorded due to use of water flush. No elevated ground gas concentrations (CO2, CH4, CO, H2S) recorded. No reduced O2 concentrations recorded. Rotary cored from ground level to 18.61m bgl., with rotary open hole follow-on. Ground level estimated from topographic survey.											15



Rotary Core Log

Borehole No.

RC03

Sheet 5 of 6

Project Name: Newhouse Academy

Project No.
079809

Co-ords: -

Hole Type
RC

Location: Heywood

Level:	134.32
--------	--------

Scale
1:25

Client: Morgan Sindall

Dates: 29/07/2022 - 08/02/2022

Logged By
JP

[illegible]

Continued on next sheet

Remarks

Service inspection pit hand excavated from GL to 1.20m.
Groundwater strikes unable to be recorded due to use of water flush.
No elevated ground gas concentrations (CO₂, CH₄, CO, H₂S) recorded. No reduced O₂ concentrations recorded.
Rotary cored from ground level to 18.61m bgl., with rotary open hole follow-on.
Ground level estimated from topographic survey.



NEWHOUSE ACADEMY

SOIL INVESTIGATION

CPT REPORT

**Cone penetration testing
Parameter interpretation**

Project Reference.: P-108182-1

Report Issue No.: 01 P-108182_01

PROJECT:	Newhouse Academy
-----------------	------------------

CLIENT:	Curtins
----------------	---------

FIELDWORK

CPT rig(s)	20.5-tonne track-truck mounted CPT unit (UK3)
Date fieldwork started	28 th October 2022
Date fieldwork completed	28 th October 2022
Lankelma's representative	Emma Stickland
Client's representative	Matthew Holroyd

DOCUMENT CHECKING

Action	Date	Name
Completed	03/11/2022	Christopher Player
Checked	03/11/2022	Joseph Hobbs
Approved	03/11/2022	Joseph Hobbs

Issue	Date	Status
01_01	03/11/2022	Final

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Appendix F	PARAMETER RESULTS 2 – SPT N60, Φ, D_r, E, I_c	
Appendix G	PENETROMETER TEMPERATURE RESULTS	

1 INTRODUCTION

At the request of Curtins, a soils investigation was carried out on project *Newhouse Academy*.

Site location:

(In the general region of)

Newhouse Academy
Newhouse Road
Heywood
OL10 2NT

2 DISCLAIMER

The investigation information, raw data and interpretations provided in this report are for the sole benefit of the Client identified at the front of the report.

Lankelma has exercised reasonable skill and care in the fieldwork and preparation of this report. This report has been completed based on information available to Lankelma at the time of preparation. The measurement and interpreted data in this report do not constitute recommendations for design purposes. An appropriately qualified person must review and interpret the data given in this report, together with any assumptions we have made that affect the data, before using the data for design or recommendation. Lankelma accepts no responsibility for the accuracy or suitability of any assumptions, derived soil parameters, soil classification descriptions or soil layer boundaries contained in this report.

3 COMPLETED WORKS

- 14 nr. cone penetration tests without pore pressure measurement (CPT)
- Factual report including point data interpretation of selected parameters

Appendix A contains tabulated details of the works completed together with analysis results where applicable.

4 FIELDWORK GENERAL

Fieldwork was performed with a 20.5-tonne track-truck mounted CPT unit (UK3) equipped with a 17.0-tonne capacity hydraulic ram set.

The Client was responsible for the positioning and re-survey of all investigative locations.

The target depth for the investigation was between 4 m and 6 m below ground level or until cone refusal as reached. Table 1 details the final test depths and reasons for test termination (*refusal factor*). Where required, each penetration refusal decision was verbally confirmed with the Client's on-site representative.

5 CONE PENETRATION TESTS

Cone penetration testing was carried out in general accordance with BS ISO 22476-1:2012.

Penetrometer measurements included cone tip resistance and friction sleeve resistance, sampled at a 10 mm resolution.

Penetrometers were calibrated in accordance with ISO 376:2011. The management of calibration records is in accordance with ISO 10012. Copies of all calibration certificates for the cones used are provided in Appendix B.

The penetrometer used was a digital model (down-hole digitisation) with internal measurement of load cell temperature. The temperature data was used for QA during the test and QC during processing. The test operative aimed to keep the rate of temperature change to less than $0.5^{\circ}/\text{min}$ in low strength soils to maintain acceptable measurement error. The temperature data can be used to assess ground temperature at depths where the cone has paused for more than 10 minutes with an accuracy of $\pm 0.5^{\circ}$.

5.1 GLOSSARY OF CPT TERMS AND SYMBOLS

SYMBOLS & ABBREVIATIONS

B_q	Pore pressure ratio. The net pore pressure normalized with respect to the net cone resistance: $B_q = (u_2 - u_0)/(q_t \cdot \sigma_v)$
F_r	Normalised friction sleeve resistance: $F_r = f_s / (q_c - \sigma_v)$
f_s	Friction sleeve resistance: The total frictional force acting on the friction sleeve, F_s , divided by its surface area A_s : $f_s = F_s/A_s$.
G	Shear modulus
g	Gravitational constant: $g = 9.81 \text{ m/s}^2$
G_0	Small strain shear modulus
G_s	Specific gravity of solids
HOC	Heavily overconsolidated
I_c	Soil Behaviour Type Index: Continuous numerical representation of Robertson (1990) soil behaviour type classification chart.
LOC	Lightly overconsolidated
NC	Normally consolidated
OC	Overconsolidated
q_c	Cone resistance: The total force acting on the cone Q_c , divided by the projected area of the cone, A_c : $q_c = Q_c/A_c$.
Q_t	Normalised cone resistance (Method 1): $Q_t = (q_c - \sigma_v)/\sigma'_v$
q_t	Corrected tip resistance: The cone tip resistance q_c corrected for pore water pressure effects on the cone shoulder.
$q_{t-\text{net}}$	Net cone resistance: $q_{t-\text{net}} = q_t - \sigma_v$. Where q_t is unavailable q_c is applied.

q_{t1}	Normalised cone resistance (Method 2): $q_{t1} = (q_t) / (\sigma'_v)^{0.5} (\frac{q_t}{\sigma_{atm}}) / (\frac{\sigma_{v0'}}{\sigma_{atm}})^{0.5}$
R_f	Friction ratio: The ratio, expressed as a percentage, of the sleeve friction, f_s , to the cone resistance, q_c , at a given depth: $R_f = (f_s/q_c) \cdot 100$
SBT or SBTn	Soil behaviour type classification
SPT	Standard Penetration Test
u_0	Equilibrium pore pressure
u_2	Pore pressure: Dynamic pore pressure measured at the shoulder position (u_2) during penetration and during dissipation tests. $u_2 = \Delta u_2 + u_0$
Δu_2	Excess pore pressure: $\Delta u_2 = u_2 - u_0$
V_s, V_p	Shear wave velocity, V_s, and pressure wave velocity, V_p. Measured with use of a seismic receiver.
z	Depth below ground level: Depth as penetration length without correction for inclination, or true depth after correction for inclination.
<u>Greek</u>	
γ	Unit weight of soil
γ_w	Unit weight of water
ρ	Volumetric mass density (or specific mass) of soil: $\rho = \gamma/g$
σ_v	Total overburden stress
σ'_v	Effective overburden stress
σ_{atm} , or, P_a	Reference atmospheric stress: $\sigma_{atm} = 101.3 \text{ kPa}$

TERMS

Cone or 'tip': The conical tip of the cone penetrometer.

Friction sleeve: The section of the cone penetrometer upon which the sleeve friction is measured, located behind the cone tip.

Piezocone: A cone penetrometer with a pore pressure sensor (u_2 or u_1)

Seismic cone: A cone penetrometer with a seismic receiver incorporated inside or behind.

Dynamic pore pressure: The pore pressure measured during penetration (u_2 or u_1) .

Soil behaviour type, or 'SBT': Soil classification scheme or classified soil type according to Robertson (1990, 2016) often abbreviated to SBT or according to normalised cone parameters SBTn.

Rod string: The series of hollow tube push rods that transmit force to the penetrometer.

5.2 CPT DATA REDUCTION AND PRESENTATION

The CPT results are presented in Appendix C. The corrected cone resistance (q_t), local side friction (f_s), friction ratio (R_f) and inclination are all presented against depth and elevation in accordance BS ISO 22476-1:2012. CPT data and the associated derived geotechnical parameters are included in the 4.0 data file provided.

The cone tip and sleeve force measurements were converted to pressure using the nominal dimensions of the penetrometer.

Zero load output values were recorded before and after each test. The set of zero values applied to the measurements (subtracted from the raw output measurement) were those deemed to be obtained at a temperature closest to ground temperature, or the average of the two sets where appropriate.

For tests performed with digital cones, the tip sleeve and pore pressure measurements were corrected for static and transient temperature effects using parameters obtained from the *TEMPERATURE EFFECTS* section of the calibration certificate. For each CPT, the dataset was first grouped into penetration strokes (max 1.2 m) and then locally sub-grouped by tip resistance above and below 2 MPa. For each sub-group of $q_c < 2$ MPa, the slope of the temperature (T) profile with time (t) was determined by regression to obtain the rate of temperature change $\Delta T/\Delta t$. For each recorded value, the static and transient temperature error component (apparent sensor output due to change in temperature) was subtracted from the reading.

For subtraction type cones incorporating traditional temperature compensation wiring in the strain gauge circuit, the residual apparent cone tip resistance ($q_{c:a}$) and sleeve resistance ($f_{s:a}$) due to static and transient temperature effects can be approximated by

$$q_{c:a} = a(\Delta T/\Delta t) + b(\Delta T),$$

$$f_{s:a} = a(\Delta T/\Delta t) + b(\Delta T) - q_{c:a}$$

and

$$u_a = b(\Delta T)$$

Where $q_{c:a}$ is the apparent tip resistance, $f_{s:a}$ is the apparent sleeve resistance, a is the apparent resistance due to unit transient temperature change $\Delta T/\Delta t$, and b is the change in apparent resistance per unit static temperature change relative to the temperature of the penetrometer at the time of zero load output measurement. Note that for the piezometer sensor only the static temperature component is considered and is only applied to piezometer sensors without temperature compensation circuitry.

Parameter a is established by subjecting the cone to a positive and negative nominal temperature change ($\Delta T \sim \pm 9^\circ$) in water and measuring the apparent output corresponding to the maximum rate of temperature change at the load cells. Parameter b is established by measuring the apparent output after the cone has temperature stabilised.

The temperature corrected tip ($q_{c:c}$), sleeve resistance ($f_{s:c}$) and pore pressure (u_c) are then found from

$$q_{c:c} = q_{c:m} - q_{c:a},$$

$$f_{s:c} = f_{s:m} - f_{s:a}$$

$$u_c = u_m - u_a$$

Where subscript ‘:m’, denotes the field measured resistance/pressure as recorded in the raw data files.

Notes:

1. Depending on the temperature performance of the individual cone, temperature correction of the sleeve is often not warranted as it does not substantially improve accuracy. This is because for subtraction type cones the errors in the sleeve force largely cancel with errors in the tip force when they have the same sign.
2. There is currently no recognised nomenclature for CPT parameters with temperature correction applied during post processing. To avoid confusion the nomenclature is kept unchanged in the logs and AGS data (q_c/q_t , f_s , and u_2) and unless stated otherwise, temperature correction has been applied using the parameters reported in the calibration certificate.

For tests without u_2 pore pressure measurement it is not possible to derive the total cone resistance (or ‘corrected cone resistance’) expressed as

$$q_t = q_c + u_2 \times (1 - a)$$

Where a is the ‘area ratio’ and $(1 - a)$ is the proportion of cross-sectional area between the cone tip and penetrometer body where pore pressures (positive or negative) can act to add or subtract from the total external axial force on the tip. The difference between measured and corrected values is largest in low strength collapsible soils with large excess pore pressures. The percentage adjustment is described by the curves on the chart below for $a = 0.8$:

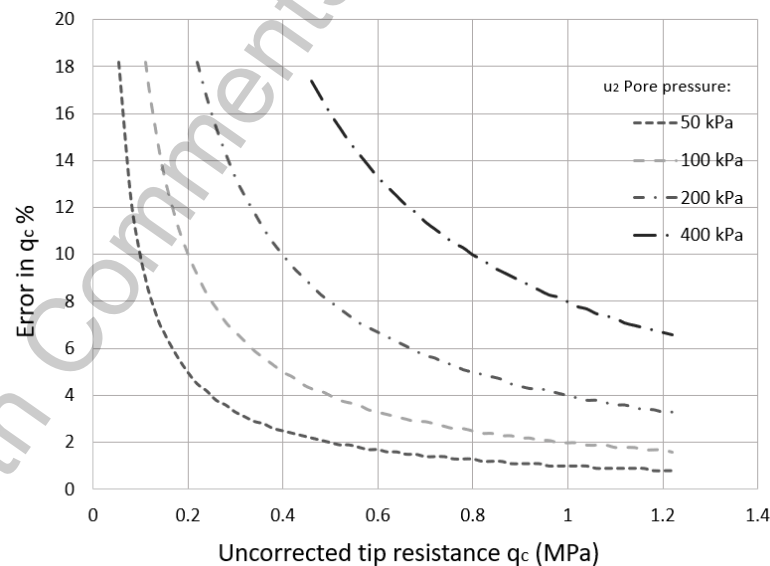


Figure 5-1 Uncorrected tip with measured tip resistance

Penetration length readings were corrected for inclination and sleeve readings were depth corrected for the dimensional offset between cone tip and sleeve during post processing. Rod spikes (artefacts of the pause for push rod addition) were filtered from the cone tip and sleeve data and replaced with an interpolated value. The data was re-sampled from 10 mm resolution to 20 mm to reduce the size of the data set to a more manageable size for end users. A 20 mm

resolution is well within the intrinsic influence zone of the cone tip measurement and the loss of meaningful resolution is negligible.

The raw data is presented in Appendix C. For piezocone tests q_t is reported on all logs, and q_c only appears in the digital AGS data.

Geotechnical parameters appropriate for drained and undrained cone penetration conditions were derived for corresponding drained and undrained derived soil behaviour types (SBTs) respectively, however, to account for uncertainty in the SBT correlation with drainage behaviour, all parameters were derived over a range of transitional soils within the range $2.4 < I_c < 2.7$ (see section 6.3).

In general, the engineering parameters derived for fine grain soils (undrained) are suitable for soils of both silicate and carbonate composition, whereas parameters derived for coarse soils are intended for non-cemented silicate composition.

5.3 IN-SITU STRESS CONDITIONS

An estimate of the equilibrium pore pressure and total and effective vertical stress states is required for derivation of most soil parameters obtained from the CPT and dissipation test.

The total vertical stress with depth was calculated as the sum of the derived soil unit weight above a given depth. See section 5.4 for information on the empirical estimate of soil unit weight.

An arbitrary phreatic surface of 3.00 mBGL was applied in the calculation of effective stress.

Note: The term phreatic surface is used here, however when it is based on piezometer measurements (piezocone) it is assumed that the piezometric level (under hydrostatic conditions) and phreatic surface coincide. The phreatic or piezometric level reported is intended to provide information about pore pressure distribution assumed for calculation purposes and may not represent the true position of the groundwater table or perched water bodies. Complex groundwater pressure distributions will be applied if they are observed from the measurements and are sufficiently well defined.

5.4 SOIL UNIT WEIGHT

The soil unit weight was estimated using the following method proposed by Robertson (2010b).

$$\frac{\gamma}{\gamma_w} = 0.27 \log(R_f) + 0.36 (\log(q_t/R_f)) + 1.236$$

Throughout pre-drilled zones (inspection pits or drill-out) the soil was assigned a nominal unit weight of 17 kN/m³.

For depths where the friction sleeve resistance measurement was less than zero due to measurement limitations, the friction sleeve resistance input parameter was substituted with a nominal 1.0 kPa resistance for the purpose of obtaining an approximate soil unit weight necessary for estimation of total vertical stress over the entire profile.

5.5 SOIL BEHAVIOUR TYPE

The data have been interpreted using 4 soil behaviour type schemes: Robertson (1990, 2010, 2016) and Schneider et al, 2008. The Robertson (1990) scheme is widely used and forms the bases of the layer analysis whereby the profile is split into zones of common classification. The Robertson (2010 & 2016) and Schneider et al methods are less widely used but can provide better or more relevant classification in many instances. Differences in classification between the Robertson 1990, 2016 and Schneider et al schemes can also help to identify significant structure/cementation (Robertson 2016).

A dedicated soil behaviour type comparison log is provided in Appendix D.

Robertson (1990, 2010)

The soil behaviour type (SBT) was interpreted using the Robertson (1990) classification system based on the normalised cone resistance (Q_t) and normalised friction sleeve resistance (F_r) for silicate and organic soils.

While the classification based on normalised parameters is more accurate, particularly for NC soils exceeding 15 m depth, the classification is often significantly in error (artificially granular/drained) at shallow depth (< 1-3 m). The error at shallow depth is associated with the potentially large difference between the estimated vertical effective stress (applied in normalisation) and the unknown horizontal stress influencing penetration resistance.

Robertson (2010) proposed a non-normalised version of the 1990 chart which uses dimensionless cone resistance (q_c/P_a) and friction ratio (R_f). The classification according to this chart can be more reliable at shallow depth.

It should be noted that:

- The SBT classification provides a general soil type and tends to show biased towards the soil fraction that dominates the mechanical behaviour.
- If fine cohesive soils are dry and overconsolidated, the classification tends to shift towards a coarser soil type (or lower I_c index)

While the repeatability and behavioural bias of the SBT is usually beneficial, the classification is not always an appropriate substitute for classification based on particle size and plasticity index tests.

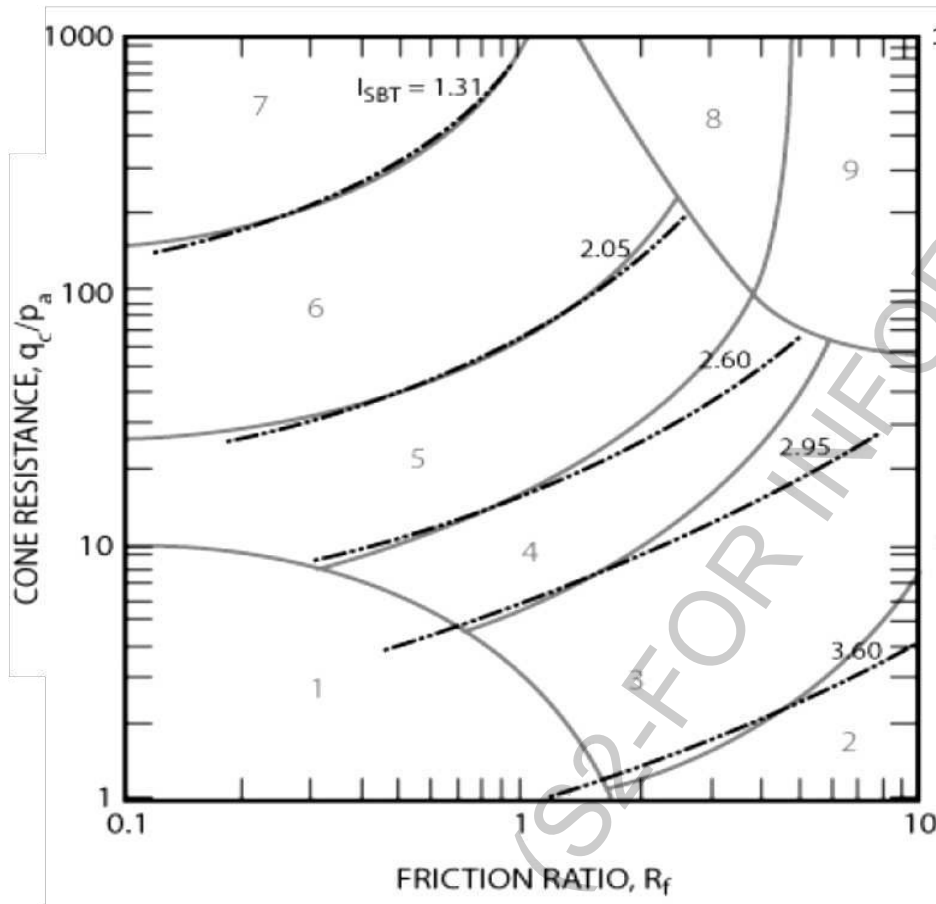


Figure 5-2 Non-normalised SBT chart by Robertson et al. (2010) based on dimensionless cone resistance (q_c/p_a) and friction ratio, R_f , showing contours of SBT index I_{SBT} (denoted I_c on the test plots). The chart is also applicable to normalised tip (Q_t) and sleeve (F_r) values.

Table 1 Robertson (1990, 2010) soil behaviour type zone descriptions

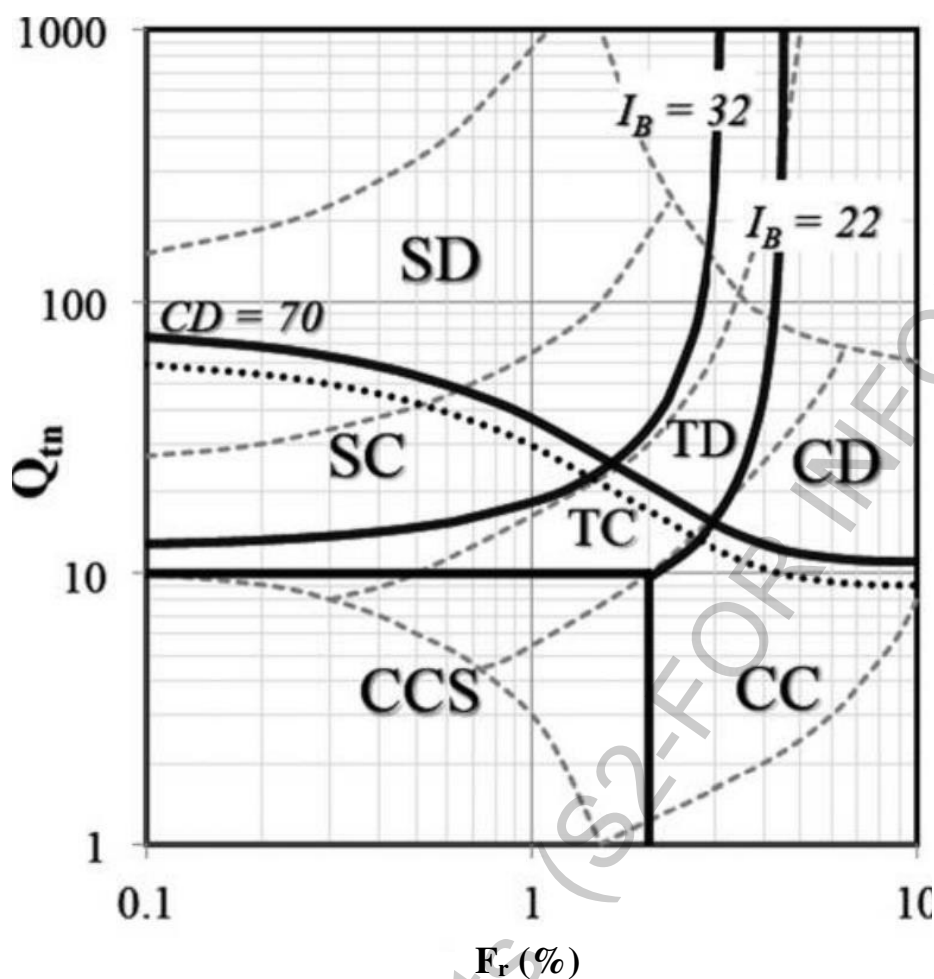
Zone	Soil Behaviour Type (SBT)	
1	Sensitive fine-grained	6 Sands - clean sand to silty sand
2	Organic soils	7 Gravelly sand to sand
3	Clays – clay to silty clay	8* Very stiff/dense sand to clayey sand ¹
4	Silt mixtures - clayey silt to silty clay	9* Very stiff fine grained ¹
5	Sand mixtures – silty sand to sandy silt	*Heavily overconsolidated or cemented

¹Note zones 8 and 9 appear as ‘Very stiff/dense sand to clayey sand - HOC or cemented’ and ‘Very stiff fine grained - HOC or cemented’ within the soil unit descriptions of plots in Appendix D.

Results are presented in Appendix D.

Robertson 2016

Using the same $Q_t - F_r$ space as above, Robertson (2016) proposed an alternative purely behavioural classification system that places less emphasis on classification according to composition/textural properties and more emphasis on mechanical behaviour - namely the tendency of the soil to dilate or collapse during large strain shear, and sensitivity.



Zone	Soil Behaviour Type (SBT)
CCS	Clay-like – contractive - sensitive
CC	Clay-like – Contractive
CD	Clay-like – Dilative
TC	Transitional - Contractive
TD	Transitional - Dilative
SC	Sand-like - Contractive
SD	Sand-like - Dilative

Figure 5-3 Robertson 2016 soil behaviour type classification chart and zone descriptions

Layer Analysis

The layer boundaries are manually interpreted based on broad changes in Robertson 1990 SBT classification or variance with depth. Once layer boundaries are defined, the SBT zones classified within each layer are listed together with the corresponding percentage of data points within the layer (excluding null/filtered data). The modal classification is reported in full, with abbreviated short descriptions for all secondary zones, for example - 'Clays - clay to silty clay [74%]; *Silt mixtures [20%]', where the asterisk represents an abbreviation of the full description 'Silt mixtures - clayey silt to silty clay'. It is important to consider that the classification zone boundaries do not exist in nature and small shifts in the cone response can lead to multiple classifications within layers of relatively uniform behaviour; especially were the layer data plot close to a zone junction and/or has spurious spikes or very thin layers. Therefore, some system

is required to limit the number of classified zones that appear within each layer description. The following logic has been used to only retain high % constituent classification values:

For $LT \geq 1$, $C = 85$
 For $0.5 \leq LT < 1$, $C = 75$
 For $0 < LT < 0.5$, $C = 65$

Where

C = Minimum % SBT zone classification coverage within the layer description text
 LT = Layer thickness (m)

For layers having a thickness of less than 1 m, 10% of data at the top and bottom of the layer are excluded to limit the effect of transition zone data (measured resistance influenced by overlying or underlying strata) being included in the classification.

The continuous SBT index I_c should be used to assess the classification distribution and variation not accounted for by the layer description.

5.6 SOIL BEHAVIOUR TYPE INDEX - I_c

The principal trend in soil behaviour type (SBT) variation can be expressed by a continuous index, I_c , proposed by Robertson and Wride (1998) based on a similar index proposed by Jefferies and Davies (1993). The index provides a continuous profile of SBT variation with depth for end-user analysis of soil units and variation within units. The equivalent non-normalised version proposed by Robertson (2010) is provided for comparison.

The basis of I_c and its approximation of the original chart classification zones may be seen from Figure 5-2. The method does not identify zones 1 (*sensitive fine grained*) or zones 8 & 9 (*heavily overconsolidated or cemented*).

Normalised SBT index I_c (Robertson and Wride, 1998):

$$I_c = [(3.47 - \log Q_t)^2 + (\log F_r + 1.22)^2]^{0.5}$$

Non-normalised SBT index I_c (Robertson, 2010):

$$I_c = \left[\left(3.47 - \log \left(\frac{q_c}{\sigma_{atm}} \right) \right)^2 + (\log R_f + 1.22)^2 \right]^{0.5}$$

The normalised version of I_c is generally more accurate, while the non-normalised version is intended for compatibility with the non-normalised Robertson's (2010) SBT chart and may be more accurate at shallow depths in overconsolidated soils.

The results are presented in Appendix D.

5.7 RELATIVE DENSITY

The relative density of sands was calculated based on an empirical relationship proposed by Jamiolkowski *et al.* (2001) based on a large database of undisturbed frozen samples and

calibration chamber tests. The expected accuracy may be evaluated from the figures presented below.

$$D_r = 100 \left[0.268 \cdot \ln \left(\frac{q_t / \sigma_{atm}}{\sqrt{\sigma_{vo}' / \sigma_{atm}}} \right) - k \right]$$

k = Compressibility dependant constant can be taken as -0.675 for medium compressibility (applied value in our interpretation), ≤ 1 for high compressibility and ≥ 2 for compressible sands.

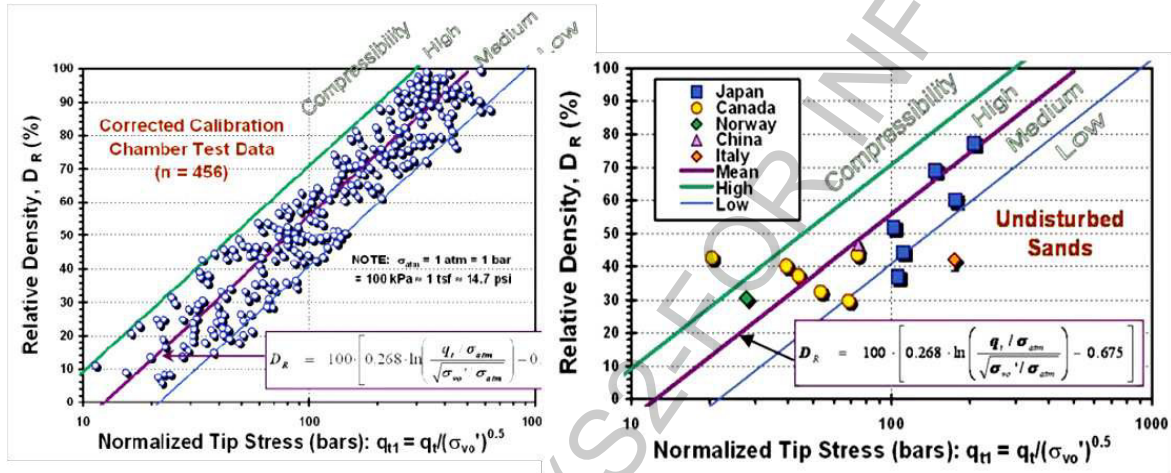


Figure 5-4 Relative density with normalised tip stress and sand compressibility from calibration chamber tests (left) and undisturbed frozen samples (right). Jamiolkowski *et al.* (2001). Reproduced from Mayne (2007).

The results are presented in Appendix F.

5.8 UNDRAINED SHEAR STRENGTH

The undrained shear strength s_u is usually estimated by the bearing capacity method, whereby the net tip resistance is divided by a factor N_k (Lunne *et al.*, 1981):

$$s_u = \frac{q_c - \sigma_{v0}}{N_k}$$

Where N_k is an empirical factor which varies with soil type, stress history, structure/fabric, plasticity, and the mode of shear.

Mayne and Peuchen (2018) performed an evaluation of 407 high-quality undrained anisotropically consolidated triaxial compression tests (CAUC) with net tip resistance data pairs, resulting in N_{kt} factors with regression analysis details for five categories of clays shown in Table 2.

Table 2 Summary of CAUC s_u versus q_{net} for clays. Reproduced from Mayne and Peuchen (2018).

Clay Group	Number of sites	Nr Data	Correlation Coefficient r^2	Factor N_{kt}	Mean Pore Pressure Parameter B_q
Offshore NC-LOC	17	115	0.98	12.32	0.51
Onshore NC-LOC	30	191	0.867	12	0.53
Sensitive NC-LOC	5	43	0.507	10.33	0.84
OC Intact	5	36	0.862	13.57	0.49
OC Fissured	5	22	0.393	22.47	-0.01
All clays	62	407	0.923	13.33	0.55

Alternatively, a variable N_{kt} factor can be estimated for the profile as a function of the pore pressure parameter B_q , applicable for B_q values of > -0.01 . The following equation proposed by Mayne and Peuchen is based on the same database evaluation:

$$N_{kt} = 10.5 - 4.6 \cdot \ln(B_q + 0.1)$$

Where the pore pressure parameter B_q is the ratio of excess pore pressure to net tip resistance:

$$B_q = \frac{u_2 - u_0}{q_t - \sigma_{v0}}$$

The N_{kt} estimate has a standard error of 2.4 N_k and correlation coefficient of 0.645.

The estimate based on B_q is presented as ' s_{u5} ' on the parameter plots and is only suitable for tests that have a high-quality pore pressure data, often indicated by a positive, repeatable, and dynamic response.

Note: N_{kt} (with subscript 't') indicates a N_k factor that has been established using the corrected tip resistance q_t . N_{kt} can be applied to the uncorrected tip resistance q_c (non-piezcone tests) but results in a slightly lower estimate of s_u depending on the correction magnitude ($q_c - q_t$) in lower strength soils.

Undrained shear strengths corresponding to selected values of N_k are presented on the plots of Appendix D. ' s_{u3} ' on the logs ($N_k = 15$) has been included as a reference for comparison to traditionally applied N_k values of 15 and 20.

The results are presented in Appendix E.

5.9 OVERCONSOLIDATION RATIO

The preconsolidation stress σ'_p was calculated based on the method proposed by Mayne et al (2009):

$$\sigma'_p = k \cdot (q_t - \sigma_{v0})^{m'}$$

$$OCR = \sigma'_p / \sigma'_{v0}$$

Mayne *et al* found that the trend with mean grain size followed a power law through the addition of exponent m' and that its value can be estimated by relation to soil behaviour type index I_c :

$$m' = 1 - \frac{0.28}{1 + \frac{I_c}{2.65}}^{25}$$

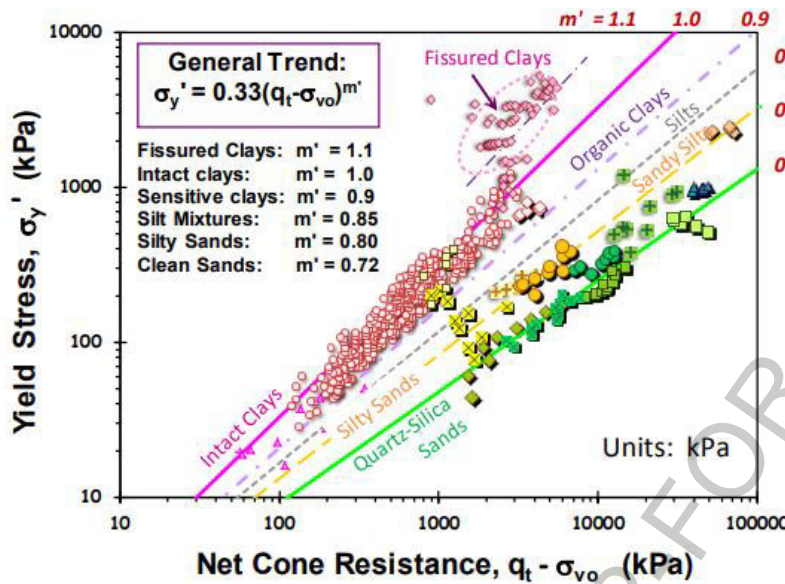


Figure 5-5 Preconsolidation stress with net cone resistance power law, reproduced from Mayne (2014).

An additional set of σ_p' and OCR values were calculated for $m' = 1.1$ to reflect the upper trend for over consolidated fissured clays not captured by the correlation with I_c .

The results are presented in Appendix E.

5.10 SPT N60 VALUES

Equivalent SPT N60 values, defined as the non-normalised SPT blow count over a 30 cm interval, were derived for two correlations.

Method 1 - Jefferies and Davies (1993) cited in Lunne *et al.* (1997):

$$N_{60} = \frac{q_t}{8.5 \cdot \sigma_{atm} \cdot \left(1 - \frac{I_c}{4.6}\right)}$$

Method 2 - Robertson (2012):

$$\frac{\left(\frac{q_t}{p_a}\right)}{N_{60}} = 10^{(1.268 - 0.2817I_c)}$$

The correlations are intended for clays, silts and sands and not for carbonates or cemented geo-materials.

The results are presented in Appendix F.

5.11 FRICTION ANGLE

Sands

The peak friction angle of granular materials was calculated using the Kulhawy and Mayne (1990) method. The relationship is based on a calibration chamber database from 24 sands of varying mineralogy and is found from:

$$\phi' = 17.6 + 11.0 \cdot \log(q_{t1})$$

Where:

ϕ' = Peak friction angle (degrees)

q_{t1} = stress normalised cone resistance:

$$q_{t1} = \left(\frac{q_t}{\sigma_{atm}} \right) / \left(\frac{\sigma_{v0'}}{\sigma_{atm}} \right)^{0.5}$$

The presence of compressible minerals tends to reduce tip resistance resulting in lower estimate of friction angle, while very coarse (sand) or larger grain size tends to increase tip resistance resulting in higher estimate. Increased penetration resistance due to high k_0 conditions also results in an overestimate of friction angle.

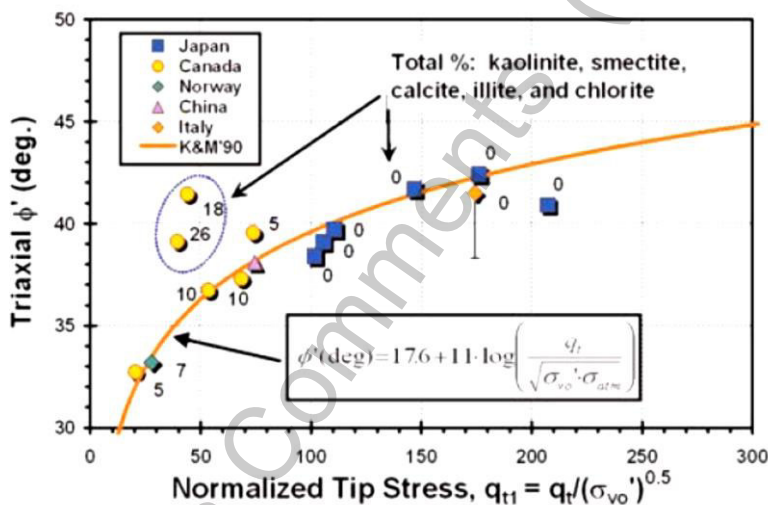


Figure 5-6 Peak triaxial friction angle from undisturbed sands with normalised cone resistance.

Fine grained soils

The effective friction angle for fine grained soils was calculated based on the Senneset *et al.* (1988, 1989) method by applying the approximate closed form solution by Mayne & Campanella (2005) as a direct function of the pore pressure parameter B_q and normalised tip resistance Q . The method is applicable where $0.1 < B_q < 1.0$ and $20^\circ < \phi' < 45^\circ$ and generally appropriate for non-cemented normally consolidated to lightly overconsolidated soils.

$$\phi' = 29.5^\circ B_q^{0.121} [0.256 + 0.336 B_q + \log Q]$$

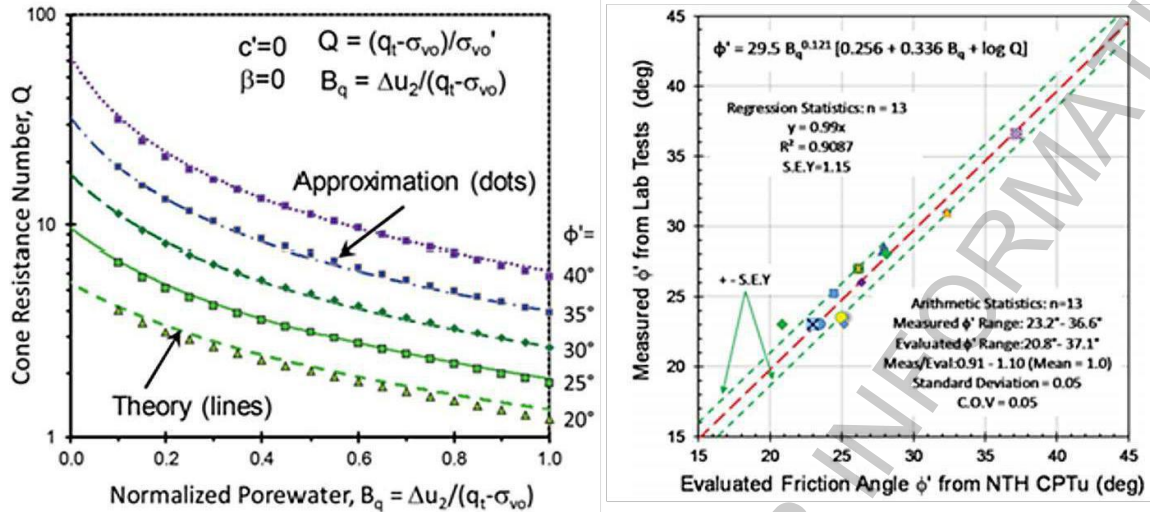


Figure 5-7 [Left] Theoretical curves with function approximation (dots) overlay [Right] calibration data from geotechnical centrifuge tests for a variety of soils. Redrawn from Ouyang & Mayne (2018).

The results are presented in Appendix F.

5.12 COEFFICIENT OF VOLUME CHANGE

Coefficient of volume change m_v defined as the inverse of the constrained modulus M , is evaluated for all soil types using the constrained modulus method proposed by Mayne (2006) cited in Mayne (2007). The value may be used to predict settlement at the end of primary consolidation and is applicable to the present state of vertical effective stress up to the pre-consolidation stress for overconsolidated soils.

$$m_v = \frac{1}{M}$$

Where:

$$M = \alpha \cdot (q_t - \sigma_v)$$

$$\alpha = 5$$

An alpha factor of 8.25 reported by Kulhawy & Mayne (1990) for fine grained soils appears to provide a better fit through the data for intact non-organic clays, reducing to around 1 to 2 for organic plastic clays.

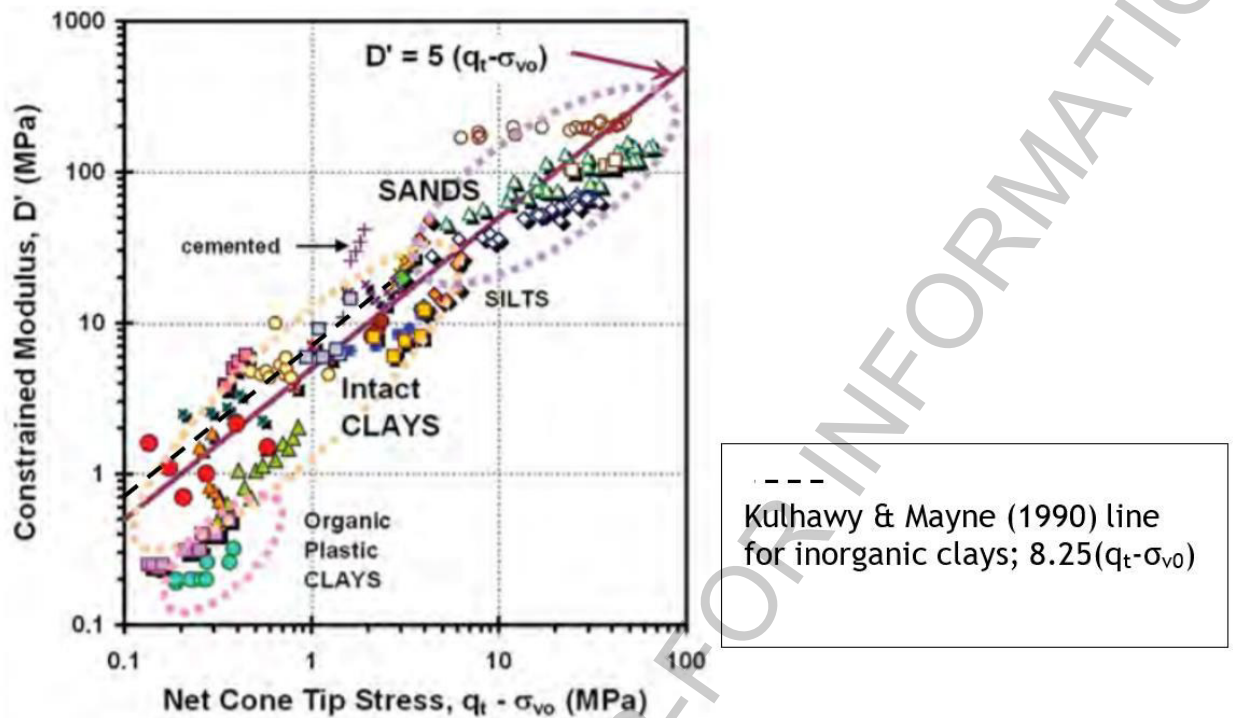


Figure 5-8 Constrained modulus of Mayne (2006). Annotated/redrawn from NCHRP Synthesis 368 (2007).

The results are presented in Appendix E.

5.13 YOUNG'S MODULUS

The secant Young's modulus E' at 25% mobilised shear strength (FOS = 4) was calculated according to the method proposed by Robertson (2009):

$$E' = \alpha(q_t - \sigma_v)$$

Where:

$$\alpha = 0.015(10^{0.55Ic+1.68})$$

The method described by Robertson may be adapted to estimate E' for loading at different percentages of mobilised shear strength.

The results are presented in Appendix F.

6 CPT INTERPRETATION NOTES

Provided below is a non-exhaustive set of notes on interpretation of the acquired CPT data with reference to examples within the dataset where appropriate.

DRAINED AND UNDRAINED SOIL BEHAVIOUR

Geotechnical parameters appropriate for drained and undrained cone penetration conditions are derived for drained and undrained soil behaviour types (SBTs) respectively, however, to help mitigate the uncertainty in the SBT correlation with drainage behaviour, all parameters are derived over the Soil Behaviour Type range $2.4 < I_c < 2.7$. For partially drained conditions, error will be introduced within derived parameters.

Piezocene dynamic pore pressure and dissipation tests may be used to identify drainage conditions. Dissipation t_{50} values exceeding 50 seconds indicate undrained penetration behaviour based on the findings of Kim *et al.* (2008).

In partially drained materials the friction sleeve resistance may rise significantly immediately following a pause in penetration due to consolidation and increased effective stress on the friction sleeve.

DYNAMIC PORE PRESSURE u_2 (CPT u)

While the piezo system is saturated before use, testing through unsaturated soils may result in some degree of desaturation leading to a less accurate and more 'sluggish' pore pressure response. Desaturation can also occur during penetration due to suction pressure causing cavitation during dilative shear at the cone shoulder. Dissipation tests that are undertaken following desaturation are likely to have a more pronounced initial rise and the results of analysis may have some degree of error.

If the piezometer system becomes desaturated it may re-saturate at higher excess pressures later in the test as gas dissolves under pressure. The pore pressure response in saturated contractive soils should normally have a dynamic 'peaky' appearance.

The tip resistance in lower strength contractive soils without pore pressure measurement in the u_2 position is likely to be significantly lower (up to 20%, typically ~10%) than the equivalent corrected tip resistance depending on the magnitude of excess pore pressure generated during penetration.

CONE TIP AND SLEEVE OFFSET

The accuracy of the SBT over thin layers and at layer boundaries is sensitive to offset error in the friction ratio often resulting in sharp peaks or troughs at boundaries. The friction ratio is often inaccurate in heavily disturbed soils with a 'blocky' macro fabric. The last ~8 cm of data is also not included in the SBT material description as no friction sleeve measurements are recorded.

FRICTION SLEEVE DATA

There are three common causes of friction sleeve measurement error; 1) unequal pore pressure acting on the sleeve end areas as the sleeve passes through materials of different permeability and hence excess pore pressure Δu_2 , often resulting in a negative/positive spike, 2) Accuracy limitations and temperature effects in very low strength or sensitive soils, and 3) error associated with bending strain that occurs while the cone inclination deviates rapidly. Temperature effects

are generally mitigated by temperature stabilisation during the test and at the time of zero output measurement.

CONE TYPE

The reference cone type has a 10 cm² projected cone tip area and 150 cm² friction sleeve area, however it is common to use a larger 15 cm² cone with a 225 cm² friction sleeve area for improved sensitivity, temperature stability, damage prevention and penetration depth potential due to the higher bending strength. Use of a 15 cm² cone does however require higher penetration force (reaction force) for a given penetration pressure and produces more pronounced transitions zones and thin layer effects due to the larger influence zone.

TRANSITION ZONES AND THIN LAYER EFFECTS

During penetration at the boundary between soils of contrasting stiffness, a transition zone is often evident prior to mobilisation of the true soil stiffness. These should be cautiously ignored in assessment of soil behaviour type and parameter evaluation. Where the stiff layer is thin (<~1 m) mobilised resistance may be significantly less than that of an equivalent thick layer. The effect for thin low stiffness layers is less significant. Procedures for thin-layer effect correction are provided by Robertson and Wride (1998) and Boulanger & DeJong (2018).

GRAVELS

The presence of gravel or larger clasts in a soil is often characterised by short peaks in the CPT tip and sleeve readings, possibly with associate inclinometer 'shake' and/or short sharp reductions in pore water readings due to dilation effects. Frequent gravels in soft or loose soils may generate localised erroneous friction ratio values.

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APPENDICES

Appendix A	SUMMARY TABLES
Appendix B	GENERAL INFORMATION
Appendix C	CONE PENETRATION TEST RESULTS
Appendix D	SOIL BEHAVIOUR TYPE RESULTS
Appendix E	PARAMETER RESULTS 1 – s_u, m_v, OCR, SBT, I_c
Appendix F	PARAMETER RESULTS 2 – SPT N60, Φ, D_r, E, I_c
Appendix G	PENETROMETER TEMPERATURE RESULTS

APPENDIX A SUMMARY TABLES

Table 3 CPT summary

Location ID	Stroke number	Final depth (m)	Cone ID	Piezocene test	Pre-drilled (m)	Pre-drilling details	Rig	Primary refusal factor	Applied zero values: qc, fs, u2	Tip zero drift (kPa)	Sleeve zero drift (subtraction) (kPa)	Piezo zero drift (kPa)	Nr dissipation tests	Raw File Name	Easting (m)	Northing (m)	Elevation (m)	Date	Remarks
CPT101	1	4.04	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Tip load	pre, pre, pre	6.20	0.20	0.40		108182-V1-281022-UK03-LP91.L02				28/10/2022	
CPT102	1	3.76	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Tip load	pre, pre, pre	-57.60	0.80	-2.40		108182-V1-281022-UK03-LP91.L01				28/10/2022	
CPT103	1	3.92	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at surface	pre, pre, pre	-26.20	1.10	-4.60		108182-V1-281022-UK03-LP91.L03				28/10/2022	
CPT104	1	3.96	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Tip load	pre, pre, pre	-15.40	1.20	-1.20		108182-V1-281022-UK03-LP91.L04				28/10/2022	
CPT105	1	4.16	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at surface	pre, pre, pre	27.60	-1.70	-1.00		108182-V1-281022-UK03-LP91.L05				28/10/2022	
CPT106	1	4.62	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	-7.60	0.70	-0.40		108182-V1-281022-UK03-LP91.L06				28/10/2022	
CPT107	1	3.30	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	-16.40	1.50	-1.70		108182-V1-281022-UK03-LP91.L08				28/10/2022	
CPT108	1	4.84	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	-7.80	0.40	-0.60		108182-V1-281022-UK03-LP91.L07				28/10/2022	
CPT109	1	3.78	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	10.00	0.10	1.10		108182-V1-281022-UK03-LP91.L09				28/10/2022	
CPT110	1	5.46	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	5.00	-0.30	-1.40		108182-V1-281022-UK03-LP91.L10				28/10/2022	
CPT111	1	5.58	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	7.20	-0.40	-0.30		108182-V1-281022-UK03-LP91.L11				28/10/2022	
CPT112	1	5.30	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	-17.40	0.70	0.40		108182-V1-281022-UK03-LP91.L12				28/10/2022	
CPT113	1	5.60	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	-41.40	1.40	-0.30		108182-V1-281022-UK03-LP91.L13				28/10/2022	
CPT114	1	5.04	S15-CFIPTT.1993	NO	1.20	IP-BF	UK3	Lateral support at depth	pre, pre, pre	64.60	-1.80	1.50		108182-V1-281022-UK03-LP91.L14				28/10/2022	

CPT test plots are presented in Appendix C.

APPENDIX B GENERAL INFORMATION

LIST OF FIGURES

Cone calibration certificate: S15-CFIIP.1993

Data sheet: 20.5-tonne track-truck mounted CPT unit (UK3)

Instrument:	Digital-Geopoint-S15-150kN-5MPa	Location:	Lankelma Calibration Laboratory
Serial number:	S15-CFIPTT.1993	Temperature (°C):	19.0
Manufacturer:	Geopoint	Temperature change (°C):	0.06
Calibration standard:	Conforms to ISO 376:2011 & ISO 22476-1:2012	Calibration engineer:	P Metcalf
ISO 22476-1:2012 application class:	Class 1	Date of calibration:	05/10/2022
		Calibration expiry:	05/04/2023

This calibration certificate is valid for 6 months.

Calibration signed and dated by:

P Metcalf

Calibration checked and dated by:

A Harman

Calibration verification signed and dated by:

REFERENCE INSTRUMENTS	SERIAL NUMBER	UNCERTAINTY OF RECORDED VALUE	CALIBRATION DATE
AM DSCCHA-100kN Load Cell	66914	0.02%	29/04/2021
AM DSCCHA-5kN Load Cell	61065	0.05%	29/04/2021
Omega MMG750V	502273	0.01%	01/09/2022
Keithley 3706A Multimeter	4067652	10ppm	11/08/2022
LD Solar2-45	168558	0.04°	01/08/2022
ETI Ref Thermometer	D20345255	0.01°C	08/09/2022

The calibration tests were made in the Lankelma force standards machine. The applied forces of which are within an uncertainty of:
± 0.050 % of nominal value from 0.5kN up to 10kN, then 0.02% of nominal from 10kN up to 100kN.

MEASUREMENTS

- The forces applied, and the resulting deflections are given in Tables 1. No corrections for temperature have been applied to these results.
 - The cone was loaded to full range 3 times for no less than 1 minute before calibration and after each rotation.
 - The cone was calibrated in low and high range using two reference load cells. The low range calibration consisted of a maximum load of 5kN with 4 sets of increasing forces and 2 sets of decreasing forces. The high range calibration consisted of a maximum load of 100kN with 3 sets of increasing forces and 2 sets of decreasing forces.
 - The difference in deflection for each applied force with rotation is the relative reproducibility error b , shown as a percentage of the recorded value and in units of pressure MPa. The uncertainty relating to the difference in deflection for increasing forces against decreasing forces is the reversibility uncertainty U_{rev} , shown as a percentage of the recorded value and in units of pressure MPa.
 - For each application of force, the coefficients of a linear and third order equation relating the estimate of the mean deflection as a function of the applied calibration force were calculated. Table 2.
 - The combined expanded uncertainty of deflection U for each force is shown as a percentage of the recorded value and in units of pressure MPa.
 - The coefficients of a third order equation relating a given applied force to the estimate of the mean deflection were also calculated. The coefficients are given in Table 3.
 - In use the forces acting on the sleeve load cell element are a combination of tip resistance and sleeve friction, with the tip resistance from the tip load cell element being subtracted to give the sleeve friction value. The resultant error values for differing tip and sleeve values are shown in Table 4.
- * The combined expanded uncertainties shown are to $k=2$ with a 95% coverage factor.

The calibration uncertainty is the uncertainty in the force value calculated from the interpolation equation at any deflection.

At each calibration point a combined standard uncertainty uc is calculated from the readings obtained during the calibration.

$$uc = \sqrt{\sum_{i=1}^8 u_i^2}$$

and

$$U = k \times uc$$

where

- u_1 is the standard uncertainty associated with the applied calibration force.
- u_2 is the standard uncertainty associated with the reproducibility of the calibration results.
- u_3 is the standard uncertainty associated with the repeatability of the calibration results.
- u_4 is the standard uncertainty associated with the resolution and noise of the system.
- u_5 is the standard uncertainty associated with the creep of the instrument.
- u_6 is the standard uncertainty associated with the drift in zero output.
- u_7 is the standard uncertainty associated with temperature of the instrument.
- u_8 is the standard uncertainty associated with interpolation best fit of the linear or 3rd order polynomial equation.

Symbols and their designations

Symbol	Designation
Ref LC	Reference load cell with calibration force in kN
cts	Counts. Base digital cone units.
0.1N	Interpolated digital cone units from counts
b	Relative reproducibility error
U_{rev}	Reversibility uncertainty
U_c	Combined standard uncertainty
U_{c_sub}	Combined standard uncertainty including sleeve subtraction
U	Combined expanded uncertainty
$k=2$	95% uncertainty coverage factor

Cone temperature effect profile:

This section deals with the apparent pressure readings obtained from sensors due to static and transient temperature change. The parameters for post-processing temperature correction are established and the apparent pressures after correction are presented. Depending on the design or temperature performance, correction of the friction sleeve and/or piezometer readings may not be warranted

Table 1-a.

CONE END RESISTANCE CALIBRATION

Low range calibration								High range calibration								
Ref LC (kN)	Tip change in output (cts)				Reproducibility error b MPa %		Reversibility error U_{rev} MPa %		Ref LC (kN)	Tip change in output (cts)			Reproducibility error b MPa %		Reversibility error U_{rev} MPa %	
	1 0°	2 120°	3 240°	4 240°						1 0°	2 120°	3 240°				
0.100	1.098E+05	1.092E+05	1.075E+05	1.075E+05	0.000	0.63			5.000	5.505E+06	5.503E+06	5.495E+06	0.002	0.05		
0.500	5.466E+05	5.450E+05	5.444E+05	5.444E+05	0.000	0.12			10.000	1.101E+07	1.101E+07	1.099E+07	0.003	0.05		
1.000	1.093E+06	1.092E+06	1.092E+06	1.093E+06	0.000	0.05			15.000	1.650E+07	1.650E+07	1.649E+07	0.003	0.03		
1.500	1.642E+06	1.639E+06	1.639E+06	1.641E+06	0.001	0.06			20.000	2.201E+07	2.201E+07	2.200E+07	0.003	0.02		
2.000	2.189E+06	2.187E+06	2.189E+06	2.188E+06	0.000	0.03			30.000	3.300E+07	3.301E+07	3.299E+07	0.003	0.01		
2.500	2.738E+06	2.735E+06	2.736E+06	2.738E+06	0.001	0.03			40.000	4.400E+07	4.400E+07	4.400E+07	0.000	0.00		
3.000	3.287E+06	3.283E+06	3.285E+06	3.287E+06	0.001	0.04			50.000	5.500E+07	5.499E+07	5.501E+07	0.004	0.01		
3.500	3.835E+06	3.831E+06	3.834E+06	3.834E+06	0.001	0.03			60.000	6.597E+07	6.598E+07	6.598E+07	0.001	0.00		
4.000	4.381E+06	4.380E+06	4.381E+06	4.382E+06	0.000	0.01			80.000	8.788E+07	8.789E+07	8.783E+07	0.012	0.02		
5.000	5.478E+06	5.476E+06	5.476E+06	5.479E+06	0.000	0.01			100.000	1.097E+08	1.098E+08	1.097E+08	0.005	0.01		
4.000	4.377E+06	4.381E+06			0.001	0.03	0.001	0.02	80.000	8.777E+07	8.777E+07		0.000	0.00	0.039	0.07
3.500	3.830E+06	3.832E+06			0.000	0.02	0.001	0.03	60.000	6.592E+07	6.589E+07		0.005	0.01	0.025	0.06
3.000	3.282E+06	3.284E+06			0.000	0.02	0.001	0.04	50.000	5.495E+07	5.495E+07		0.001	0.00	0.014	0.04
2.500	2.732E+06	2.737E+06			0.001	0.06	0.001	0.04	40.000	4.400E+07	4.399E+07		0.001	0.00	0.001	0.00
2.000	2.187E+06	2.190E+06			0.001	0.05	0.000	-0.01	30.000	3.301E+07	3.301E+07		0.000	0.00	-0.002	-0.01
1.500	1.638E+06	1.642E+06			0.001	0.08	0.000	0.04	20.000	2.202E+07	2.201E+07		0.002	0.02	-0.002	-0.02
1.000	1.090E+06	1.094E+06			0.001	0.10	0.000	0.03	15.000	1.652E+07	1.652E+07		0.001	0.01	-0.006	-0.06
0.500	5.420E+05	5.482E+05			0.001	0.41	0.000	0.07	10.000	1.102E+07	1.102E+07		0.001	0.01	-0.004	-0.06
0.100	1.096E+05	1.095E+05			0.000	0.01	0.000	-0.06	5.000	5.513E+06	5.514E+06		0.000	0.01	-0.003	-0.10

Table 2-a.

Low range calibration								High range calibration							
Reference output		Linear equation			3rd order equation			Reference output		Linear equation			3rd order equation		
Ref Load Cell Nom. (MPa)	Ref Load Cell (0.1N)	Cone output (0.1N)	Expanded uncertainty U^* MPa %		Equation output (0.1N)	Expanded uncertainty U^* MPa %		Ref Load Cell Nom. (MPa)	Ref Load Cell (0.1N)	Cone output (0.1N)	Expanded uncertainty U^* MPa %		Equation output (0.1N)	Expanded uncertainty U^* MPa %	
0.067	1000	991	0.002	2.31	996	0.001	1.50	3.333	50000	50085	0.014	0.43	49989	0.009	0.27
0.333	5000	4965	0.005	1.49	4962	0.005	1.53	6.667	100000	100185	0.028	0.41	99994	0.013	0.19
0.667	10000	9946	0.007	1.05	9933	0.009	1.36	10.000	150000	150209	0.032	0.32	149935	0.019	0.19
1.000	15000	14932	0.009	0.90	14908	0.012	1.24	13.333	200000	200378	0.054	0.41	200032	0.021	0.16
1.333	20000	19922	0.011	0.79	19888	0.015	1.13	20.000	300000	300465	0.068	0.34	300016	0.030	0.15
1.667	25000	24914	0.011	0.68	24869	0.018	1.06	26.667	400000	400586	0.086	0.32	400096	0.039	0.15
2.000	30000	29909	0.012	0.60	29854	0.020	0.99	33.333	500000	500722	0.107	0.32	500261	0.058	0.17
2.333	35000	34902	0.013	0.58	34837	0.022	0.95	40.000	600000	600693	0.107	0.27	600341	0.072	0.18
2.667	40000	39888	0.015	0.57	39812	0.025	0.95	53.333	800000	799965	0.078	0.15	800107	0.079	0.15
3.333	50000	49866	0.019	0.57	49770	0.032	0.95	66.667	1000000	999114	0.149	0.22	1000177	0.095	0.14
2.667	40000	39870	0.018	0.66	39795	0.028	1.04	53.333	800000	799125	0.137	0.26	799264	0.122	0.23
2.333	35000	34880	0.016	0.70	34814	0.025	1.07	40.000	600000	600037	0.056	0.14	599684	0.070	0.17
2.000	30000	29889	0.015	0.76	29834	0.022	1.12	33.333	500000	500301	0.061	0.18	499840	0.050	0.15
1.667	25000	24896	0.014	0.85	24851	0.020	1.20	26.667	400000	400561	0.083	0.31	400071	0.038	0.14
1.333	20000	19923	0.010	0.78	19889	0.015	1.12	20.000	300000	300549	0.078	0.39	300100	0.031	0.15
1.000	15000	14929	0.010	0.97	14905	0.013	1.28	13.333	200000	200473	0.066	0.49	200127	0.026	0.19
0.667	10000	9943	0.008	1.18	9929	0.010	1.44	10.000	150000	150404	0.056	0.56	150130	0.023	0.23
0.333	5000	4963	0.006	1.72	4960	0.006	1.79	6.667	100000	100328	0.045	0.68	100137	0.021	0.32
0.067	1000	998	0.000	0.64	1004	0.001	0.79	3.333	50000	50196	0.027	0.82	50100	0.015	0.46

Table 3-a. Third order equation

For a given cone indicated output of D (0.1N units), the corrected applied force	$a_0 = 8.09664$	Maximum tip zero drift during the calibration (MPa) =	0.001
F (in 0.1N units) is calculated from :	$a_1 = 0.99783$	Maximum load cell zero drift during the calibration (MPa) =	0.000
$F = (a_3 \times D^3) + (a_2 \times D^2) + (a_1 \times D) + a_0$	$a_2 = 1.68006E-09$	Factor used to convert from counts to 0.1N units =	0.0091046
	$a_3 = 1.54478E-15$	Maximum tip full scale reading (MPa) =	100.00
		Tip resolution (Pa) =	66.7
		Tip area (cm²) =	15
		Tip area ratio factor =	0.809

COMBINED EXPANDED UNCERTAINTY TIP

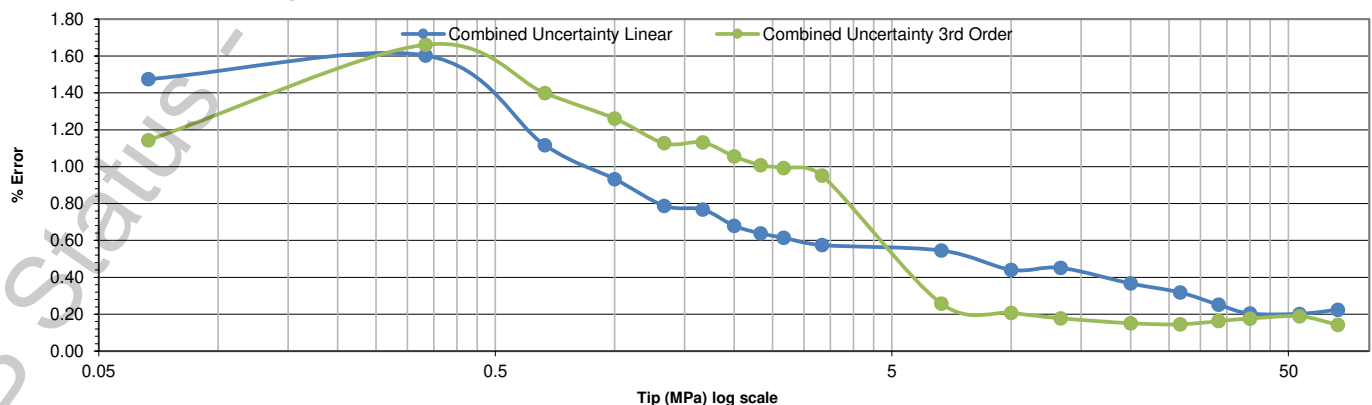


Table1-b.

SLEEVE FRICTION CALIBRATION

Low range calibration								High range calibration								
Ref LC (kN)	Sleeve change in output (cts)				Reproducibility error <i>b</i> kPa %		Reversibility error <i>U_{rev}</i> kPa %		Ref LC (kN)	Sleeve change in output (cts)			Reproducibility error <i>b</i> kPa %		Reversibility error <i>U_{rev}</i> kPa %	
	1 0°	2 120°	3 240°	4 240°						1 0°	2 120°	3 240°				
0.100	1.113E+05	1.124E+05	1.157E+05	1.157E+05	0.051	1.15			5.000	5.680E+06	5.677E+06	5.674E+06	0.063	0.03		
0.500	5.650E+05	5.661E+05	5.662E+05	5.657E+05	0.015	0.07			10.000	1.136E+07	1.136E+07	1.135E+07	0.087	0.02		
1.000	1.129E+06	1.131E+06	1.135E+06	1.134E+06	0.068	0.16			15.000	1.702E+07	1.702E+07	1.702E+07	0.042	0.01		
1.500	1.697E+06	1.696E+06	1.700E+06	1.700E+06	0.049	0.07			20.000	2.270E+07	2.270E+07	2.269E+07	0.088	0.01		
2.000	2.263E+06	2.263E+06	2.265E+06	2.265E+06	0.024	0.03			30.000	3.404E+07	3.404E+07	3.403E+07	0.131	0.01		
2.500	2.829E+06	2.830E+06	2.830E+06	2.832E+06	0.019	0.02			40.000	4.538E+07	4.537E+07	4.536E+07	0.202	0.01		
3.000	3.393E+06	3.396E+06	3.396E+06	3.396E+06	0.039	0.03			50.000	5.670E+07	5.669E+07	5.668E+07	0.167	0.01		
3.500	3.959E+06	3.960E+06	3.961E+06	3.961E+06	0.032	0.02			60.000	6.801E+07	6.801E+07	6.799E+07	0.264	0.01		
4.000	4.527E+06	4.526E+06	4.528E+06	4.529E+06	0.026	0.01			80.000	9.061E+07	9.061E+07	9.058E+07	0.378	0.01		
5.000	5.659E+06	5.657E+06	5.661E+06	5.659E+06	0.042	0.02			100.000	1.132E+08	1.132E+08	1.131E+08	0.465	0.01		
4.000	4.523E+06	4.526E+06			0.048	0.03	0.033	0.02	80.000	9.063E+07	9.062E+07		0.106	0.00	-0.293	-0.01
3.500	3.960E+06	3.959E+06			0.009	0.01	0.003	0.00	60.000	6.803E+07	6.803E+07		0.130	0.00	-0.462	-0.02
3.000	3.392E+06	3.393E+06			0.017	0.01	0.052	0.04	50.000	5.672E+07	5.672E+07		0.034	0.00	-0.519	-0.02
2.500	2.828E+06	2.827E+06			0.020	0.02	0.039	0.04	40.000	4.540E+07	4.540E+07		0.036	0.00	-0.543	-0.03
2.000	2.261E+06	2.261E+06			0.006	0.01	0.041	0.05	30.000	3.406E+07	3.406E+07		0.053	0.00	-0.447	-0.03
1.500	1.695E+06	1.696E+06			0.016	0.02	0.023	0.03	20.000	2.272E+07	2.271E+07		0.112	0.01	-0.398	-0.05
1.000	1.129E+06	1.129E+06			0.003	0.01	0.012	0.03	15.000	1.704E+07	1.703E+07		0.085	0.01	-0.295	-0.04
0.500	5.634E+05	5.638E+05			0.006	0.03	0.045	0.20	10.000	1.136E+07	1.136E+07		0.009	0.00	-0.145	-0.03
0.100	1.117E+05	1.134E+05			0.024	0.55	-0.016	-0.36	5.000	5.681E+06	5.684E+06		0.034	0.02	-0.099	-0.05

Table 2-b.

Low range calibration										High range calibration									
Reference output		Linear factor output				3rd order equation				Reference output		Linear factor output				3rd order equation			
Ref Load Cell Nom. (kPa)	Ref Load Cell (0.1N)	Cone output (0.1N)	Expanded uncertainty U^* kPa %			Equation output (0.1N)	Expanded uncertainty U^* kPa %			Ref Load Cell Nom. (kPa)	Ref Load Cell (0.1N)	Cone output (0.1N)	Expanded uncertainty U^* kPa %			Equation output (0.1N)	Expanded uncertainty U^* kPa %		
4	1000	999	0.103	2.34		1002	0.105	2.38		220	50000	50114	1.134	0.51		50012	0.542	0.25	
22	5000	4995	0.075	0.34		4990	0.109	0.49		441	100000	100229	2.151	0.49		100027	0.783	0.09	
44	10000	9989	0.186	0.42		9973	0.286	0.65		661	150000	150281	2.678	0.41		149988	1.015	0.08	
66	15000	14985	0.189	0.29		14958	0.394	0.60		881	200000	200354	3.393	0.39		199981	1.336	0.08	
88	20000	19981	0.213	0.24		19943	0.517	0.59		1322	300000	300464	4.505	0.34		299970	1.921	0.07	
110	25000	24980	0.248	0.23		24931	0.631	0.57		1762	400000	400497	5.020	0.28		399945	2.495	0.07	
132	30000	29973	0.311	0.24		29914	0.788	0.60		2203	500000	500463	5.062	0.23		499926	3.071	0.07	
154	35000	34959	0.423	0.27		34889	1.005	0.65		2643	600000	600315	4.553	0.17		599881	3.754	0.07	
176	40000	39960	0.433	0.25		39879	1.093	0.62		3524	800000	799811	5.087	0.14		799889	4.904	0.07	
220	50000	49957	0.642	0.29		49855	1.377	0.62		4405	1000000	998979	10.794	0.25		1000059	5.993	0.07	
176	40000	39942	0.573	0.32		39861	1.251	0.71		3524	800000	800010	4.669	0.13		800088	4.733	0.07	
154	35000	34952	0.471	0.31		34882	1.062	0.69		2643	600000	600556	6.030	0.23		600123	3.677	0.07	
132	30000	29948	0.492	0.37		29889	0.998	0.75		2203	500000	500698	6.815	0.31		500162	3.267	0.07	
110	25000	24961	0.377	0.34		24912	0.788	0.72		1762	400000	400751	7.028	0.40		400199	2.940	0.08	
88	20000	19960	0.373	0.42		19922	0.697	0.79		1322	300000	300668	6.150	0.47		300174	2.358	0.09	
66	15000	14965	0.321	0.49		14938	0.553	0.84		881	200000	200531	4.839	0.55		200157	1.867	0.11	
44	10000	9970	0.274	0.62		9954	0.413	0.94		661	150000	150407	3.718	0.56		150114	1.399	0.11	
22	5000	4975	0.223	1.01		4970	0.267	1.21		441	100000	100306	2.788	0.63		100104	1.155	0.13	
4	1000	994	0.074	1.69		998	0.054	1.24		220	50000	50165	1.540	0.70		50063	0.749	0.17	

Table 3-b. Third order equation

For a given cone indicated output of D (0.1N units), the corrected applied force	a0 = 5.99989	Maximum sleeve zero drift during the calibration (kPa) = 0.072
F (in 0.1N units) is calculated from :	a1 = 0.99777	Maximum load cell zero drift during the calibration (kPa) = 0.01
F = (a3 x D³) + (a2 x D²) + (a1 x D) + a0	a2 = 1.25466E-09	Factor used to convert from counts to 0.1N units = 0.0088278
	a3 = 2.05032E-15	Physical strength limited maximum sleeve reading (MPa) = 1.333
		Sleeve resolution (Pa) = 4.4
		Sleeve area (cm²) = 227
		Sleeve area ratio factor = -0.002

COMBINED EXPANDED UNCERTAINTY SLEEVE

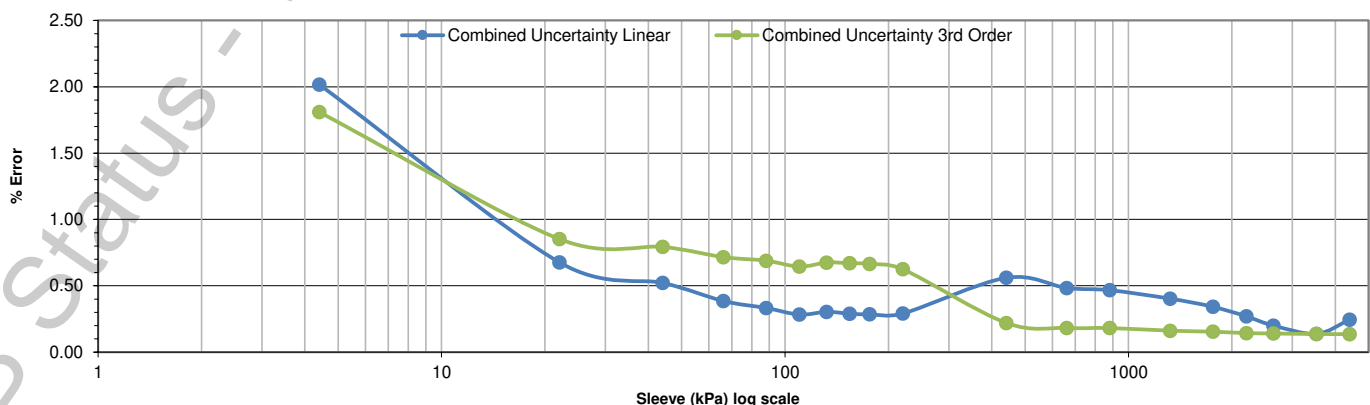


Table 4-b Sleeve friction - tip subtraction combined standard uncertainty U_{c_sub}

		Sleeve linear equation subtraction error (%)										Sleeve 3rd order equation subtraction error (%)							
		Sleeve kPa →										Sleeve kPa →							
		4	22	44	66	110	154	220	661			4	22	44	66	110	154	220	661
Tip MPa ↓	0.07	2.8	0.7	0.4	0.3	0.2	0.2	0.2	0.3	Tip MPa ↓	0.07	2.4	0.7	0.5	0.5	0.4	0.4	0.3	0.1
	0.33	6.7	1.5	0.8	0.6	0.4	0.3	0.3	0.3		0.33	7.2	1.7	1.0	0.8	0.6	0.5	0.4	0.1
	0.67	9.2	2.0	1.1	0.7	0.5	0.4	0.3	0.3		0.67	11.9	2.6	1.5	1.1	0.8	0.6	0.5	0.2
	1.00	10.9	2.3	1.3	0.9	0.5	0.4	0.3	0.3		1.00	15.7	3.4	1.9	1.3	0.9	0.8	0.6	0.2
	1.67	14.2	3.0	1.6	1.1	0.7	0.5	0.4	0.3		1.67	23.1	4.9	2.6	1.8	1.2	1.0	0.8	0.2
	2.33	17.2	3.6	1.9	1.3	0.8	0.6	0.5	0.3		2.33	30.3	6.3	3.3	2.3	1.5	1.2	0.9	0.3
	3.33	22.7	4.7	2.4	1.6	1.0	0.8	0.6	0.3		3.33	40.3	8.3	4.3	3.0	1.9	1.5	1.1	0.4
	10.00	70.4	14.2	7.2	4.8	2.9	2.1	1.5	0.6		10.00	30.2	6.3	3.3	2.3	1.5	1.2	0.9	0.3
	13.33	92.8	18.7	9.4	7.9	3.8	2.8	2.5	0.8		13.33	36.9	7.6	4.0	3.5	1.8	1.4	1.0	0.3

PORE PRESSURE CALIBRATION

Table1-c.

Ref PR (kPa)	PWP change in output (cts)			Reproducibility error <i>b</i>		Reversibility error <i>U_{rev}</i>	
	1 0°	2 120°	3 240°				
100	1.954E+07	1.948E+07	1.947E+07	0.1	0.10		
200	3.905E+07	3.902E+07	3.906E+07	0.1	0.03		
400	7.811E+07	7.803E+07	7.803E+07	0.1	0.03		
600	1.171E+08	1.170E+08	1.171E+08	0.1	0.02		
800	1.560E+08	1.558E+08	1.559E+08	0.2	0.03		
1000	1.948E+08	1.948E+08	1.947E+08	0.2	0.02		
1500	2.919E+08	2.918E+08	2.918E+08	0.3	0.02		
2000	3.889E+08	3.886E+08	3.887E+08	0.4	0.02		
2500	4.854E+08	4.853E+08	4.854E+08	0.2	0.01		
3000	5.821E+08	5.819E+08	5.819E+08	0.3	0.01		
2500	4.847E+08	4.846E+08		0.3	0.01	2.1	0.08
2000	3.875E+08	3.874E+08		0.1	0.00	3.8	0.19
1500	2.907E+08	2.905E+08		0.3	0.02	3.6	0.24
1000	1.939E+08	1.939E+08		0.1	0.01	2.8	0.28
800	1.552E+08	1.551E+08		0.1	0.02	2.2	0.28
600	1.164E+08	1.165E+08		0.2	0.03	1.8	0.30
400	7.769E+07	7.767E+07		0.0	0.01	1.2	0.29
200	3.886E+07	3.886E+07		0.0	0.00	0.5	0.26
100	1.944E+07	1.944E+07		0.0	0.01	0.2	0.21

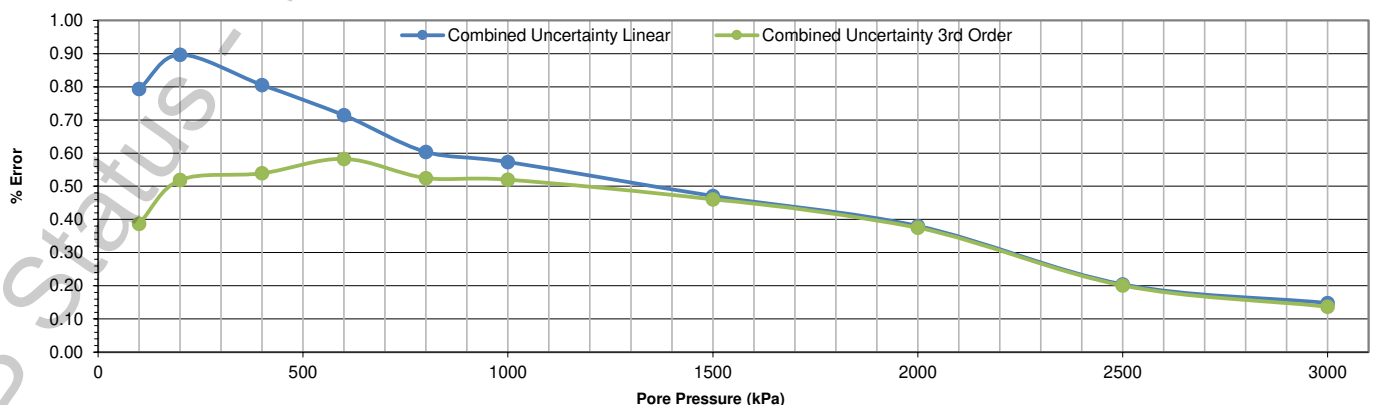
Table 2-c.

Reference output		Linear factor output			3rd order equation		
Ref Pressure (kPa)	Ref Pressure (0.1Pa)	Cone output (0.1Pa)	Expanded uncertainty <i>U</i> *	%	Equation output (0.1N)	Expanded uncertainty <i>U</i> *	%
100	1000000	1005303	1.096	1.10	1001486	0.413	0.41
200	2000000	2013214	2.697	1.35	2005136	1.121	0.56
400	4000000	4024673	5.040	1.26	4009807	2.180	0.55
600	6000000	6034240	7.029	1.17	6014660	3.261	0.54
800	8000000	8038186	7.863	0.98	8015711	3.638	0.45
1000	10000000	10043491	9.137	0.91	10019669	4.528	0.45
1500	15000000	15046115	9.798	0.65	15024034	5.698	0.38
2000	20000000	20043899	9.583	0.48	20027684	6.613	0.33
2500	25000000	25025429	6.130	0.25	25015259	4.558	0.18
3000	30000000	30008495	4.446	0.15	30000672	4.110	0.14
2500	25000000	24988644	4.092	0.16	24978438	5.490	0.22
2000	20000000	19978207	5.630	0.28	19961905	8.401	0.42
1500	15000000	14984571	4.328	0.29	14962435	8.113	0.54
1000	10000000	9996640	2.326	0.23	9972834	5.871	0.59
800	8000000	8000390	1.793	0.22	7977954	4.759	0.59
600	6000000	6002358	1.542	0.26	5982839	3.731	0.62
400	4000000	4005180	1.403	0.35	3990369	2.133	0.53
200	2000000	2003790	0.889	0.44	1995750	0.954	0.48
100	1000000	1002317	0.490	0.49	998514	0.361	0.36

Table 3-c. Third order equation

For a given cone indicated output of D (0.1N units), the corrected applied force F (in 0.1N units) is calculated from : $F = (a_3 \times D^3) + (a_2 \times D^2) + (a_1 \times D) + a_0$	a0 =	1047.51207	Maximum PWP zero drift during the calibration (kPa) = 0.15 Maximum reference zero drift during the calibration (kPa) = 0.184 Factor used to convert from counts to 0.1Pa units = 0.0515617 Maximum PWP full scale reading (kPa) = 5000 PWP resolution (Pa) = 0.1
	a1 =	0.99485	
	a2 =	3.19317E-10	
	a3 =	-5.24560E-18	

COMBINED EXPANDED UNCERTAINTY PORE PRESSURE



INCLINATION CALIBRATION

Ref Inclination (°C)	Cone inclination output	
	X Inc (cts)	Y Inc (cts)
-25	-27729	-26246
0	-1852	-363
25	23261	25380

Ref Inclination (°)	Cone inclination output	
	X Inc (°)	Y Inc (°)
-25	-25.4	-25.1
0	0.0	0.0
25	24.6	24.9

	X inc	Y inc
Factor used to convert from counts to 0.1m° units =	9.80511053	9.68501868
Inclination error (°) =	0.4	0.1

TEMPERATURE CALIBRATION

Recorded temp (°C)	Cone output 1 FS (cts)	Cone output 2 QC (cts)
7.76	3088554	3067993
10.47	3140487	3116388
15.40	3226477	3201777
20.30	3313164	3287813
25.35	3398420	3377192

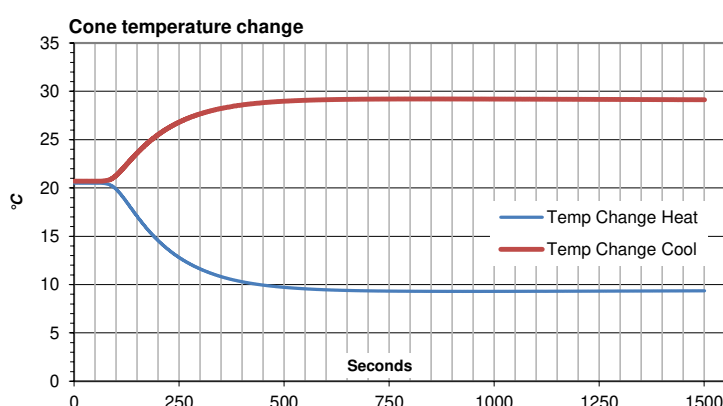
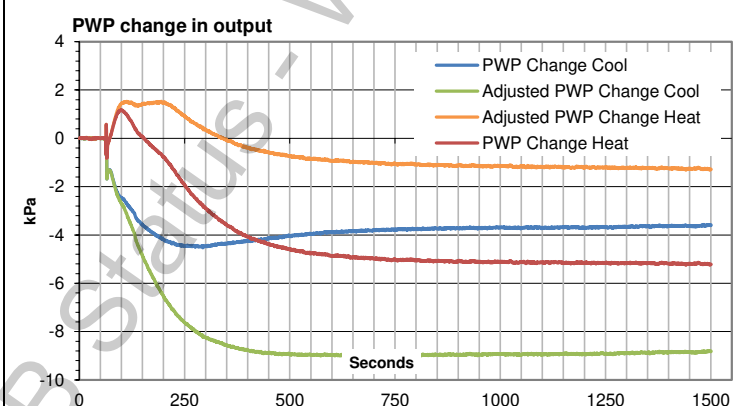
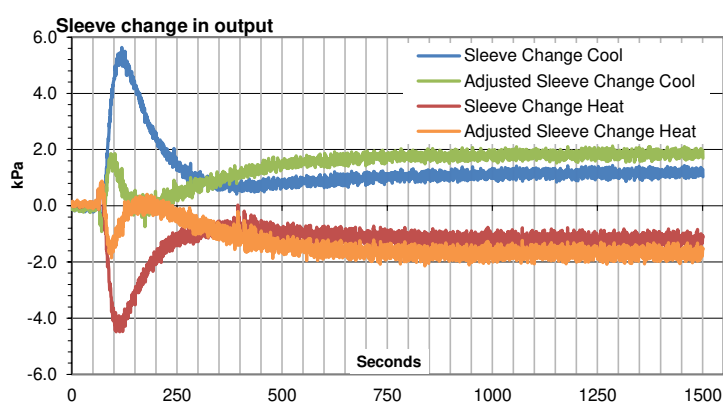
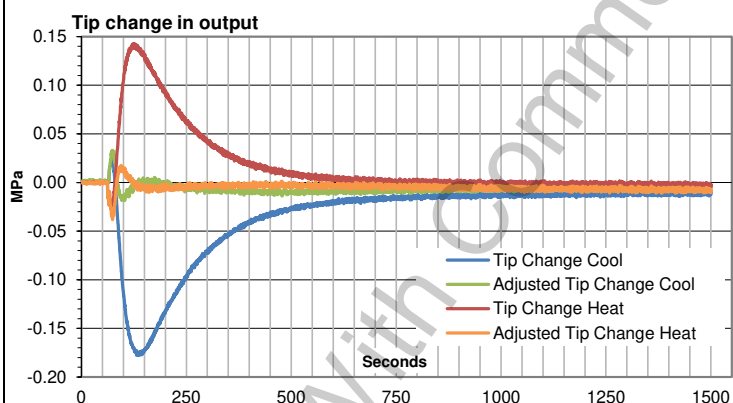
Recorded temp (°C)	Cone output 1 FS (°C)	Cone output 2 QC (°C)
7.76	7.62	7.75
10.47	10.57	10.51
15.40	15.46	15.38
20.30	20.39	20.28
25.35	25.24	25.37

Factor used to convert from counts to 0.00001°C units =	0.5686902	0.569750108
Temperature error (°C) =	0.14	0.04

CONE TEMPERATURE EFFECT

	Cooling	Heating
Start temperature =	20.50	20.70
End temperature =	9.30	29.21
Temperature change =	-11.20	8.51

	Cooling	Heating
Tip maximum rate of change (MPa/°C/min) =	0.049	0.048
Tip end change (MPa/°C) =	-0.001	0.000
Adjusted tip end change (MPa/°C) =	0.000	0.001
Sleeve maximum rate of change (kPa/°C/min) =	2.36	2.25
Sleeve end change (kPa/°C) =	0.09	-0.14
Adjusted sleeve end change (kPa/°C) =	0.15	-0.19
PWP end change (kPa/°C) =	-0.32	-0.61
Adjusted PWP end change (kPa/°C) =	0.79	-0.15





UK3 Track-truck

Rig weight	20.5 T
Max. operating ram capacity	17 T
Max. travelling speed	86 km/h
Track material	Steel
Track length	3300 mm
Track width	650 mm
Jack plate dimensions	Tracks act as jacks
Jack arrangements	1nr. on each side
Max. ground clearance on jacks	210 mm
Max. ground bearing pressure	Tracking/pushing – 47 kPa Pulling – 88 kPa
Max. testing gradient	10 degrees
Max. traversing gradient	20 degrees (operator assessed)
Noise output at 2 m	Testing - 74 dBA Driving – 87 dBA
Clamp arrangement	36/55 push-pull clamp
Ram stroke	1.2 m
Max. casing size	55 mm

Lankelma's versatile track-truck is suitable for most geotechnical sites. The rig is driven to site as a self-contained HGV with tracks that can be deployed to cope with soft or uneven terrain. Fitted with a chalywn valve and spark arrestor.

Typical production

An expected 100m+ of standard CPTu testing can be executed in a day (depending on conditions and access).

Specialist testing

Seismic
Pressuremeter
Magnetometer
Video cone
Wing cone
Push-in shear vane

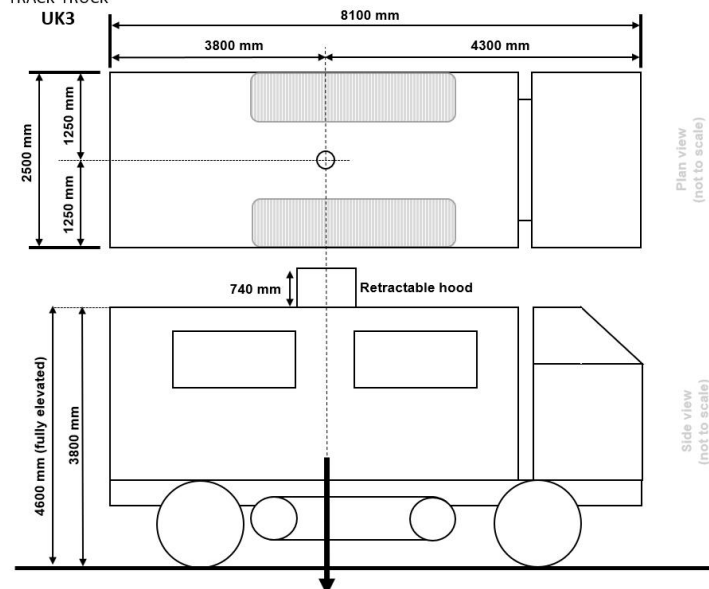
Installations

VWP
Piezometer
Inclinometer

Sampling

MOSTAP
Shelby

TRACK-TRUCK

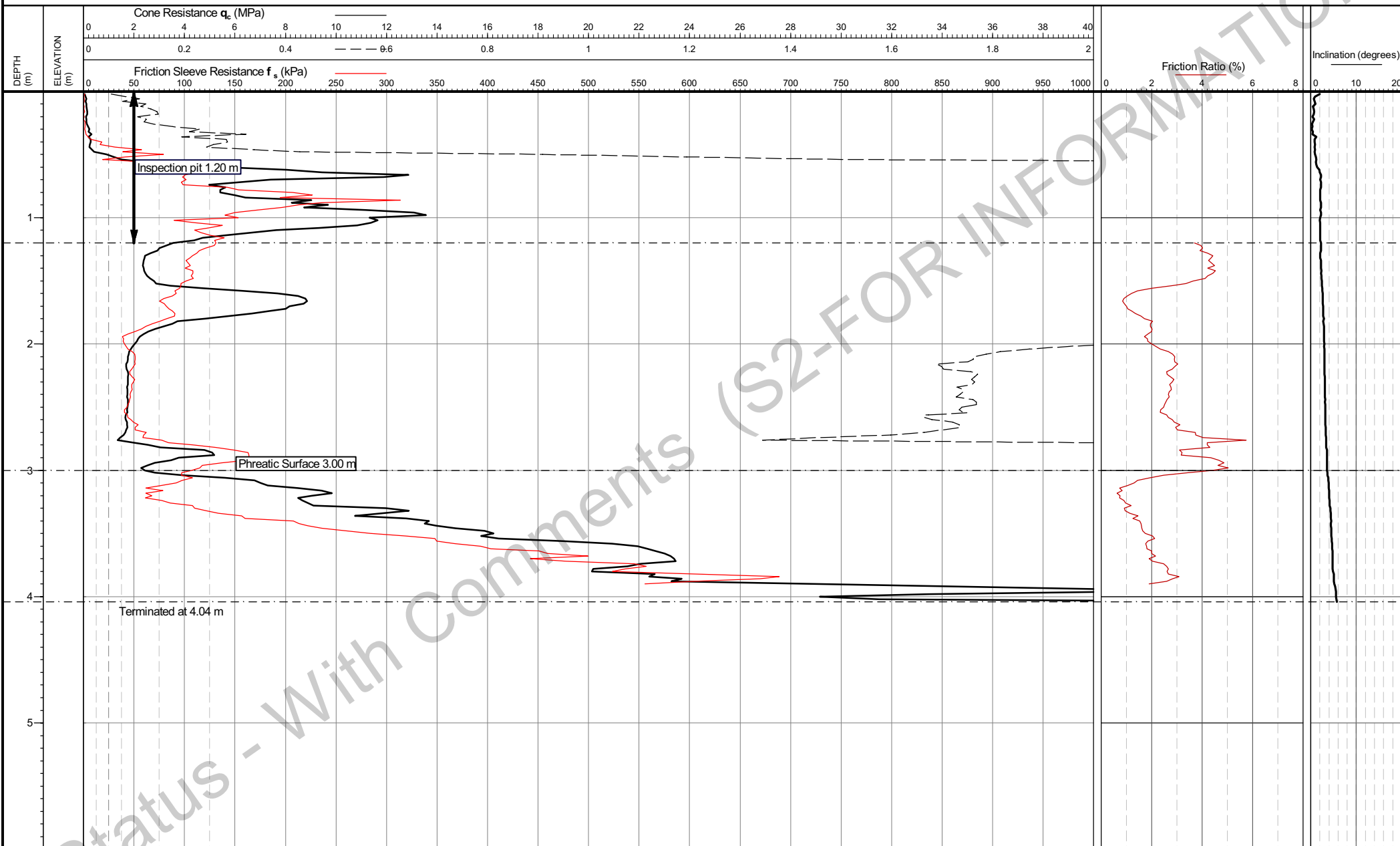


APPENDIX C CONE PENETRATION TEST RESULTS

Measured CPT parameters

intermediate parameters R_f and B_q

B Status - With Comments (S2-FOR INFORMATION)



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 08:46:26

Zero drift (Pre/post test)
 q_c (kPa): 6.2
 f_s (kPa): 0.2 ($f_{s, drift} - q_{c, drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value

Refusal criteria: Tip load

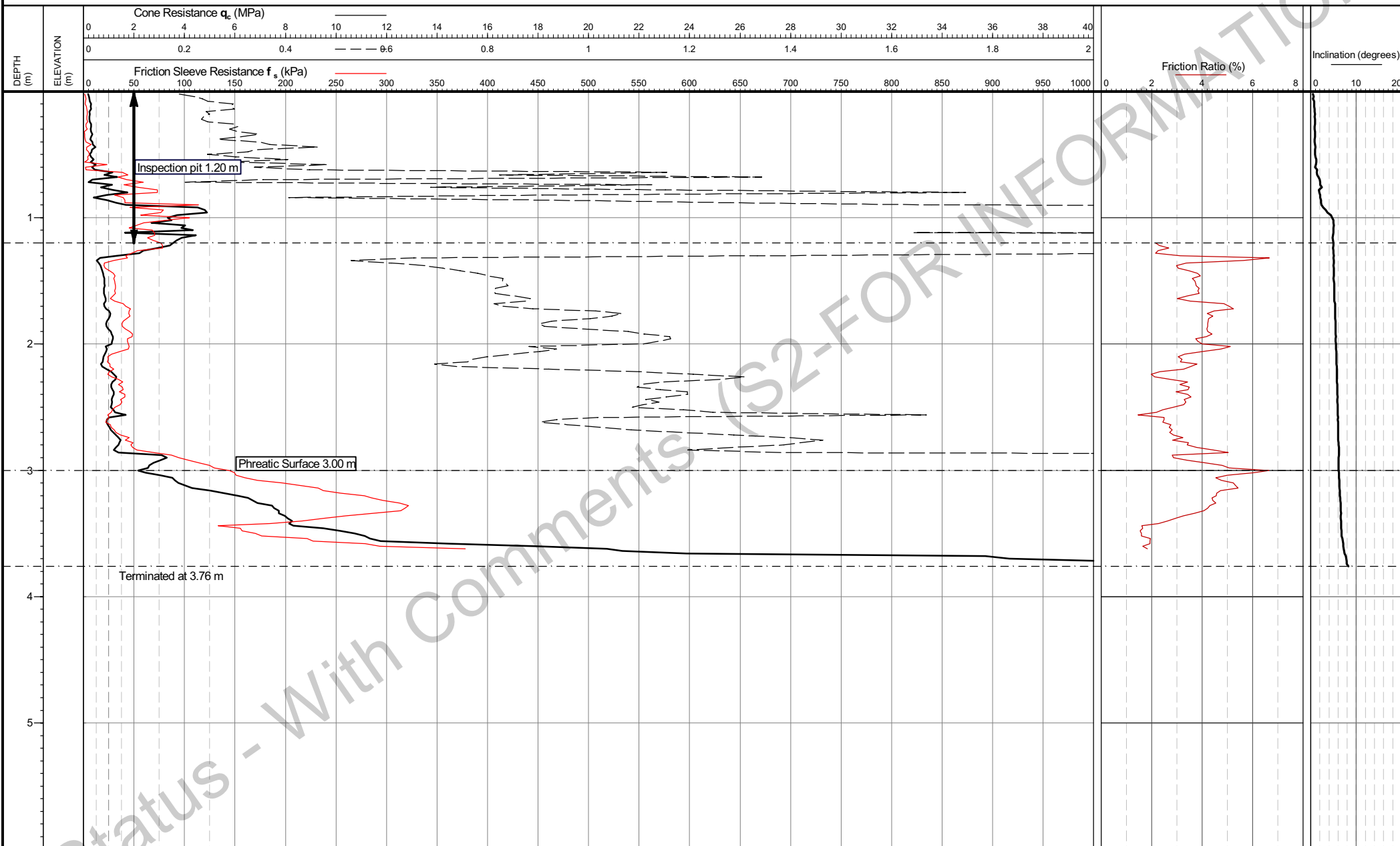
Date of plot:
28-10-22

Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT101

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 08:34:15

Zero drift (Pre/post test)
 q_c (kPa): -57.6
 f_s (kPa): 0.8 ($f_{s\ drift} - q_{c\ drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

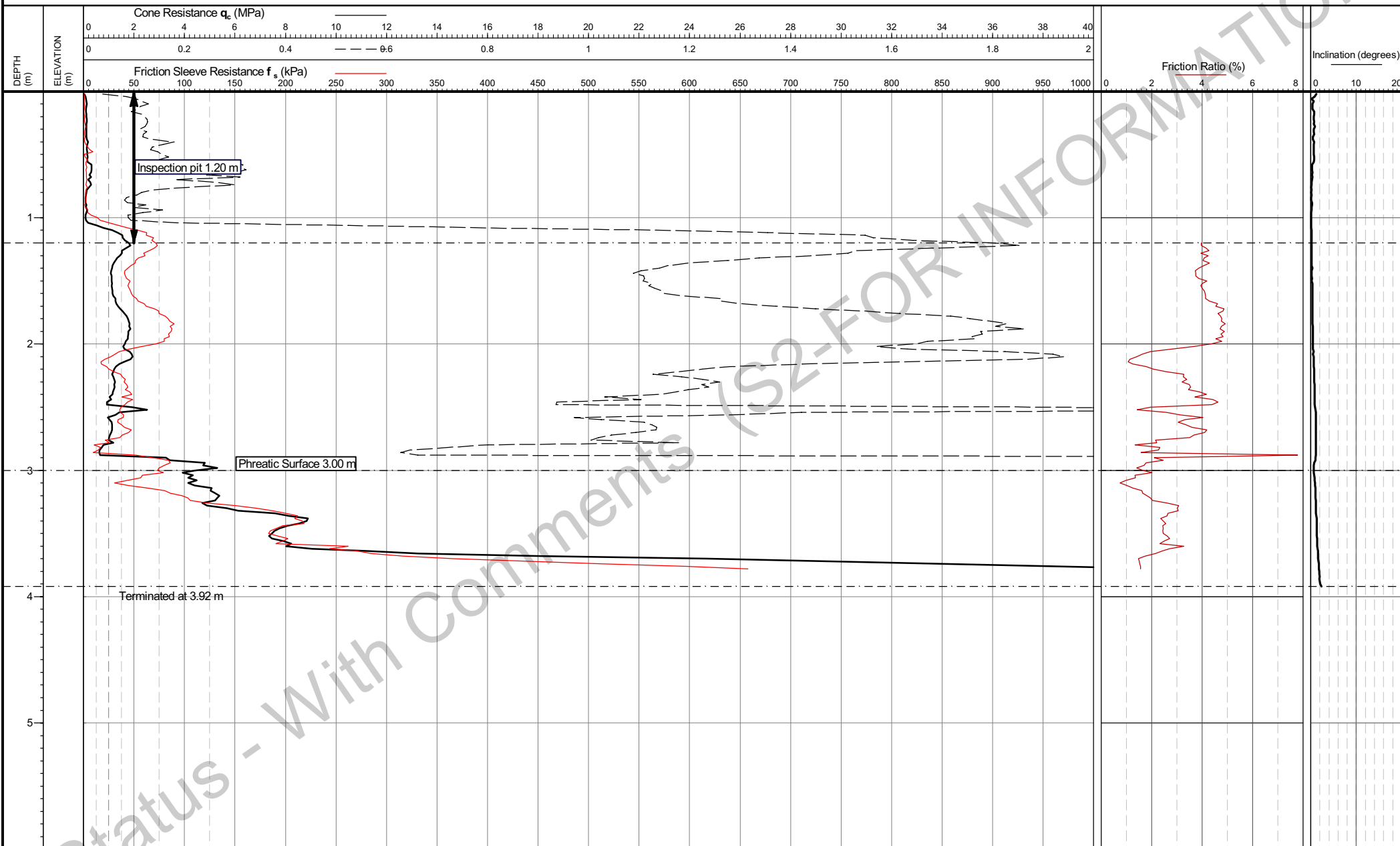
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Tip load

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT102

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 09:13:26

Zero drift (Pre/post test)
 q_c (kPa): -26.2
 f_s (kPa): 1.1 ($f_{s, drift} - q_{c, drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

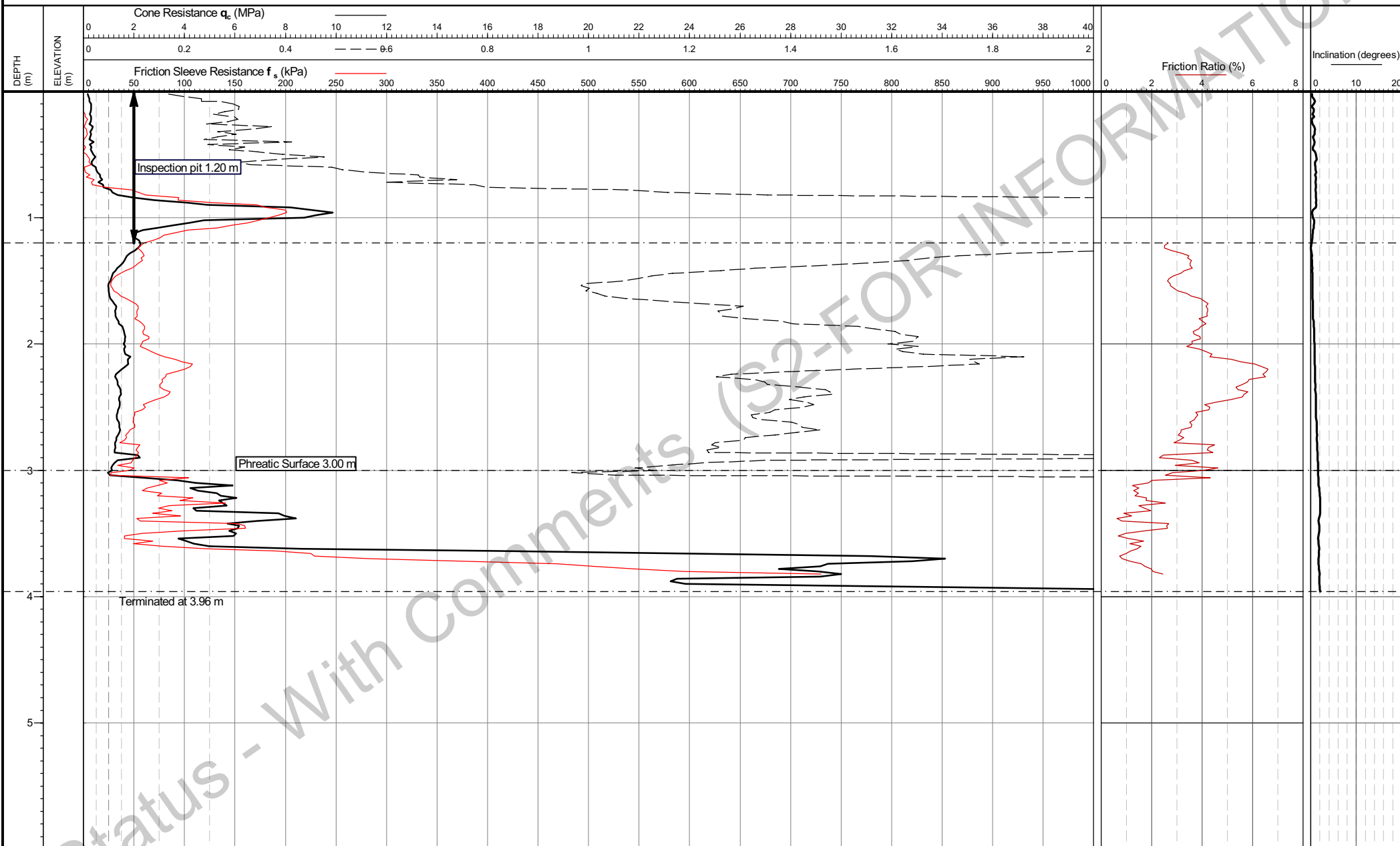
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at surface

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT103

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 09:24:35

Zero drift (Pre/post test)
 q_c (kPa): -15.4
 f_s (kPa): 1.2 ($f_{s \text{ drift}} - q_{c \text{ drift}}$)

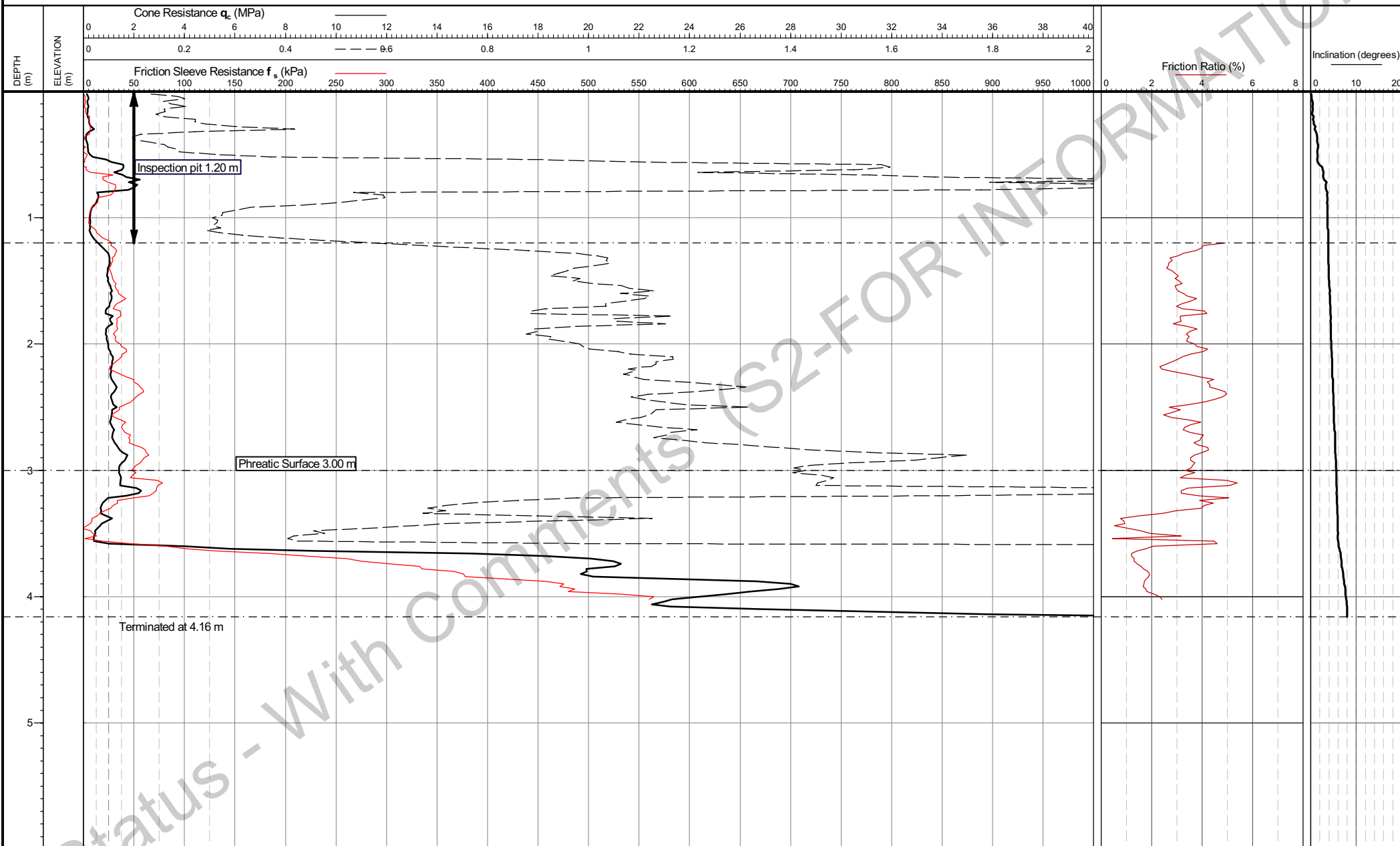
Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Tip load

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT104



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 09:43:40

Zero drift (Pre/post test)
 q_c (kPa): 27.6
 f_s (kPa): -1.7 ($f_{s\ drift} - q_{c\ drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value

Refusal criteria: Lateral support at surface

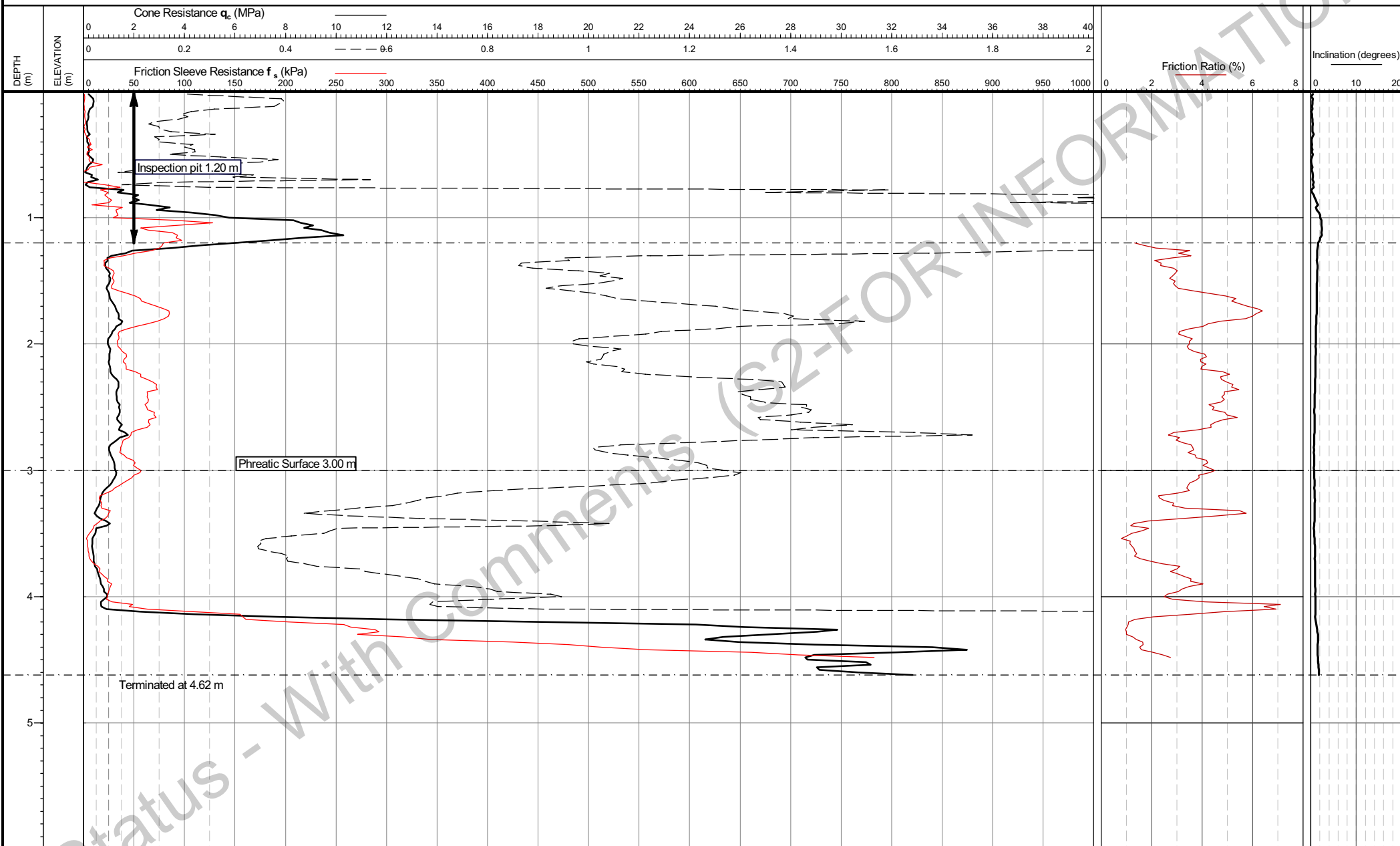
Date of plot:
28-10-22

Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT105

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 10:04:22

Zero drift (Pre/post test)
 q_c (kPa): -7.6
 f_s (kPa): 0.7 ($f_{s\ drift} = q_{c\ drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

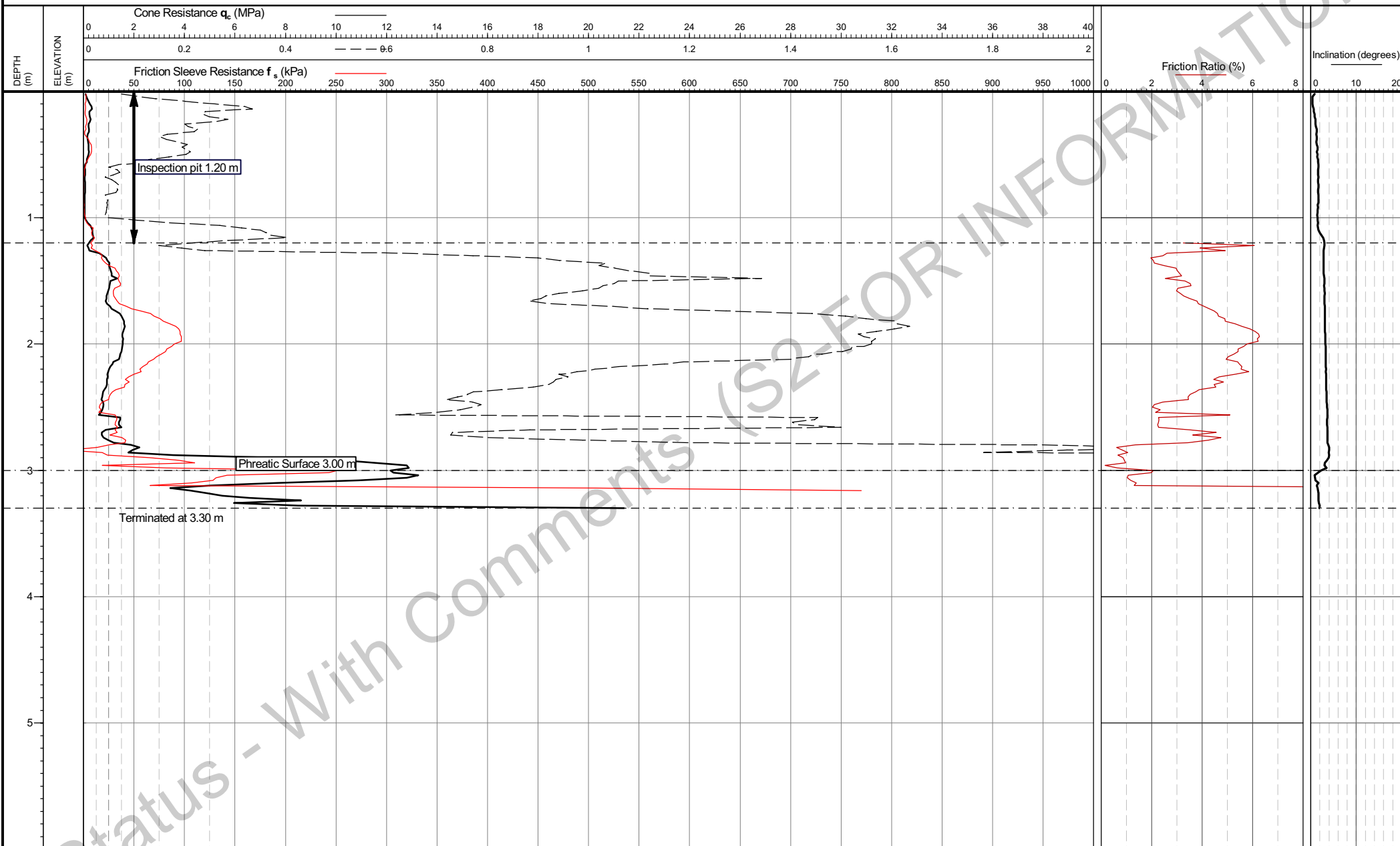
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT106

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 11:07:01

Zero drift (Pre/post test)
 q_c (kPa): -16.4
 f_s (kPa): 1.5 ($f_{s, drift} - q_{c, drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

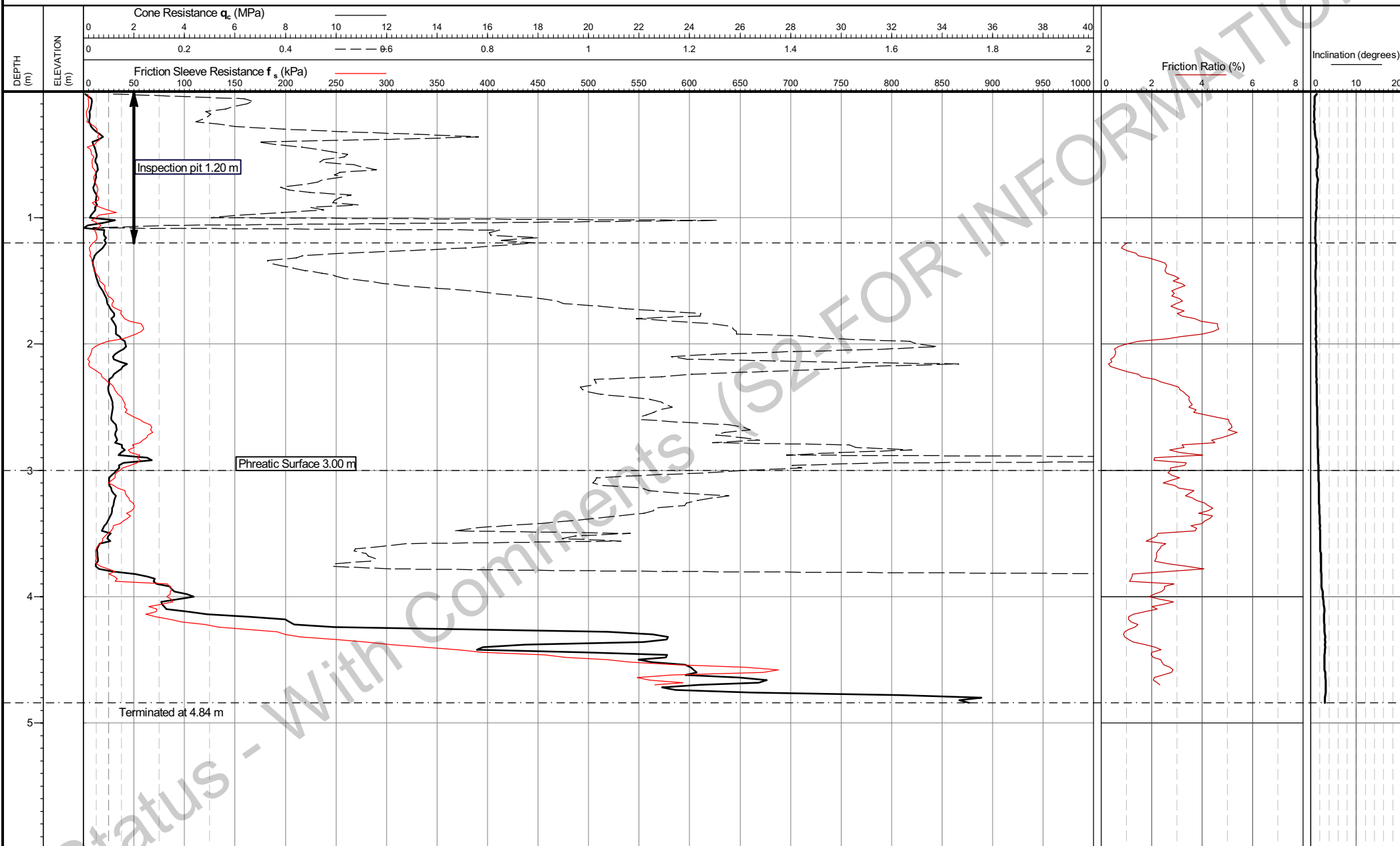
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT107

Page 1 of 1



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 10:35:41

Zero drift (Pre/post test)
 q_c (kPa): -7.8
 f_s (kPa): 0.4 ($f_{s\ drift} = q_{c\ drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

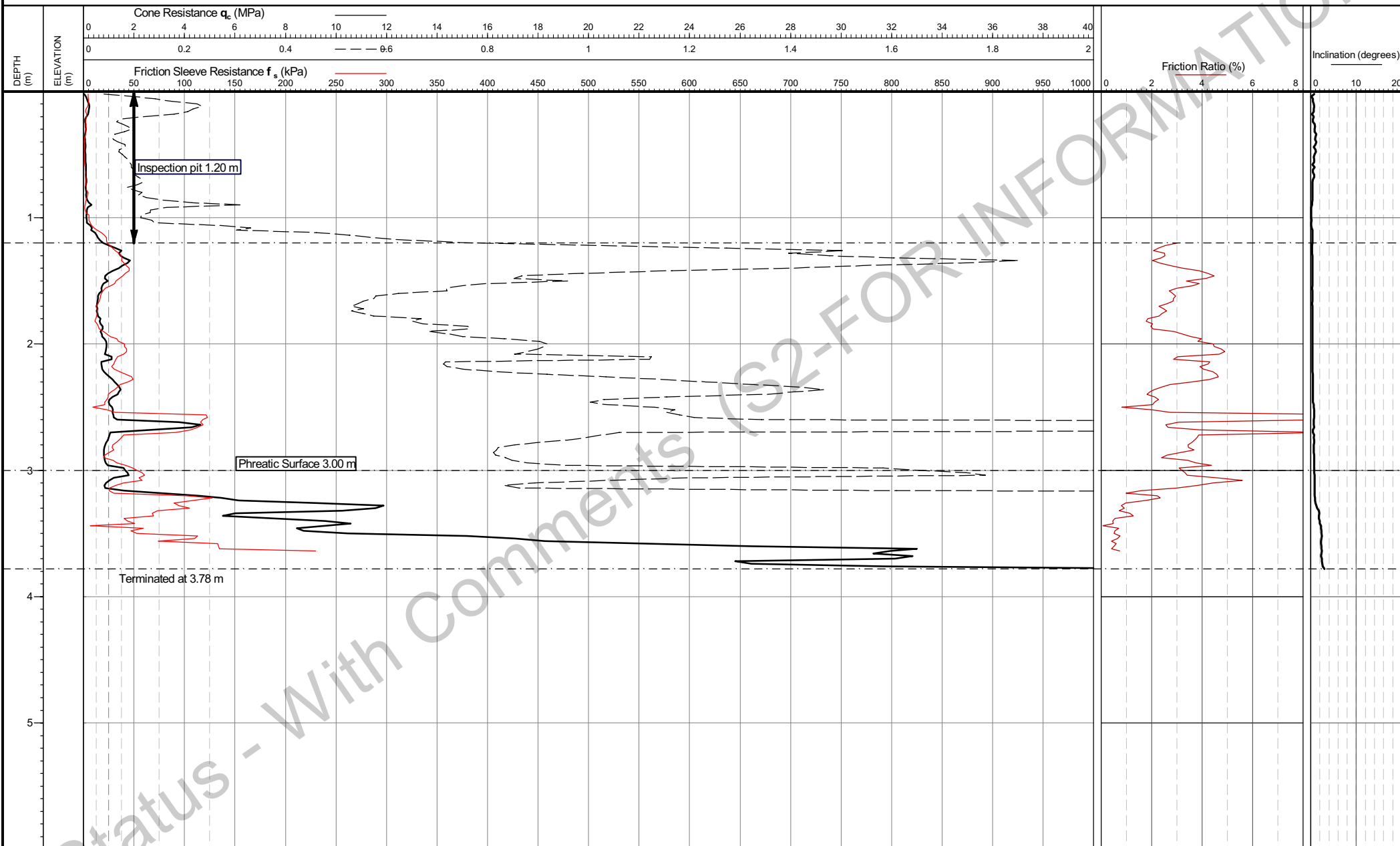
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT108

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 11:25:17

Zero drift (Pre/post test)
 q_c (kPa): 10.0
 f_s (kPa): 0.1 ($f_{s\ drift} = q_{c\ drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

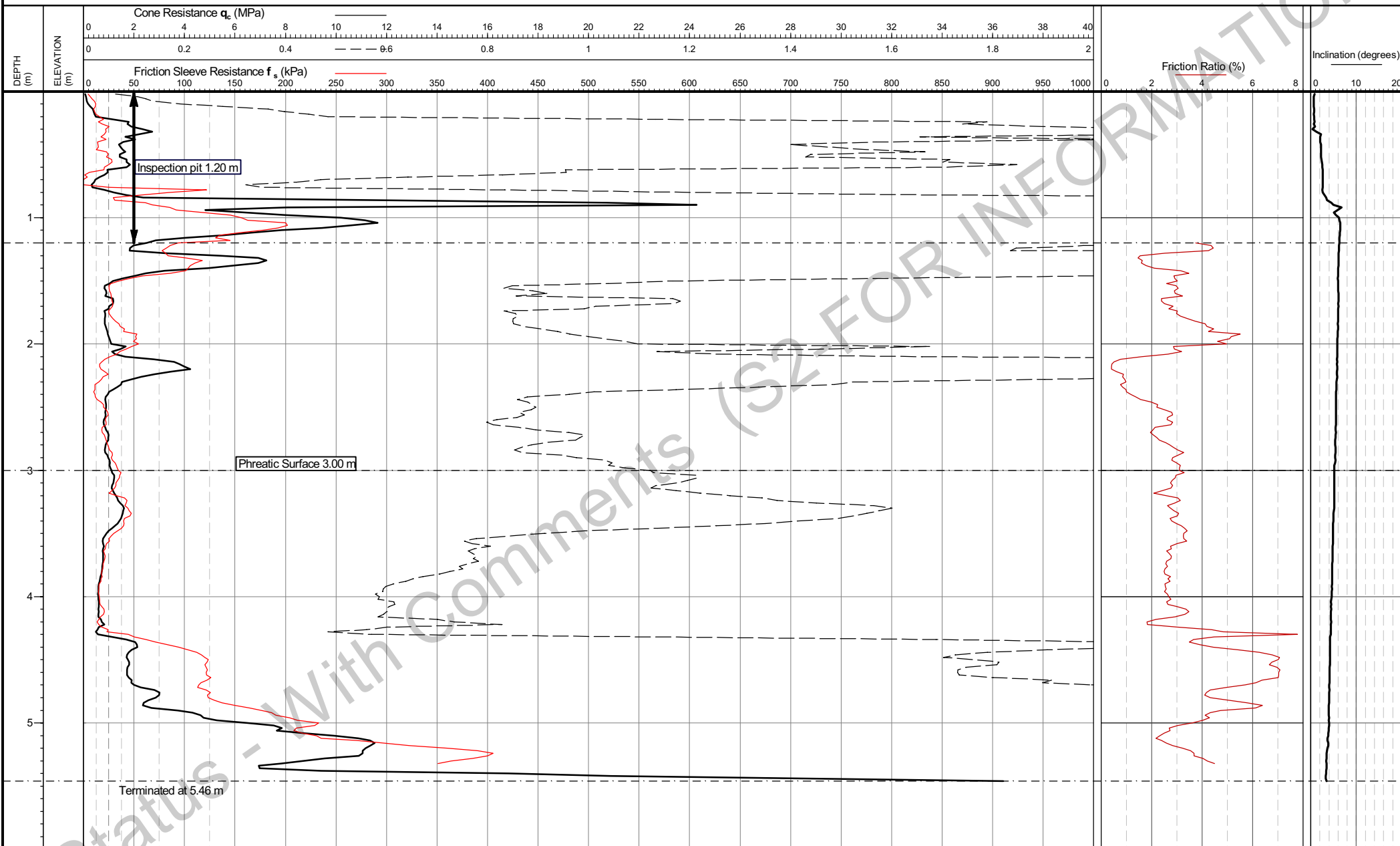
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT109

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 11:47:20

Zero drift (Pre/post test)
 q_c (kPa): 5.0
 f_s (kPa): -0.3 ($f_{s, drift} - q_{c, drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

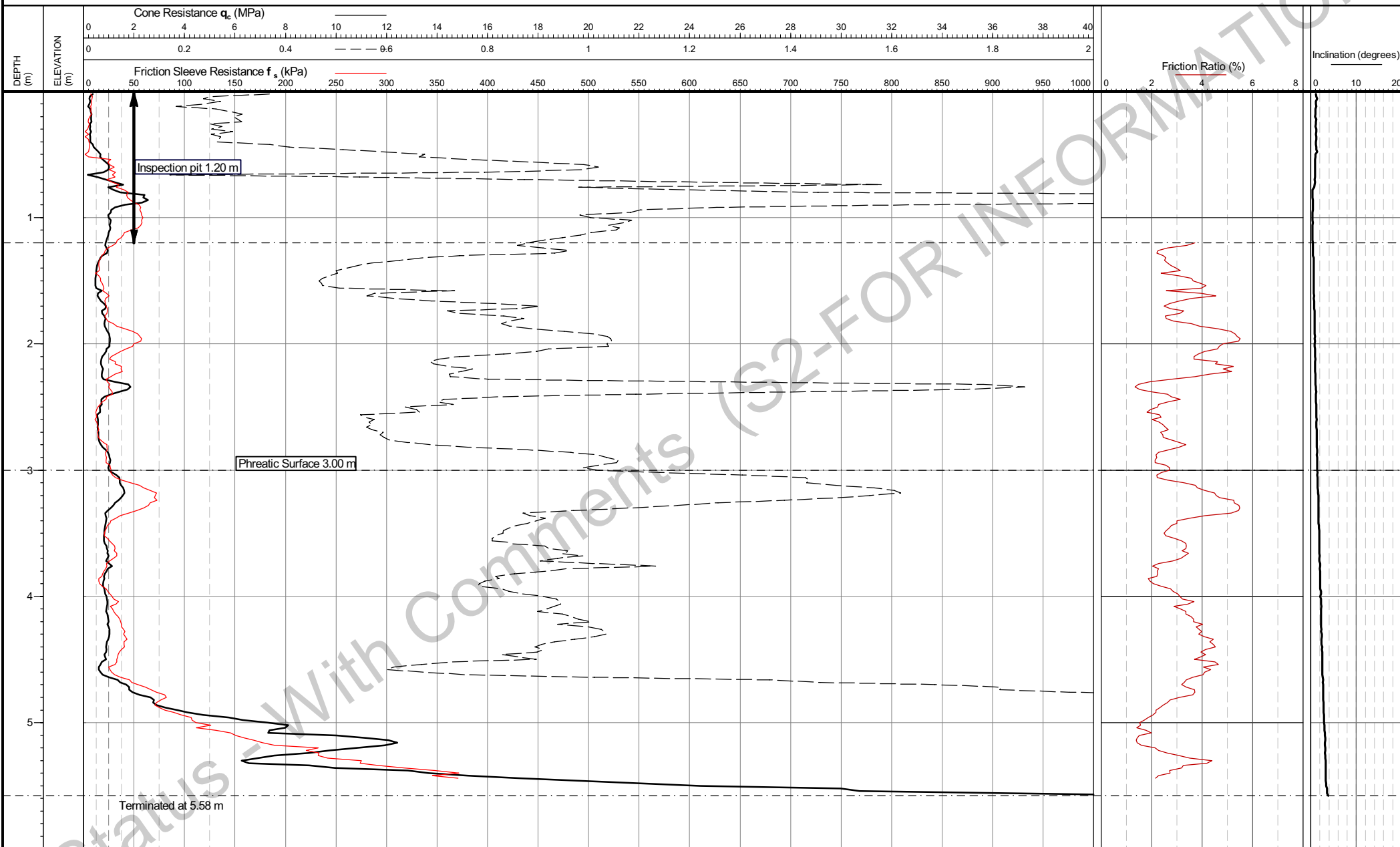
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT110

Page 1 of 1



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 12:31:27

Zero drift (Pre/post test)
 q_c (kPa): 7.2
 f_s (kPa): -0.4 ($f_{s\ drift} - q_{c\ drift}$)

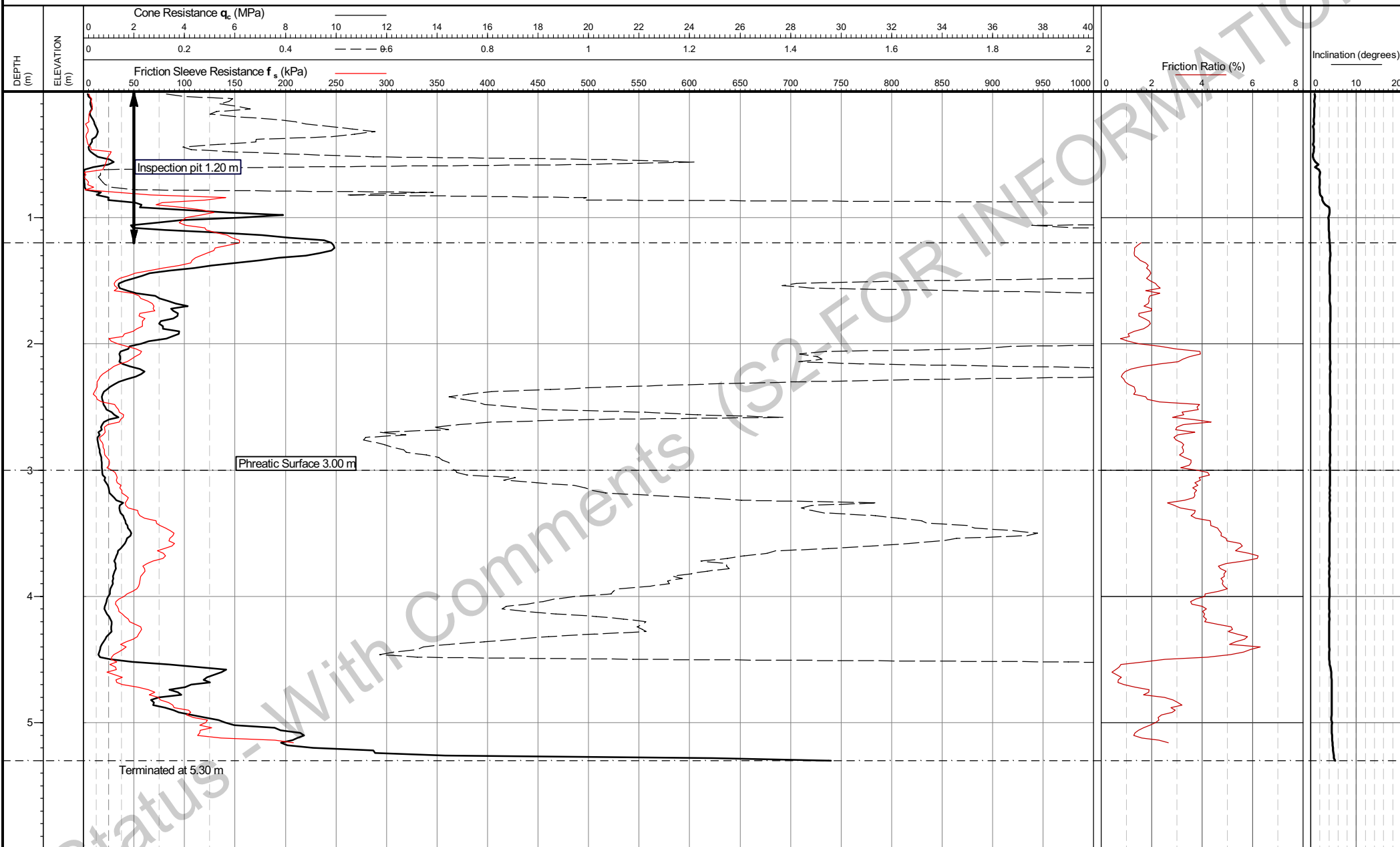
Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT111



Cone area (mm²):
Cone ID: S15-CFIPPT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 12:51:34

Zero drift (Pre/post test)
 q_c (kPa): -17.4
 f_s (kPa): 0.7 ($f_{s\ drift} - q_{c\ drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

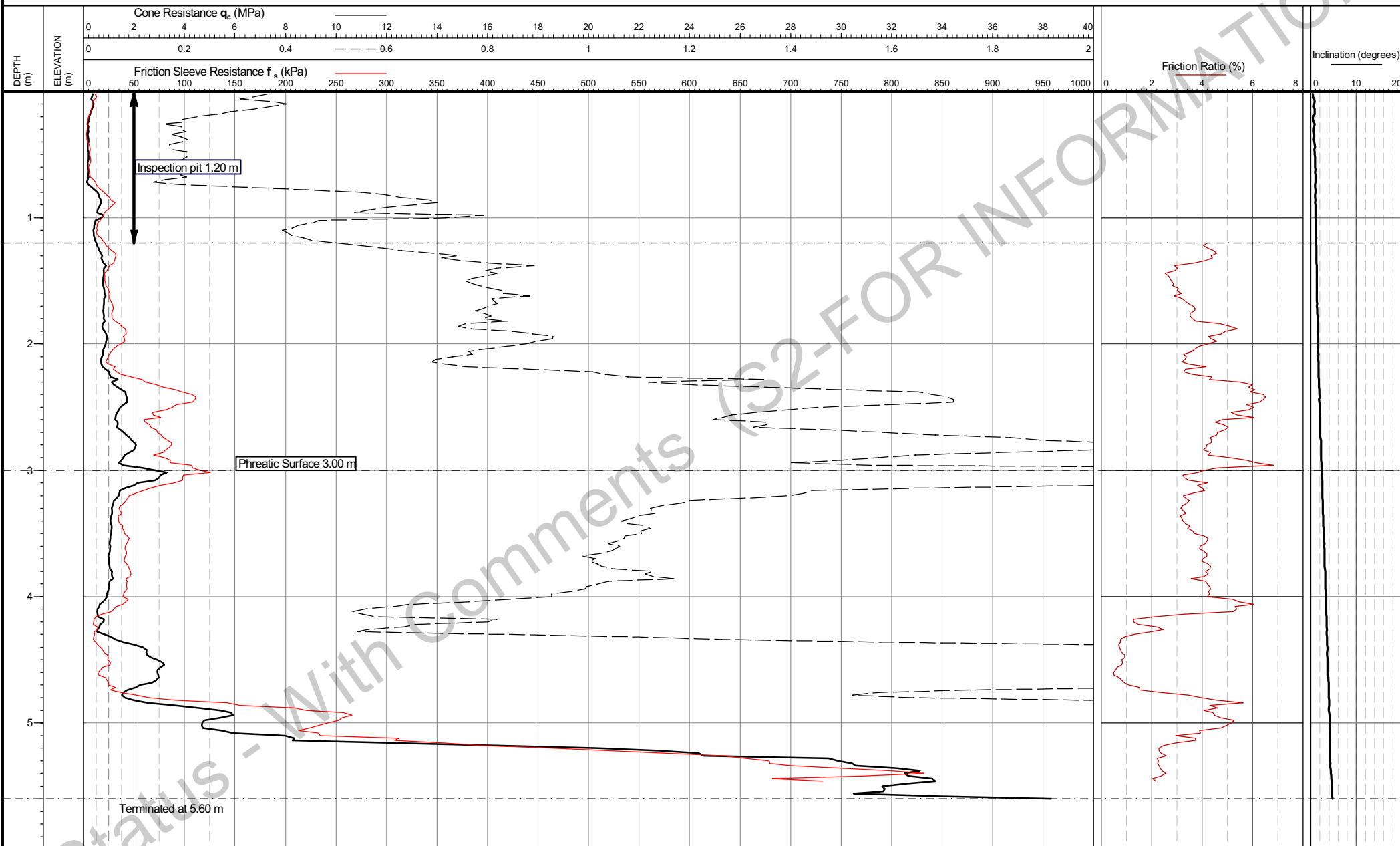
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT112

Page 1 of 1



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 13:19:07

Zero drift (Pre/post test)
 q_c (kPa): -41.4
 f_s (kPa): 1.4 ($f_{s \text{ drift}} - q_c \text{ drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

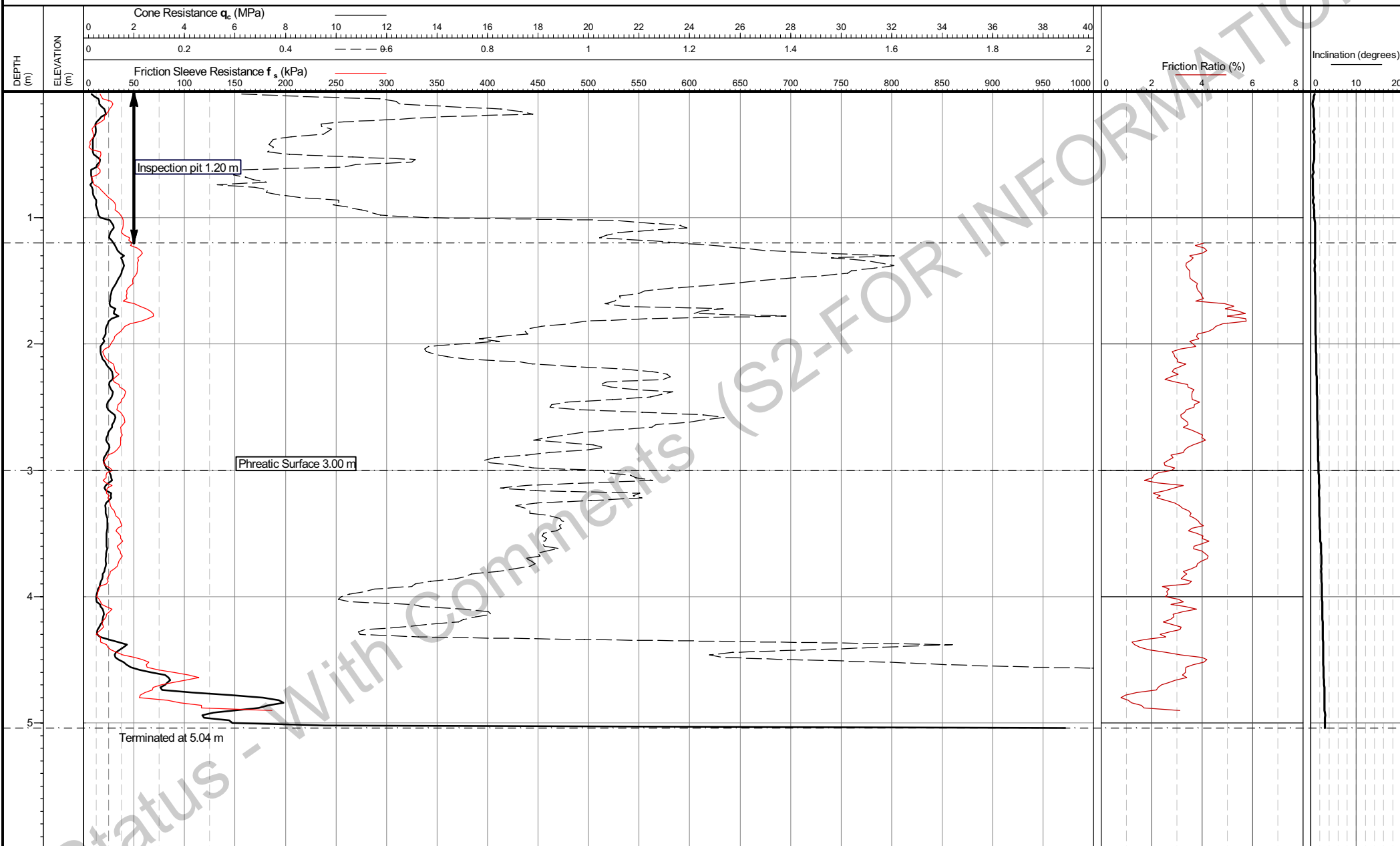
Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT113

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 13:30:02

Zero drift (Pre/post test)
 q_c (kPa): 64.6
 f_s (kPa): -1.8 ($f_{s, drift} - q_{c, drift}$)

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Refusal criteria: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT114

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APPENDIX D SOIL BEHAVIOUR TYPE RESULTS

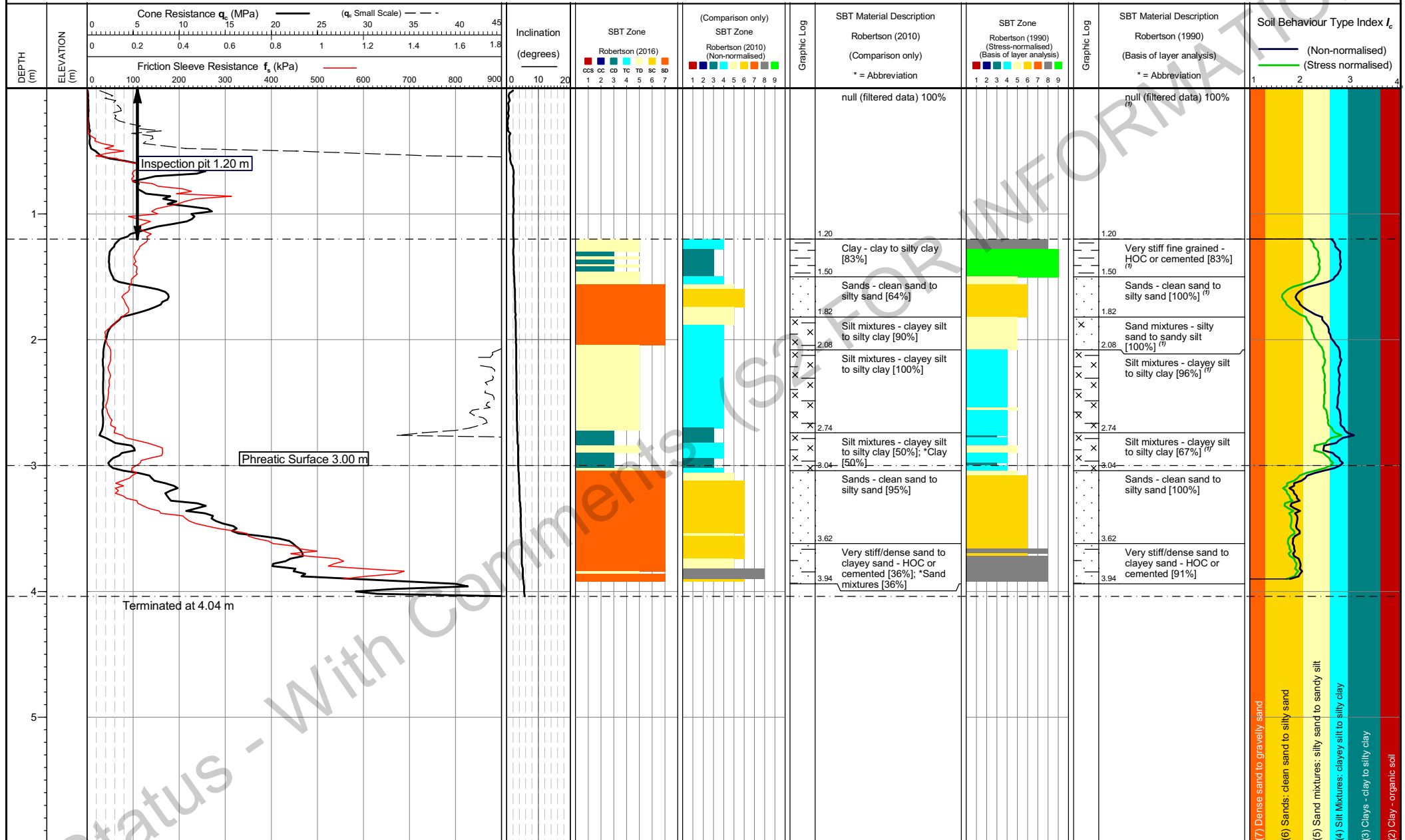
Soil behaviour type (SBT) point data evaluation according to:

Schneider et al (2008)

Robertson (2016)

Robertson (2010) with aggregate layer descriptions

Robertson (1990) with aggregate layer descriptions



Cone area (mm²):
 ConeID: S15-CFIPTT.1993
 Location: Greater Manchester, UK
 Rig Used: UK3
 Date of test: 28/10/2022 08:46:26

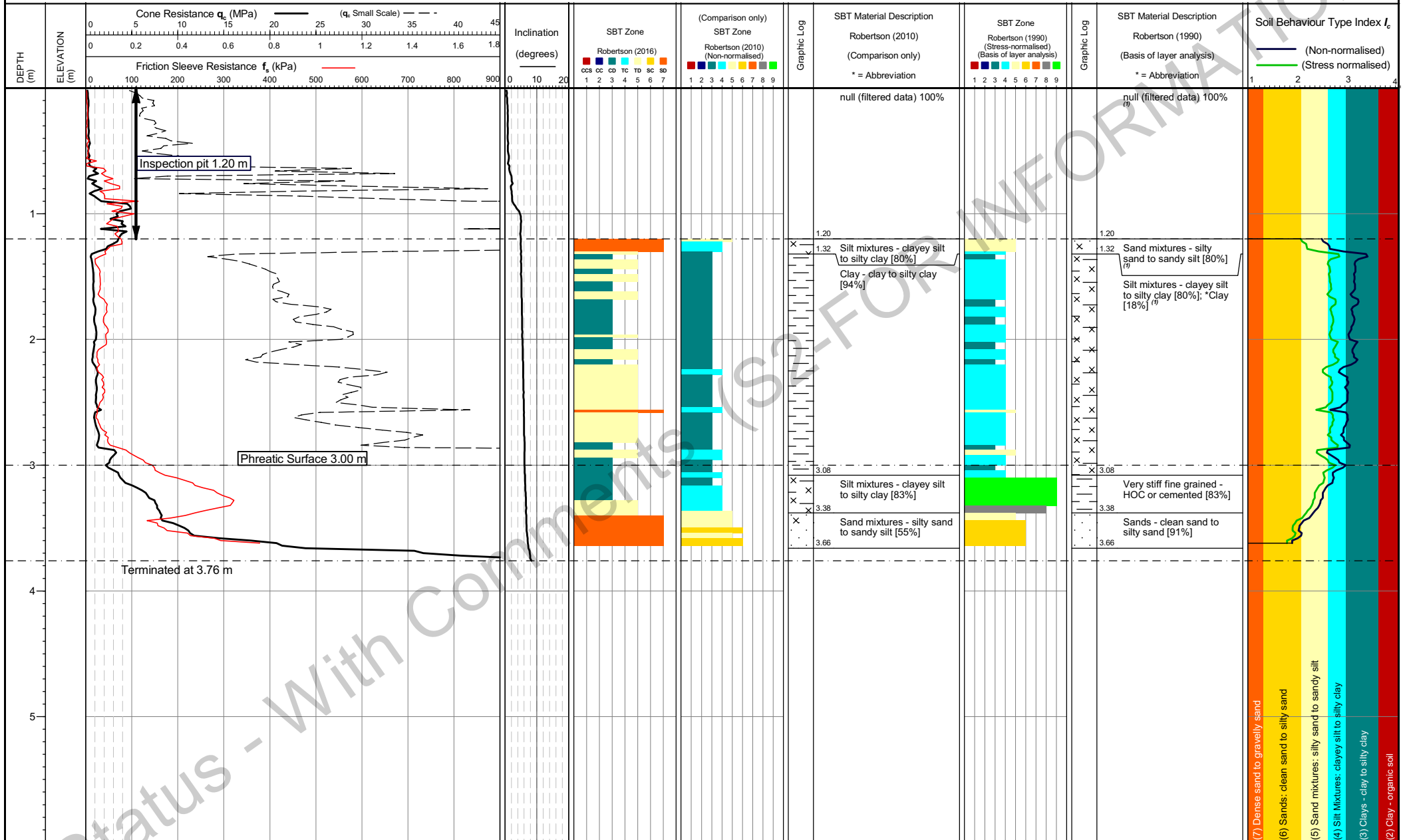
Remarks: *Phreatic surface origin: Arbitrary value
 Coordinates: ,
 Elevation:

Robertson (2016) Material Type
 1 - CCS - Clay-like - Contractive - Sensitive
 2 - CC - Clay-like - Contractive
 3 - CD - Clay-like - Dilative
 4 - TC - Transitional - Contractive
 5 - TD - Transitional - Dilative
 6 - SC - Sand-like - Contractive
 7 - SD - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
 1 - Sensitive fine-grained
 2 - Organic soils
 3 - Clays - clay to silty clay
 4 - Silt mixtures - clayey silt to silty clay
 5 - Sand mixtures - silty sand to sandy silt
 6 - Sands - clean sand to silty sand
 7 - Gravelly sand to sand
 8 - Very stiff/dense sand to clayey sand
 9 - Very stiff fine grained

⁽¹⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
 Internal QA Diss. Dissipation Test

TEST ID: CPT101



ConeID: S15-CFIPPT.1993
 Location: Greater Manchester, UK
 Rig Used: UK3
 Date of test: 28/10/2022 08:34:15

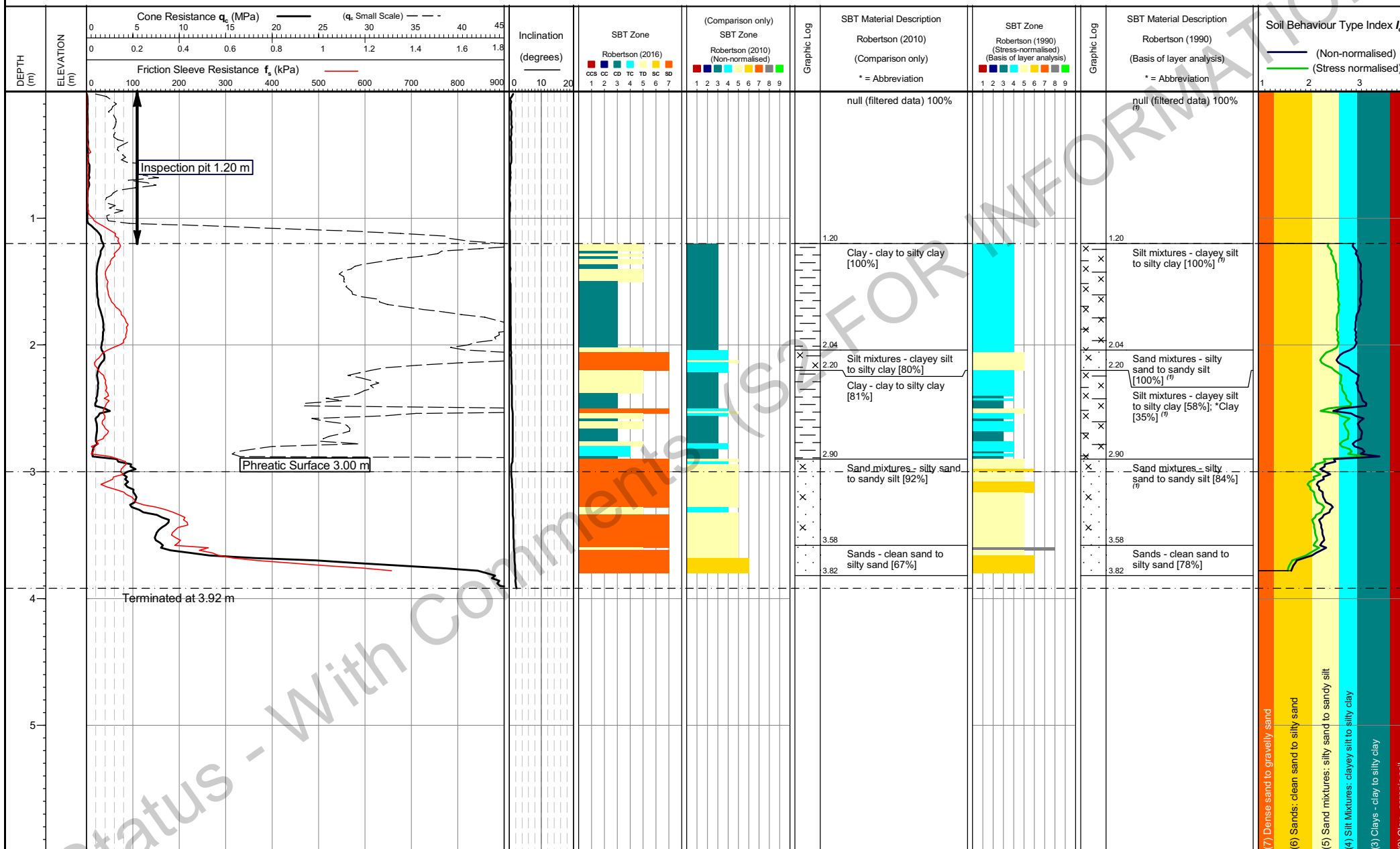
Remarks: *Phreatic surface origin: Arbitrary value
 Coordinates: ,
 Elevation:

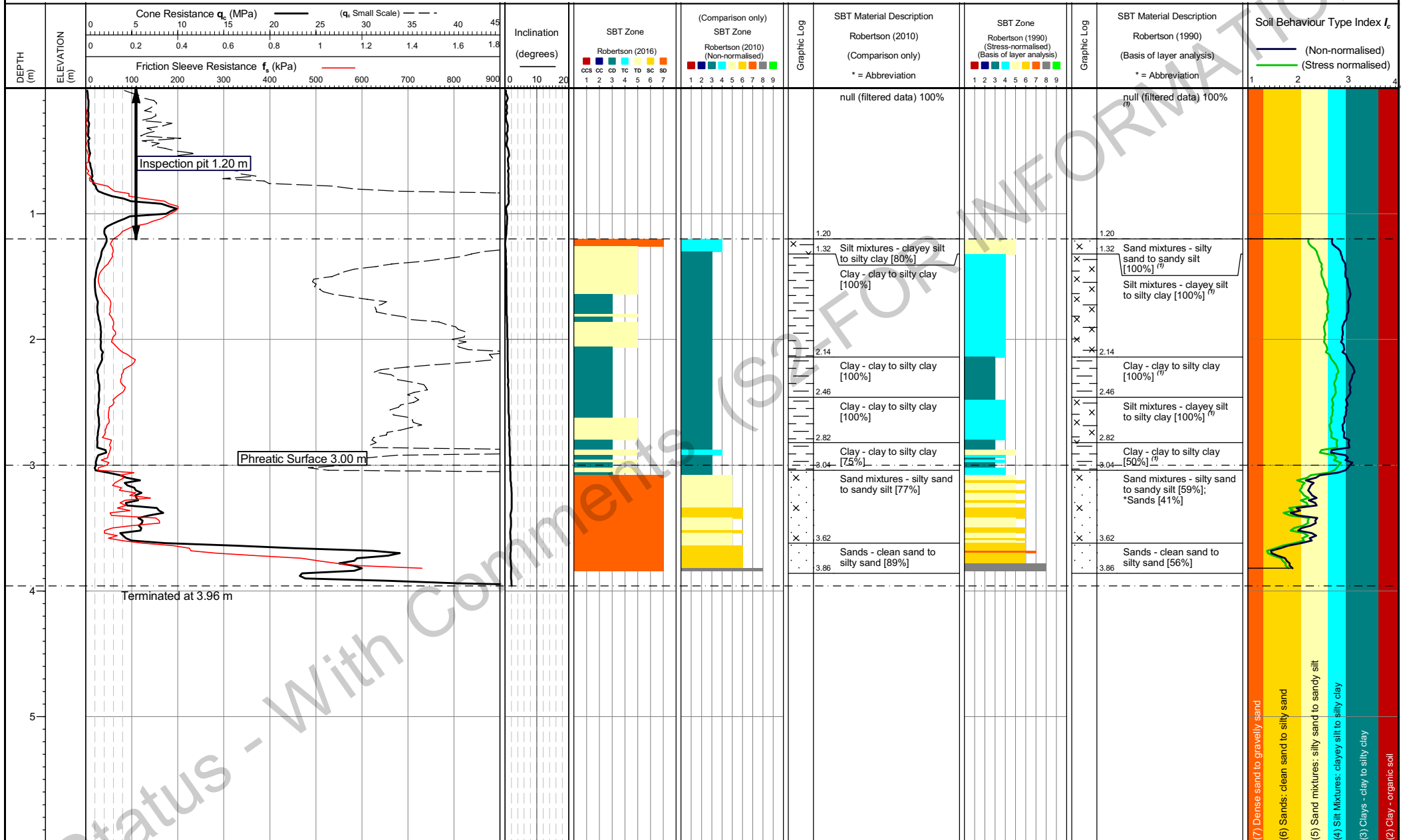
Robertson (2016) Material Type
 1 - CCS - Clay-like - Contractive - Sensitive
 2 - CC - Clay-like - Contractive
 3 - CD - Clay-like - Dilative
 4 - TC - Transitional - Contractive
 5 - TD - Transitional - Dilative
 6 - SC - Sand-like - Contractive
 7 - SD - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
 1 - Sensitive fine-grained
 2 - Organic soils
 3 - Clays - clay to silty clay
 4 - Silt mixtures - clayey silt to silty clay
 5 - Sand mixtures - silty sand to sandy silt
 6 - Sands - clean sand to silty sand
 7 - Gravelly sand to sand
 8 - Very stiff/dense sand to clayey sand
 9 - Very stiff fine grained

⁽¹⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
 Internal QA Diss. Dissipation Test

TEST ID: CPT102





Cone area (mm²):
 ConeID: S15-CFIPTT.1993
 Location: Greater Manchester, UK
 Rig Used: UK3
 Date of test: 28/10/2022 09:24:35

Remarks: *Phreatic surface origin: Arbitrary value
 Coordinates: ,
 Elevation:

Robertson (2016) Material Type
 1 - CCS - Clay-like - Contractive - Sensitive
 2 - CC - Clay-like - Contractive
 3 - CD - Clay-like - Dilative
 4 - TC - Transitional - Contractive
 5 - TD - Transitional - Dilative
 6 - SC - Sand-like - Contractive
 7 - SD - Sand-like - Dilative

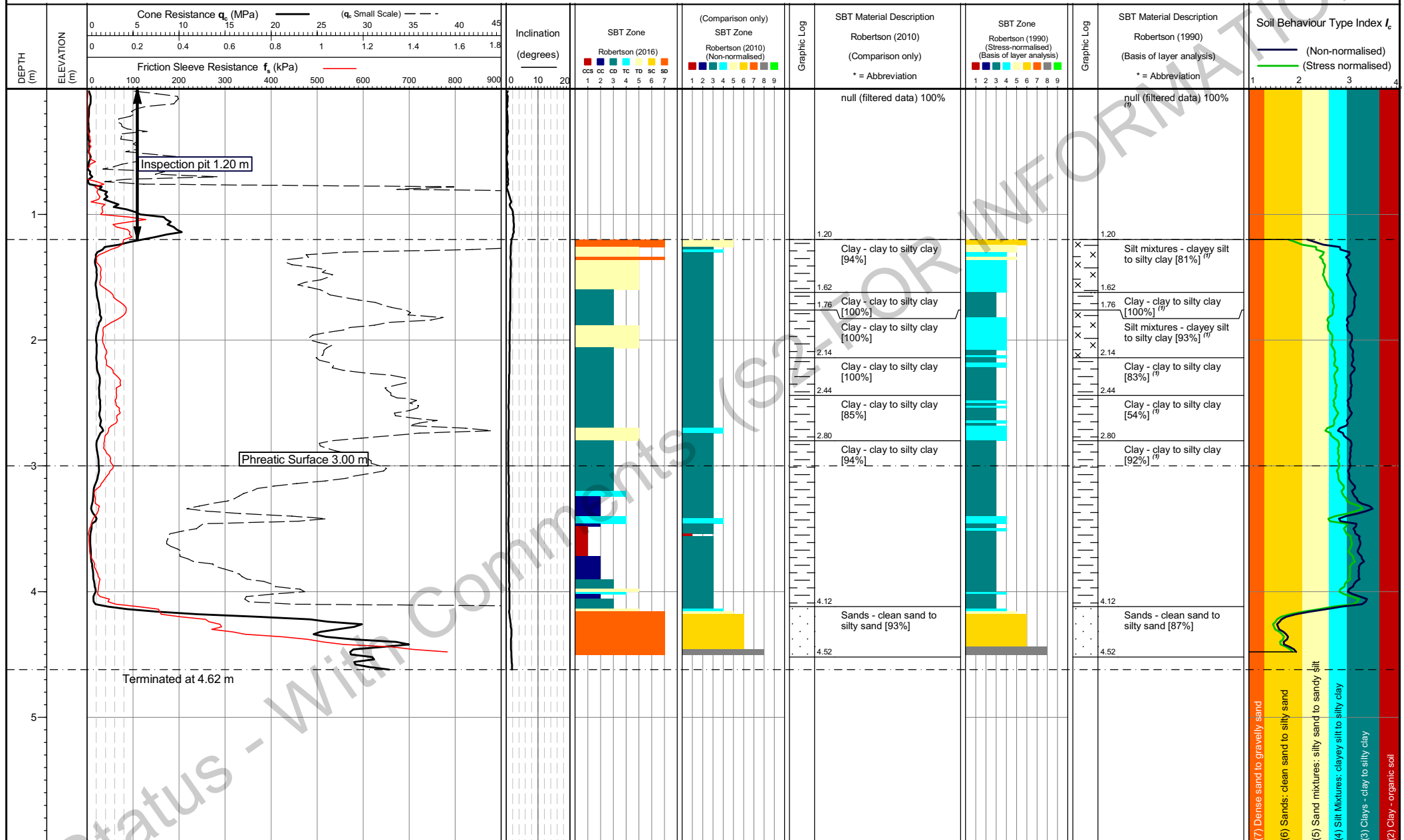
Robertson (1990 & 2010) Material Type
 1 - Sensitive fine-grained
 2 - Organic soils
 3 - Clays - clay to silty clay
 4 - Silt mixtures - clayey silt to silty clay
 5 - Sand mixtures - silty sand to sandy silt
 6 - Sands - clean sand to silty sand
 7 - Gravelly sand to sand
 8 - Very stiff/dense sand to clayey sand
 9 - Very stiff fine grained

⁽¹⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
 Internal QA Diss. Dissipation Test

TEST ID: CPT104



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Cone area (mm²):
 ConeID: S15-CFIPPT.1993
 Location: Greater Manchester, UK
 Rig Used: UK3
 Date of test: 28/10/2022 10:04:22

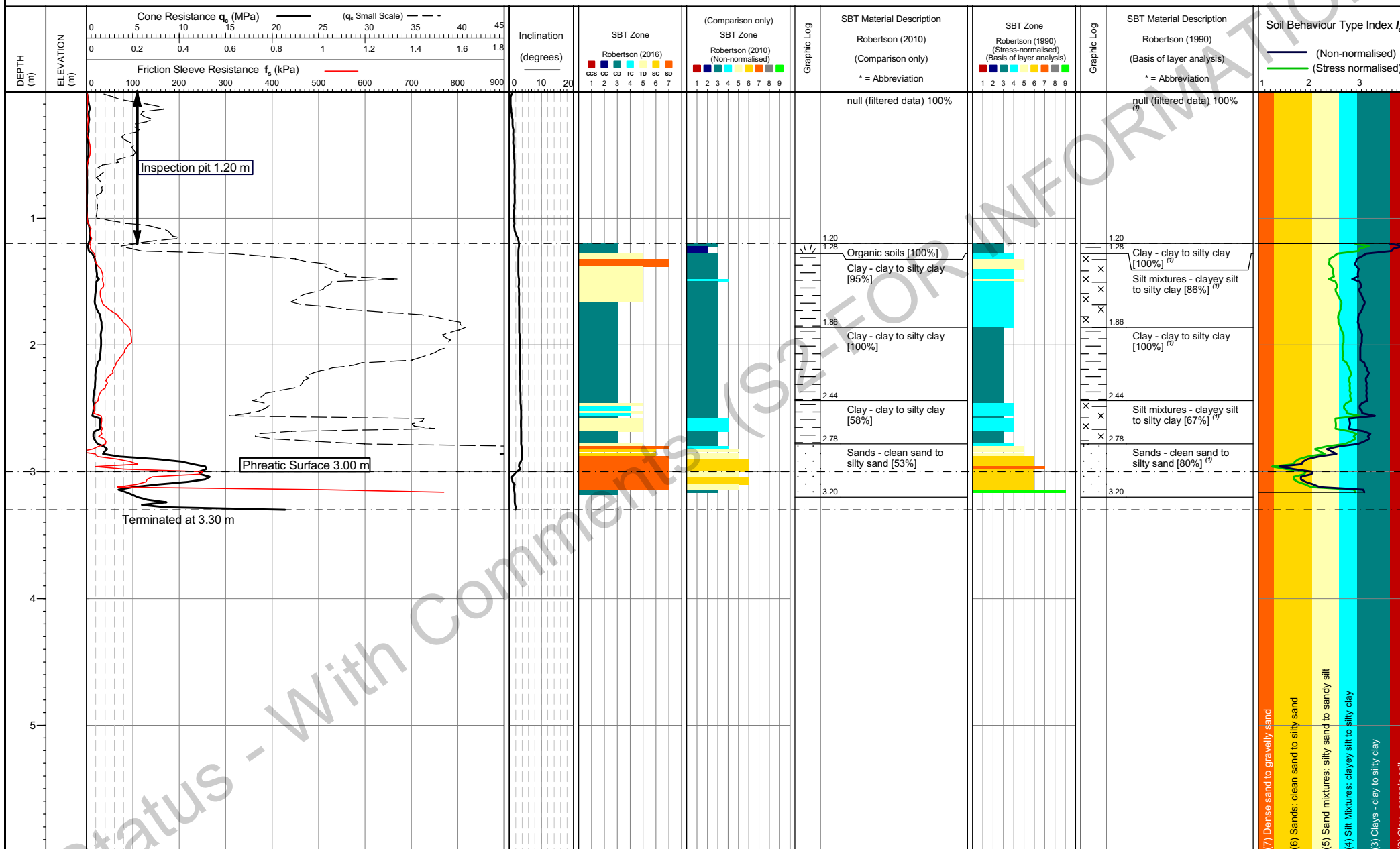
Remarks: *Phreatic surface origin: Arbitrary value
 Coordinates: ,
 Elevation:

Robertson (2016) Material Type
 1 - CCS - Clay-like - Contractive - Sensitive
 2 - CC - Clay-like - Contractive
 3 - CD - Clay-like - Dilative
 4 - TC - Transitional - Contractive
 5 - TD - Transitional - Dilative
 6 - SC - Sand-like - Contractive
 7 - SD - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
 1 - Sensitive fine-grained
 2 - Organic soils
 3 - Clays - clay to silty clay
 4 - Silt mixtures - clayey silt to silty clay
 5 - Sand mixtures - silty sand to sandy silt
 6 - Sands - clean sand to silty sand
 7 - Gravelly sand to sand
 8 - Very stiff/dense sand to clayey sand
 9 - Very stiff fine grained

⁽⁷⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
 Internal QA Diss. Dissipation Test

TEST ID: CPT106



Cone area (mm²):
ConeID: S15-CFIPTT.1993
Location: Greater Manchester, UK
Rig Used: UK3
Date of test: 28/10/2022 11:07:01

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Robertson (2016) Material Type

- 1 - CCS - Clay-like - Contractive - Sensitive
- 2 - CC - Clay-like - Contractive
- 3 - CD - Clay-like - Dilative
- 4 - TC - Transitional - Contractive
- 5 - TD - Transitional - Dilative
- 6 - SC - Sand-like - Contractive
- 7 - SD - Sand-like - Dilative

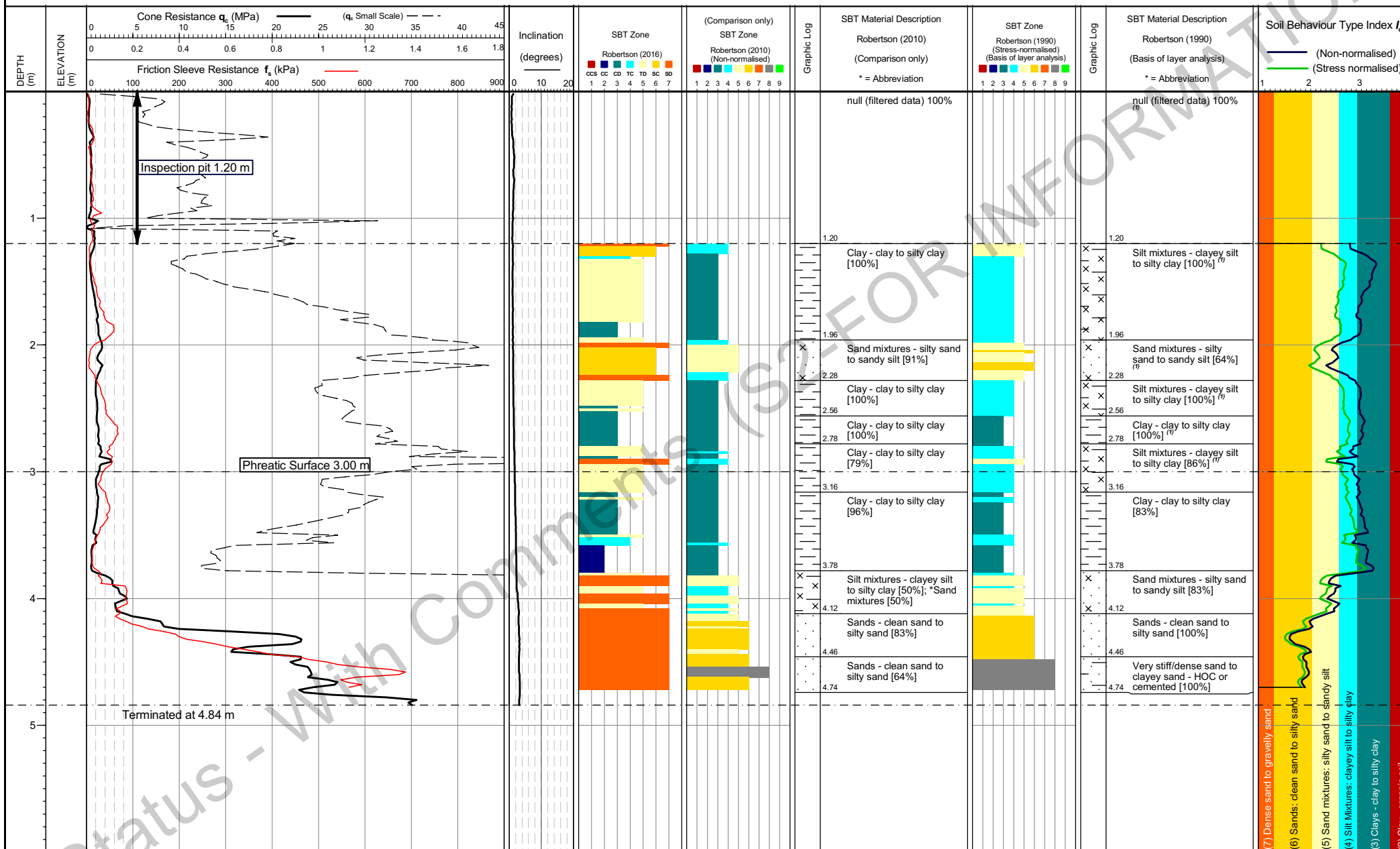
Robertson (1990 & 2010) Material Type

- 1 - Sensitive fine-grained
- 2 - Organic soils
- 3 - Clays - clay to silty clay
- 4 - Silt mixtures - clayey silt to silty clay
- 5 - Sand mixtures - silty sand to sandy silt
- 6 - Sands - clean sand to silty sand
- 7 - Gravelly sand to sand
- 8 - Very stiff/dense sand to clayey sand
- 9 - Very stiff fine grained

⁽¹⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

Internal QA Diss. Dissipation Test

TEST ID: CPT107



Cone area (mm²):
ConeID: S15-CFIPTT.1993
Location: Greater Manchester, UK
Rig Used: UK3
Date of test: 28/10/2022 10:35:41

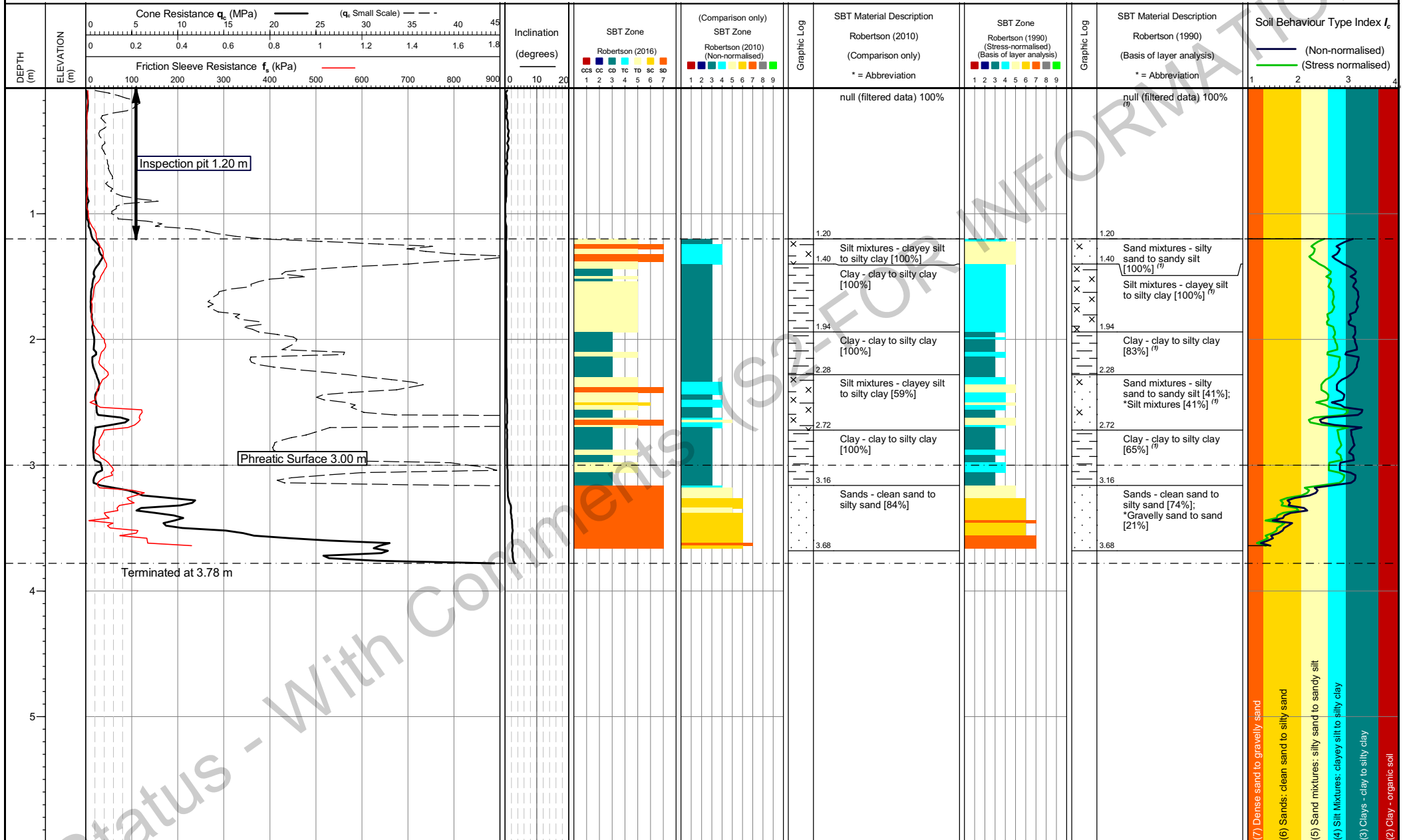
Remarks: *Phreatic surface origin: Arbitrary value
Coordinates: ,
Elevation:

Robertson (2016) Material Type
1 - CCS - Clay-like - Contractive - Sensitive
2 - CC - Clay-like - Contractive
3 - CD - Clay-like - Dilative
4 - TC - Transitional - Contractive
5 - TD - Transitional - Dilative
6 - SC - Sand-like - Contractive
7 - SD - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
1 - Sensitive fine-grained
2 - Organic soils
3 - Clays - clay to silty clay
4 - Silt mixtures - clayey silt to silty clay
5 - Sand mixtures - silty sand to sandy silt
6 - Sands - clean sand to silty sand
7 - Gravelly sand to sand
8 - Very stiff/dense sand to clayey sand
9 - Very stiff fine grained

⁽⁷⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
Internal QA Diss. Dissipation Test

TEST ID: CPT108



Cone area (mm²):
 ConeID: S15-CFIPTT.1993
 Location: Greater Manchester, UK
 Rig Used: UK3
 Date of test: 28/10/2022 11:25:17

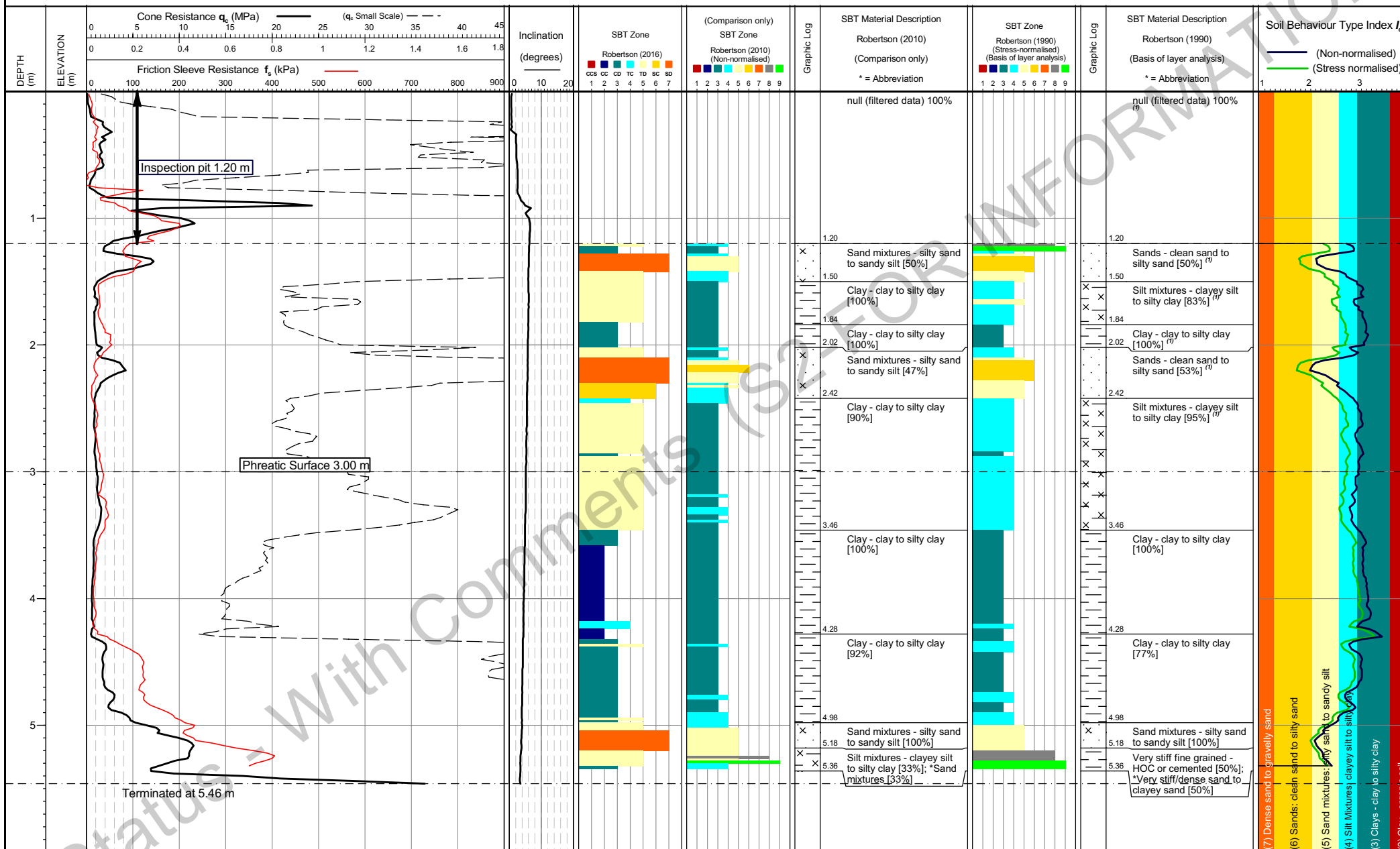
Remarks: *Phreatic surface origin: Arbitrary value
 Coordinates: ,
 Elevation:

Robertson (2016) Material Type
 1 - CCS - Clay-like - Contractive - Sensitive
 2 - CC - Clay-like - Contractive
 3 - CD - Clay-like - Dilative
 4 - TC - Transitional - Contractive
 5 - TD - Transitional - Dilative
 6 - SC - Sand-like - Contractive
 7 - SD - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
 1 - Sensitive fine-grained
 2 - Organic soils
 3 - Clays - clay to silty clay
 4 - Silt mixtures - clayey silt to silty clay
 5 - Sand mixtures - silty sand to sandy silt
 6 - Sands - clean sand to silty sand
 7 - Gravelly sand to sand
 8 - Very stiff/dense sand to clayey sand
 9 - Very stiff fine grained

⁽⁷⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
 Internal QA Diss. Dissipation Test

TEST ID: CPT109



Cone area (mm²):
ConeID: S15-CFIP11T.1993
Location: Greater Manchester, UK
Rig Used: UK3
Date of test: 28/10/2022 11:47:20

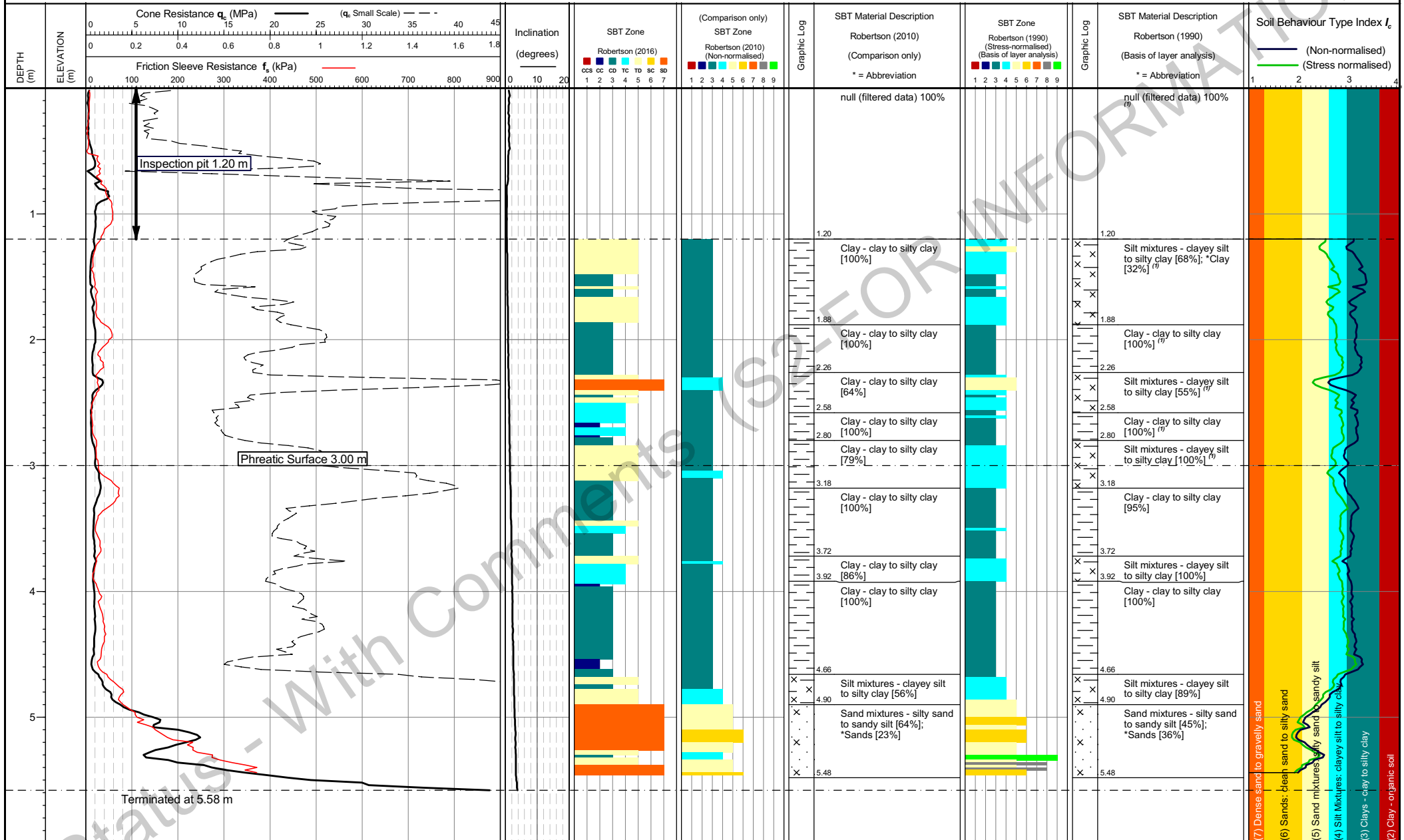
Remarks: *Phreatic surface origin: Arbitrary value
Coordinates: ,
Elevation:

Robertson (2016) Material Type
 1 - CCS - Clay-like - Contractive - Sensitive
 2 - CC - Clay-like - Contractive
 3 - CD - Clay-like - Dilative
 4 - TC - Transitional - Contractive
 5 - TD - Transitional - Dilative
 6 - SC - Sand-like - Contractive
 7 - SD - Sand-like - Dilative

Robertson (1990 & 2010) Material Type
 1 - Sensitive fine-grained
 2 - Organic soils
 3 - Clays - clay to silty clay
 4 - Silt mixtures - clayey silt to silty clay
 5 - Sand mixtures - silty sand to sandy silt
 6 - Sands - clean sand to silty sand
 7 - Gravelly sand to sand
 8 - Very stiff/dense sand to clayey sand
 9 - Very stiff fine grained

^(r) 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
 Internal QA Diss. Dissipation Test

TEST ID: CPT110



Cone area (mm²):
ConeID: S15-CFIP11T.1993
Location: Greater Manchester, UK
Rig Used: UK3
Date of test: 28/10/2022 12:31:27

Remarks: *Phreatic surface origin: Arbitrary value
Coordinates: ,
Elevation:

Robertson (2016) Material Type

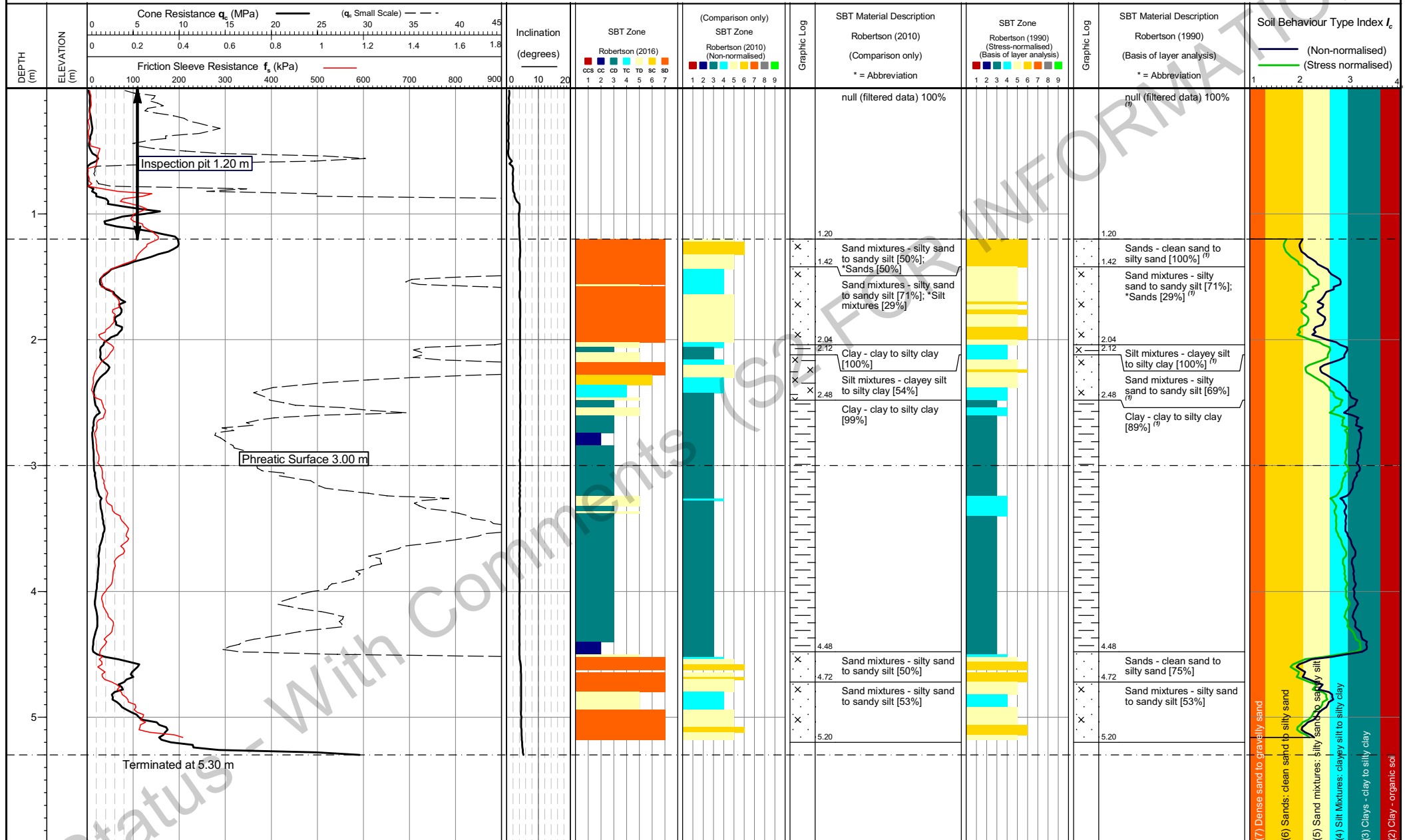
- 1 - CCS - Clay-like - Contractive - Sensitive
- 2 - CC - Clay-like - Contractive
- 3 - CD - Clay-like - Dilative
- 4 - TC - Transitional - Contractive
- 5 - TD - Transitional - Dilative
- 6 - SC - Sand-like - Contractive
- 7 - SD - Sand-like - Dilative

Robertson (1990 & 2010) Material Type

- 1 - Sensitive fine-grained
- 2 - Organic soils
- 3 - Clays - clay to silty clay
- 4 - Silt mixtures - clayey silt to silty clay
- 5 - Sand mixtures - silty sand to sandy silt
- 6 - Sands - clean sand to silty sand
- 7 - Gravelly sand to sand
- 8 - Very stiff/dense sand to clayey sand
- 9 - Very stiff fine grained

⁽¹⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
Internal QA Diss. Dissipation Test

TEST ID: CPT111



Cone area (mm²):
ConeID: S15-CFIPPT.1993
Location: Greater Manchester, UK
Rig Used: UK3
Date of test: 28/10/2022 12:51:34

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Robertson (2016) Material Type

- 1 - CCS - Clay-like - Contractive - Sensitive
- 2 - CC - Clay-like - Contractive
- 3 - CD - Clay-like - Dilative
- 4 - TC - Transitional - Contractive
- 5 - TD - Transitional - Dilative
- 6 - SC - Sand-like - Contractive
- 7 - SD - Sand-like - Dilative

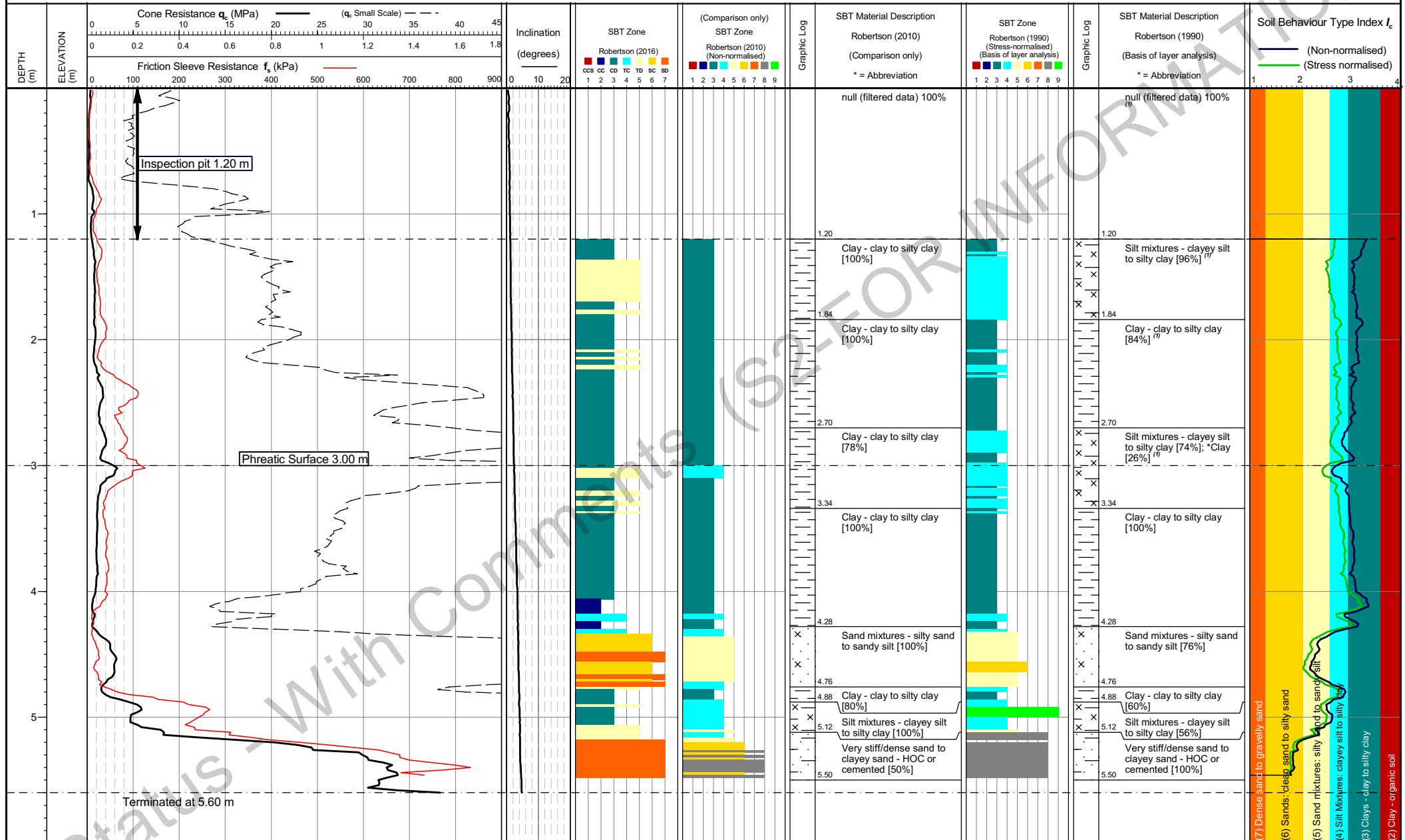
Robertson (1990 & 2010) Material Type

- 1 - Sensitive fine-grained
- 2 - Organic soils
- 3 - Clays - clay to silty clay
- 4 - Silt mixtures - clayey silt to silty clay
- 5 - Sand mixtures - silty sand to sandy silt
- 6 - Sands - clean sand to silty sand
- 7 - Gravelly sand to sand
- 8 - Very stiff/dense sand to clayey sand
- 9 - Very stiff fine grained

⁽⁷⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

Internal QA Diss. Dissipation Test

TEST ID: CPT112



Cone area (mm²):
ConeID: S15-CFIPPT.1993
Location: Greater Manchester, UK
Rig Used: UK3
Date of test: 28/10/2022 13:19:07

Remarks: *Phreatic surface origin: Arbitrary value

Coordinates: ,
Elevation:

Robertson (2016) Material Type

- 1 - CCS - Clay-like - Contractive - Sensitive
- 2 - CC - Clay-like - Contractive
- 3 - CD - Clay-like - Dilative
- 4 - TC - Transitional - Contractive
- 5 - TD - Transitional - Dilative
- 6 - SC - Sand-like - Contractive
- 7 - SD - Sand-like - Dilative

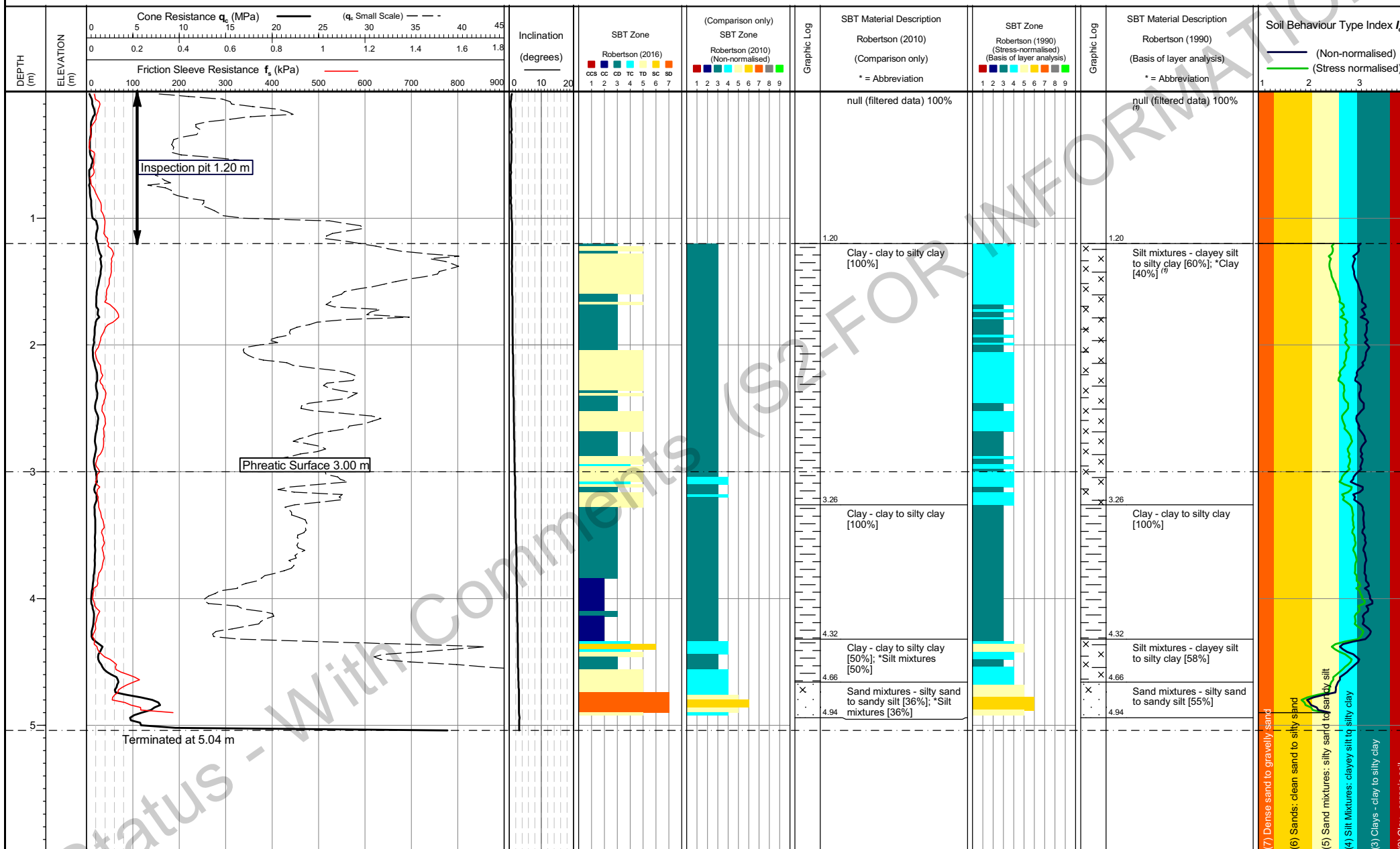
Robertson (1990 & 2010) Material Type

- 1 - Sensitive fine-grained
- 2 - Organic soils
- 3 - Clays - clay to silty clay
- 4 - Silty mixtures - clayey silt to silty clay
- 5 - Sand mixtures - silty sand to sandy silt
- 6 - Sands - clean sand to silty sand
- 7 - Gravelly sand to sand
- 8 - Very stiff/dense sand to clayey sand
- 9 - Very stiff fine grained

⁽¹⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses

Internal QA Diss. Dissipation Test

TEST ID: CPT113



Cone area (mm²):
ConeID: S15-CFIPPT.1993
Location: Greater Manchester, UK
Rig Used: UK3
Date of test: 28/10/2022 13:30:02

Remarks: *Phreatic surface origin: Arbitrary value
Coordinates: ,
Elevation:

Robertson (2016) Material Type

- 1 - CCS - Clay-like - Contractive - Sensitive
- 2 - CC - Clay-like - Contractive
- 3 - CD - Clay-like - Dilative
- 4 - TC - Transitional - Contractive
- 5 - TD - Transitional - Dilative
- 6 - SC - Sand-like - Contractive
- 7 - SD - Sand-like - Dilative

Robertson (1990 & 2010) Material Type

- 1 - Sensitive fine-grained
- 2 - Organic soils
- 3 - Clays - clay to silty clay
- 4 - Silt mixtures - clayey silt to silty clay
- 5 - Sand mixtures - silty sand to sandy silt
- 6 - Sands - clean sand to silty sand
- 7 - Gravelly sand to sand
- 8 - Very stiff/dense sand to clayey sand
- 9 - Very stiff fine grained

⁽¹⁾ 0-3 m: Normalised SBT often artificially coarse/stiff at very low in-situ stresses
Internal QA Diss. Dissipation Test

TEST ID: CPT114

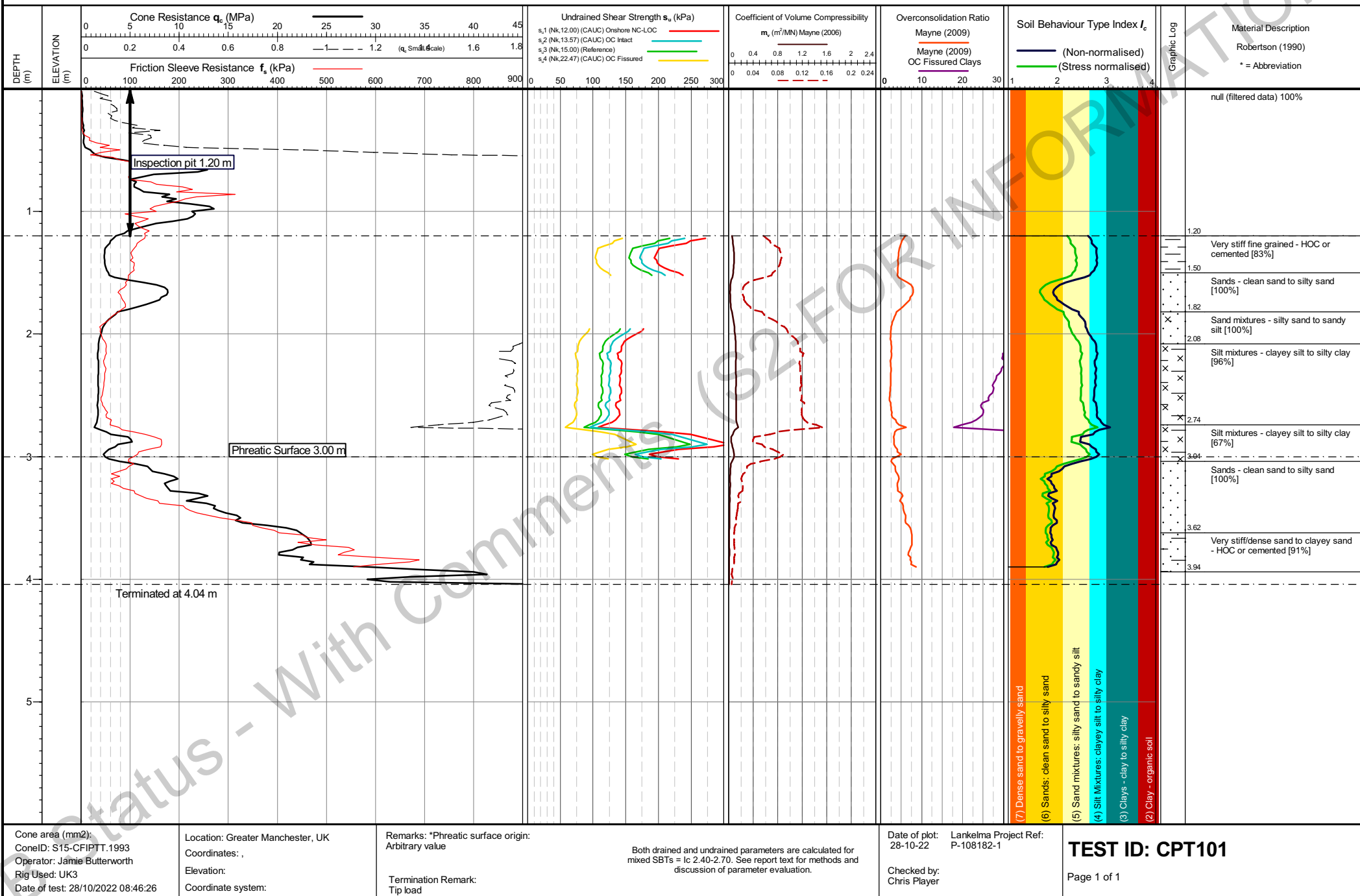
APPENDIX E PARAMETER RESULTS 1 - S_u , M_v , OCR, SBT, I_c

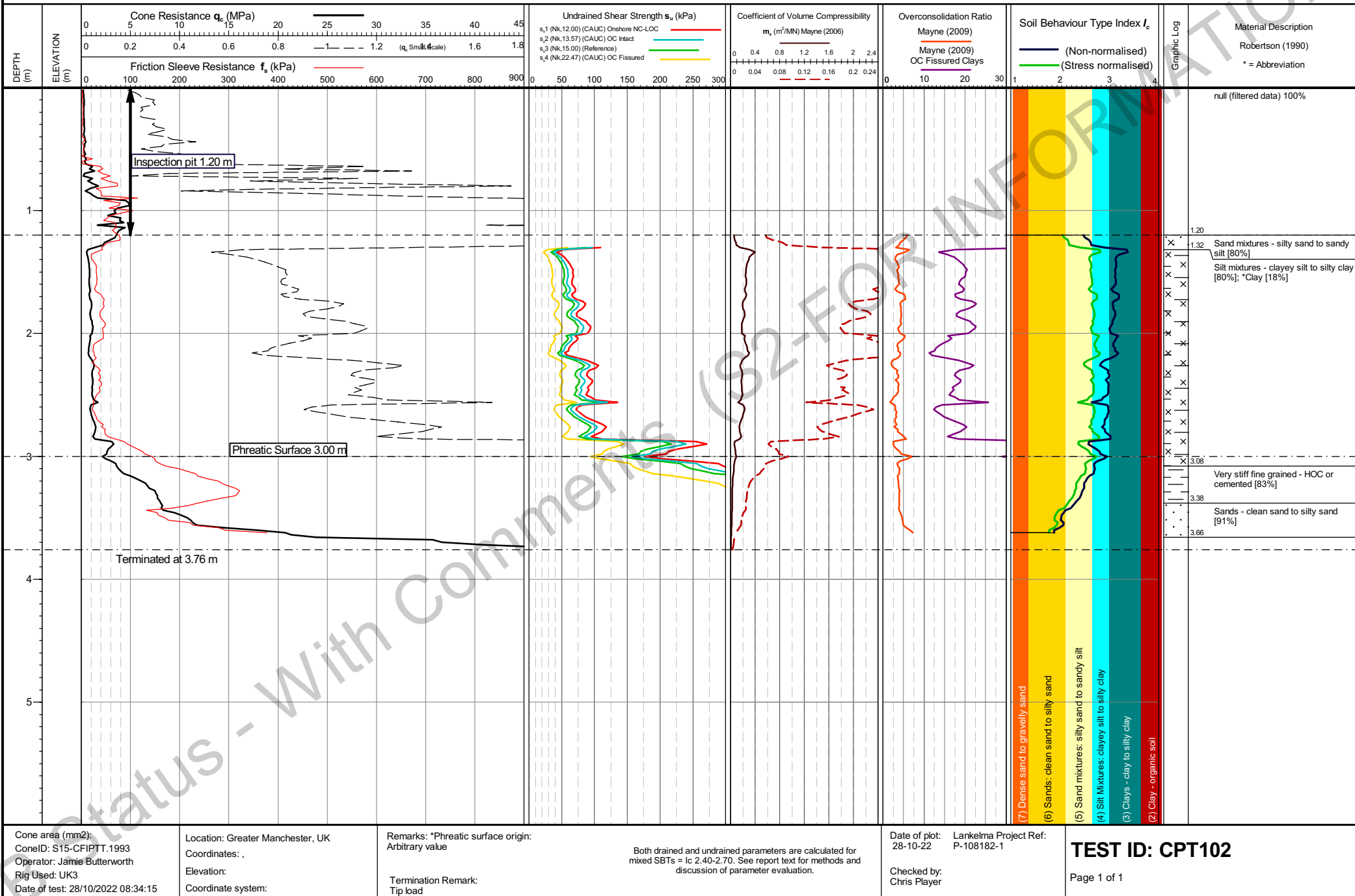
Undrained shear strength

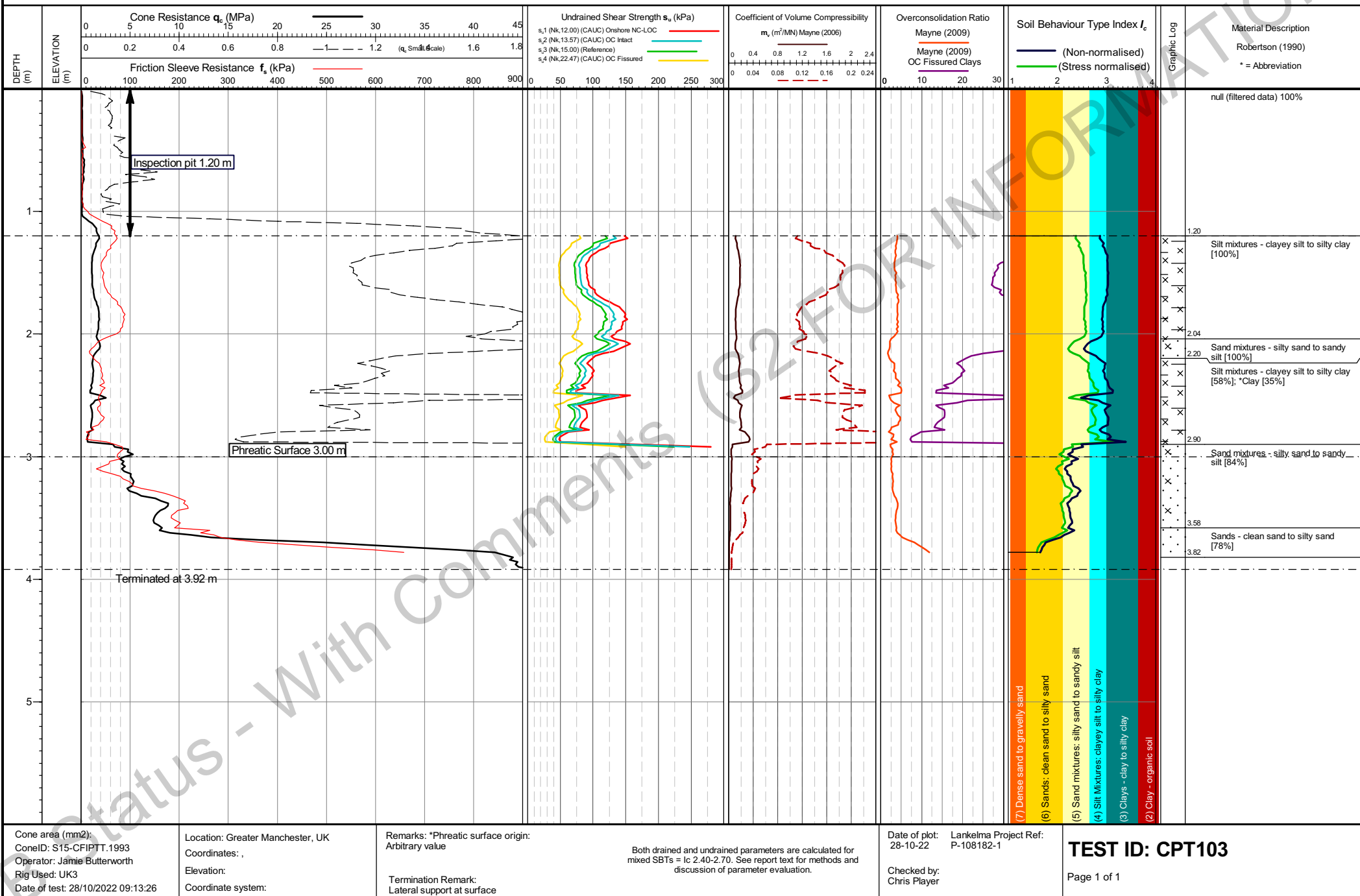
Coefficient of volume change

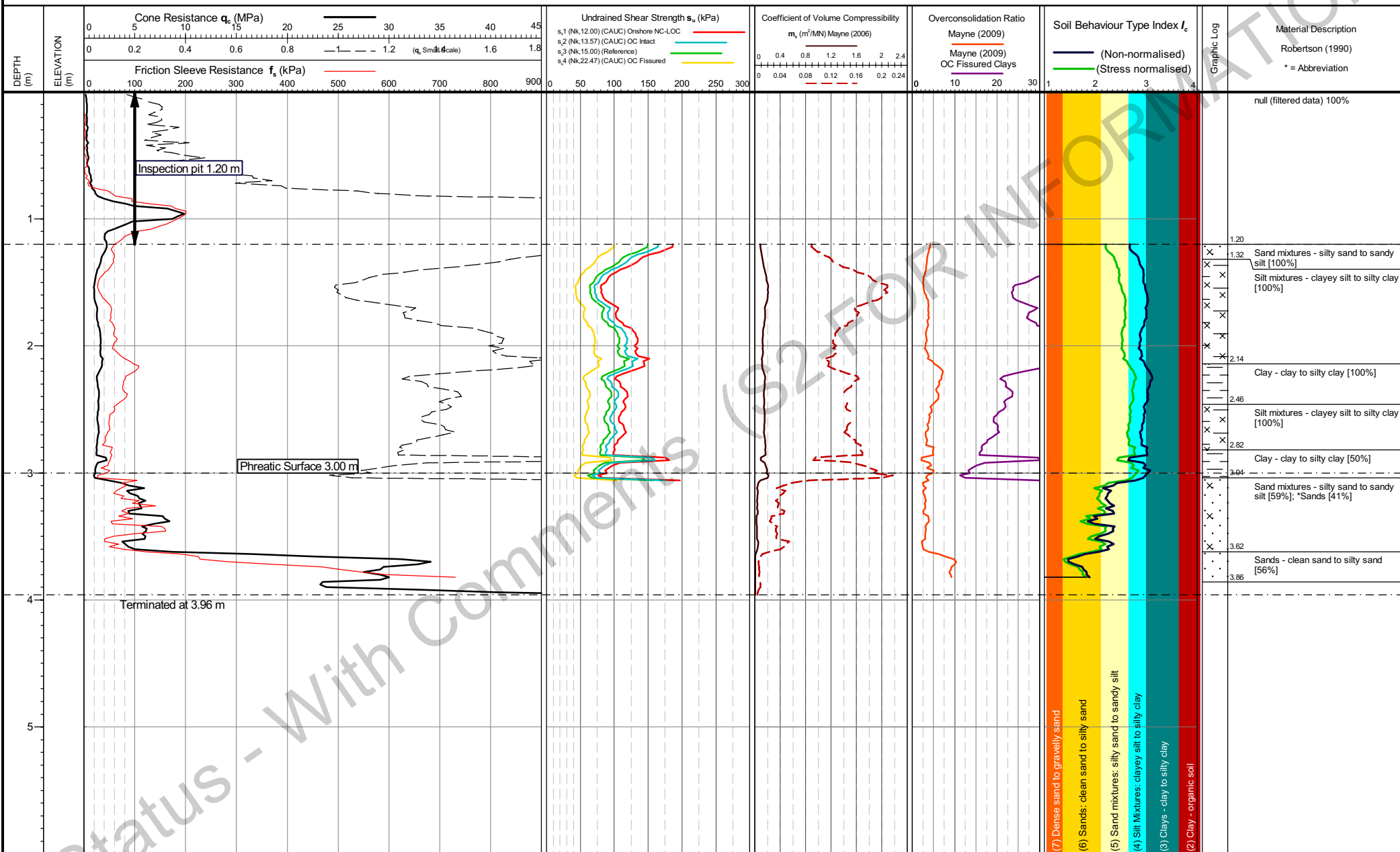
Overconsolidation ratio

Robertson 1990 SBT descriptions & SBT index I_c









Cone area (mm²):
ConeID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 09:24:35

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin:
Arbitrary value

Termination Remark:
Tip load

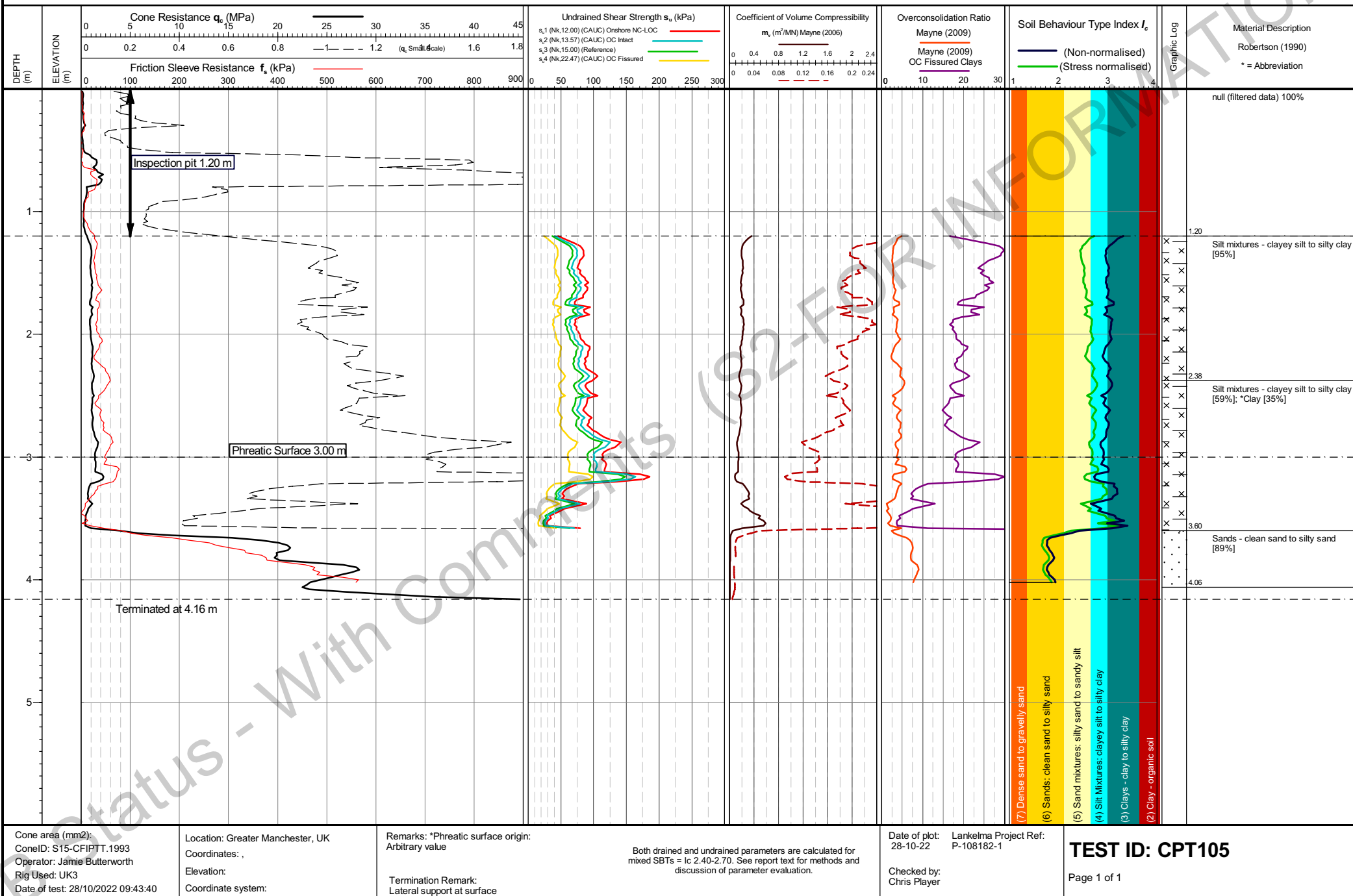
Both drained and undrained parameters are calculated for mixed SBTs = I_c 2.40-2.70. See report text for methods and discussion of parameter evaluation.

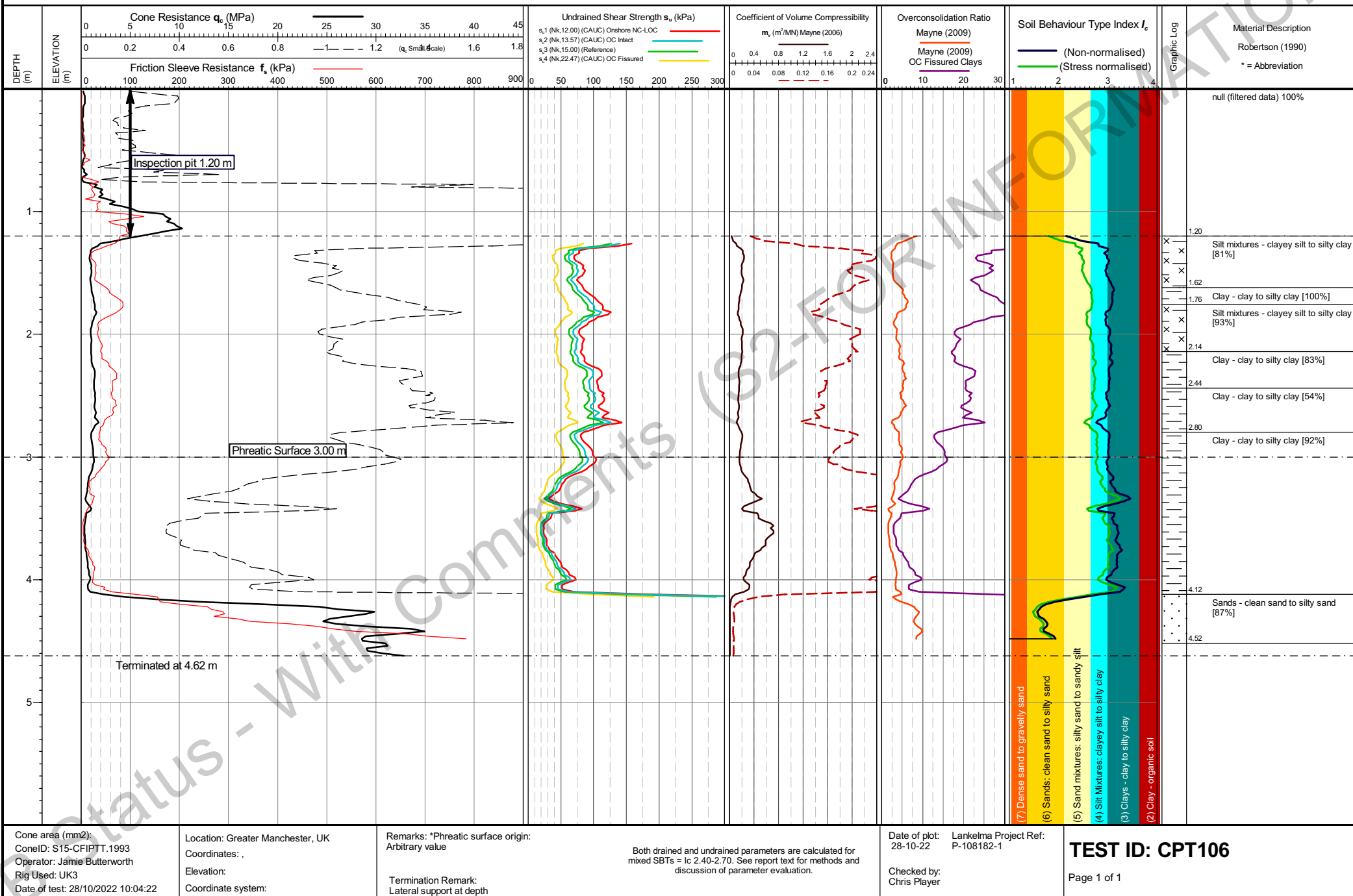
Date of plot: 28-10-22
Lankelma Project Ref: P-108182-1

Checked by:
Chris Player

TEST ID: CPT104

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Cone area (mm²):
ConeID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 10:04:22

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin:
Arbitrary value

Termination Remark:
Lateral support at depth

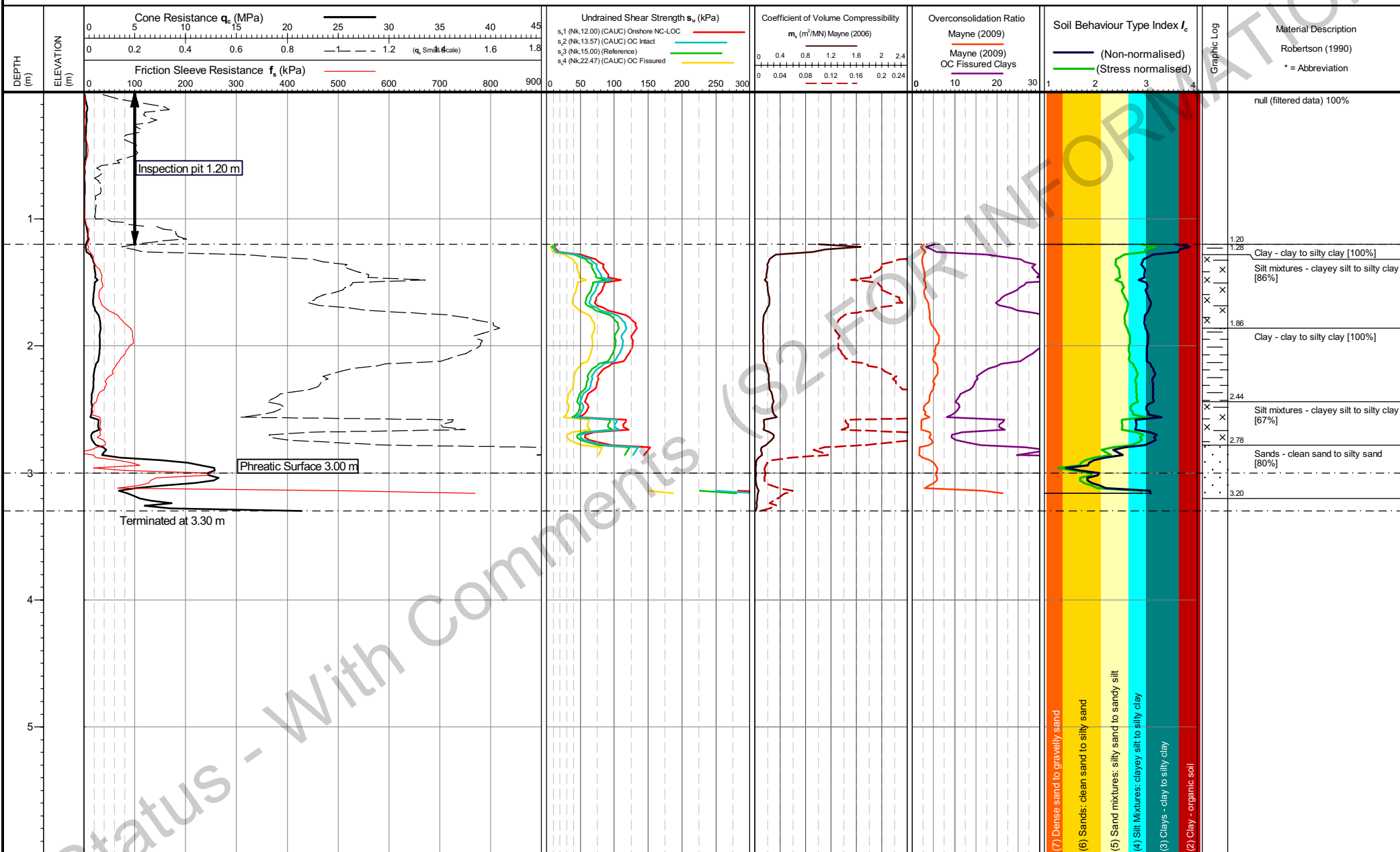
Both drained and undrained parameters are calculated for mixed SBTs = I_c 2.40-2.70. See report text for methods and discussion of parameter evaluation.

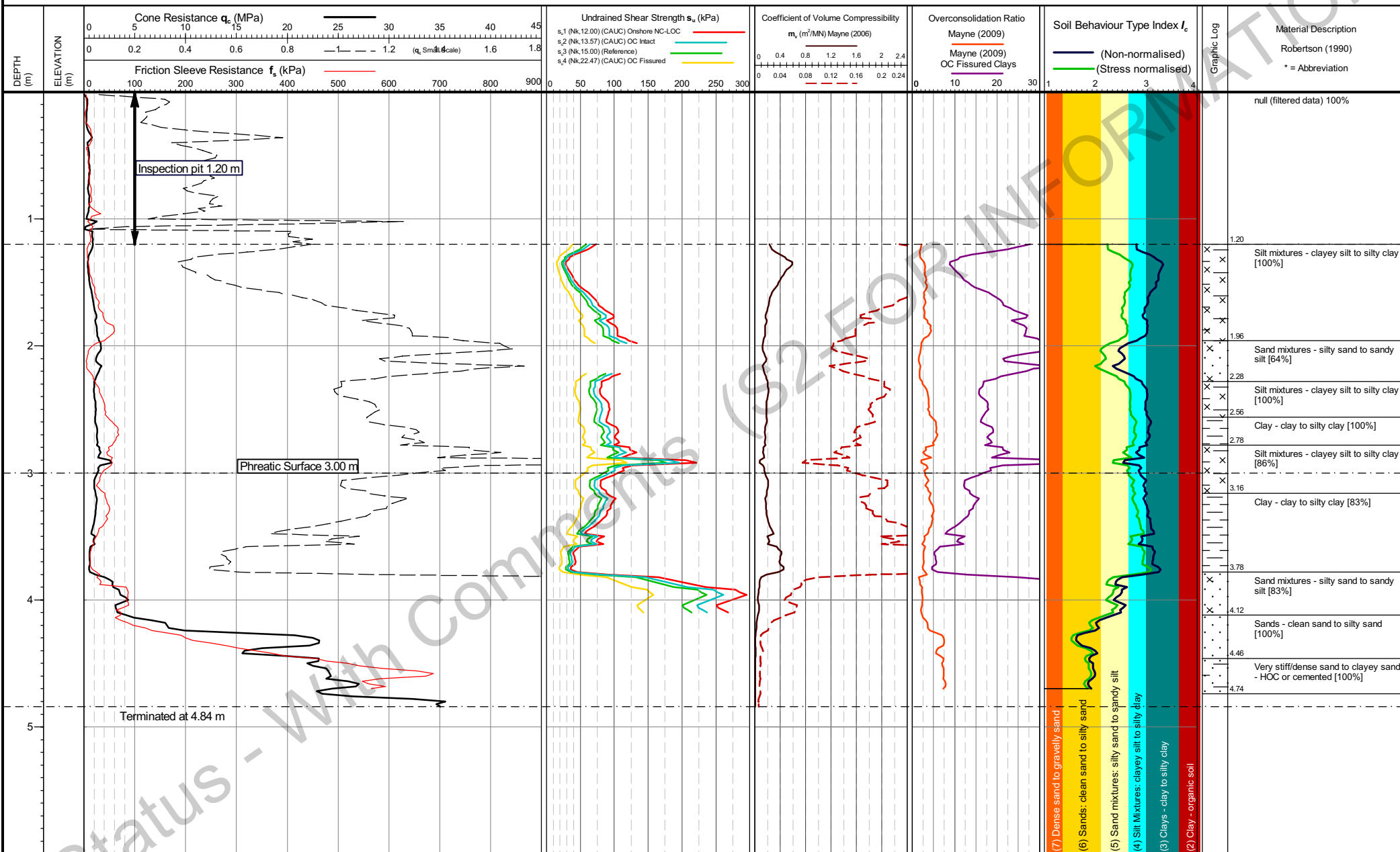
Date of plot: 28-10-22
Lankelma Project Ref: P-108182-1

Checked by:
Chris Player

TEST ID: CPT106

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Cone area (mm²):
ConeID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 10:35:41

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin:
Arbitrary value

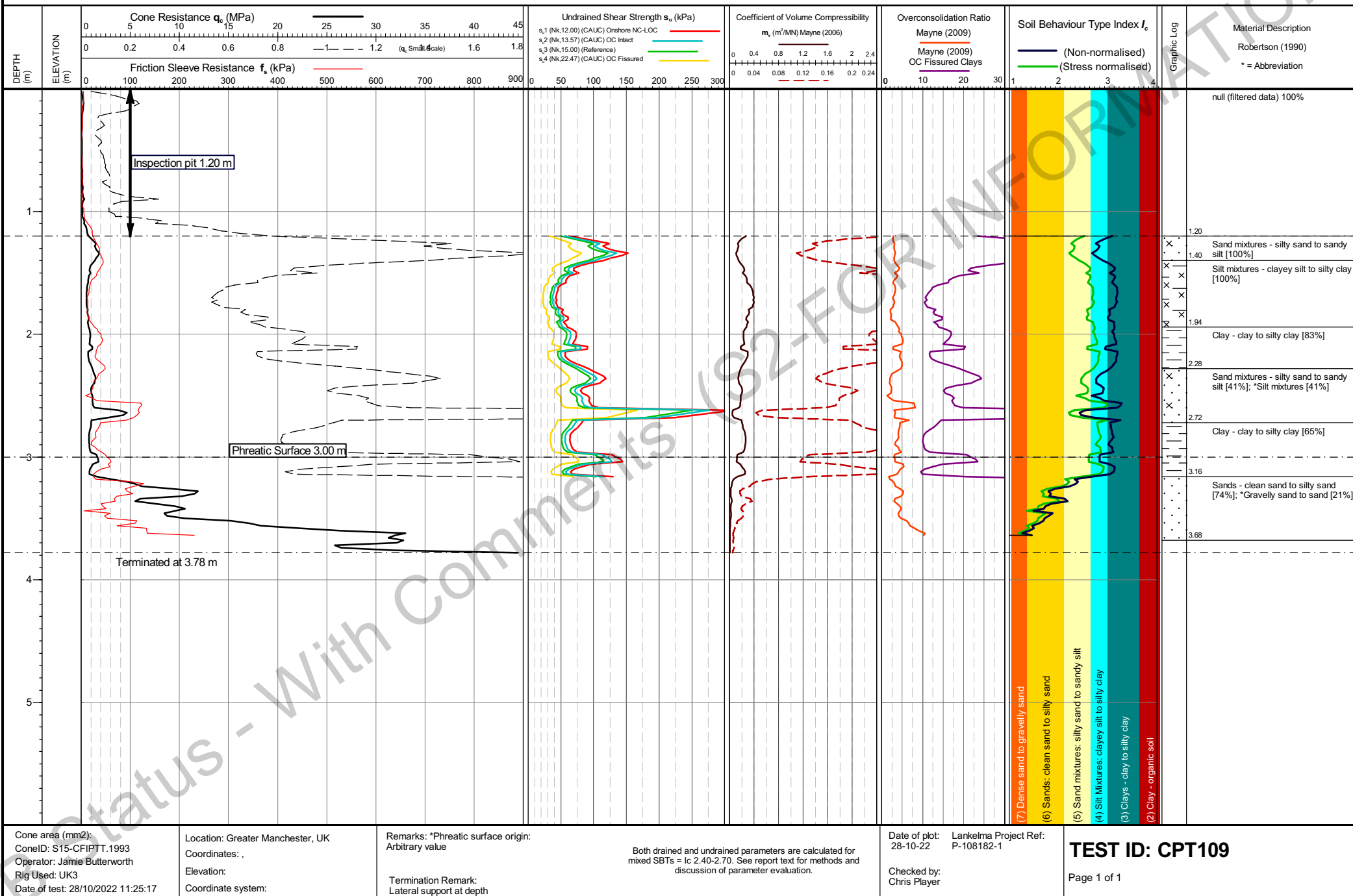
Termination Remark:
Lateral support at depth

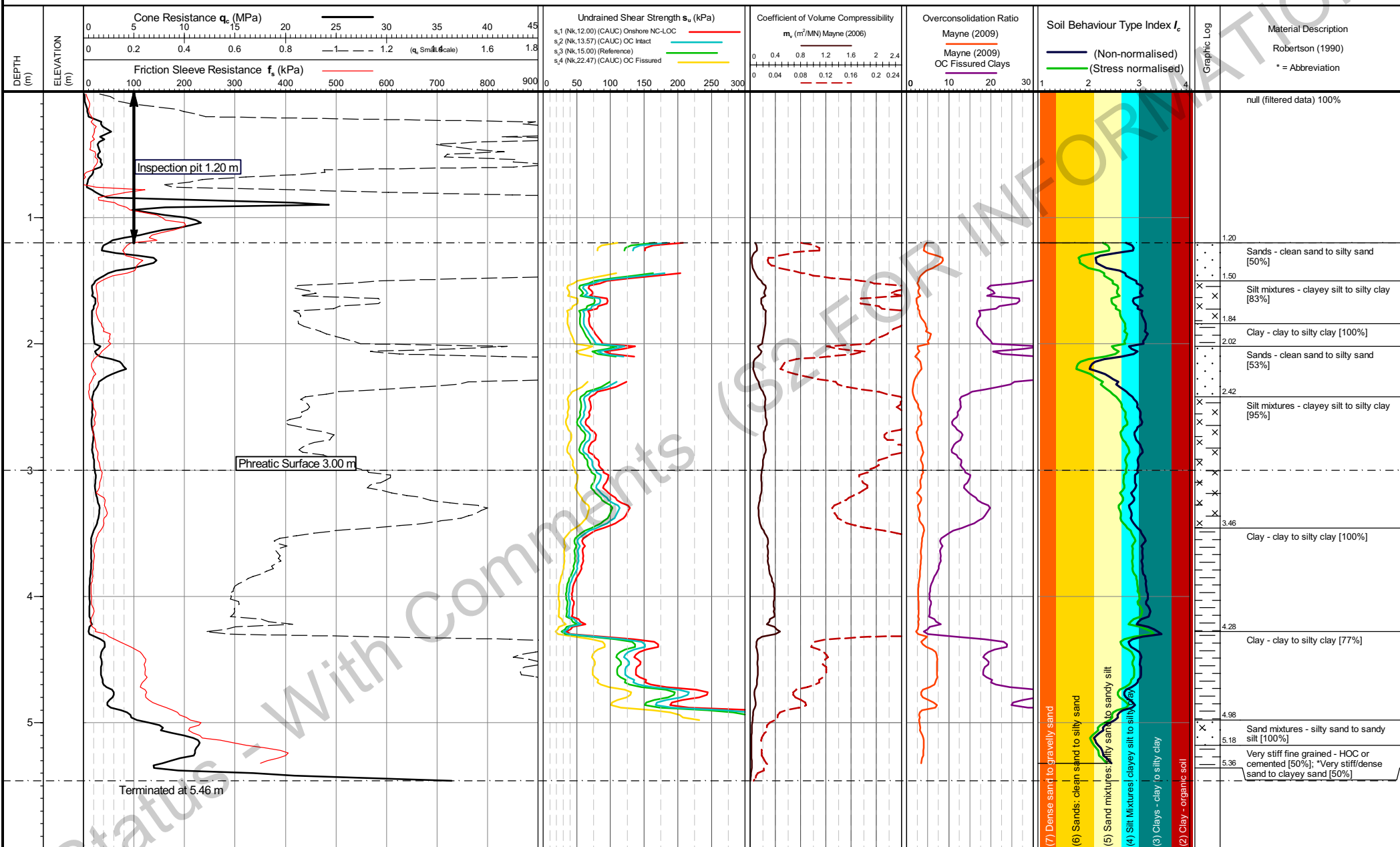
Both drained and undrained parameters are calculated for mixed SBTs = I_c 2.40-2.70. See report text for methods and discussion of parameter evaluation.

Date of plot: 28-10-22
Lankelma Project Ref: P-108182-1
Checked by: Chris Player

TEST ID: CPT108

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Cone area (mm²):
ConeID: S15-CFIPPT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 11:47:20

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks: *Phreatic surface origin:
Arbitrary value

Termination Remark:
Lateral support at depth

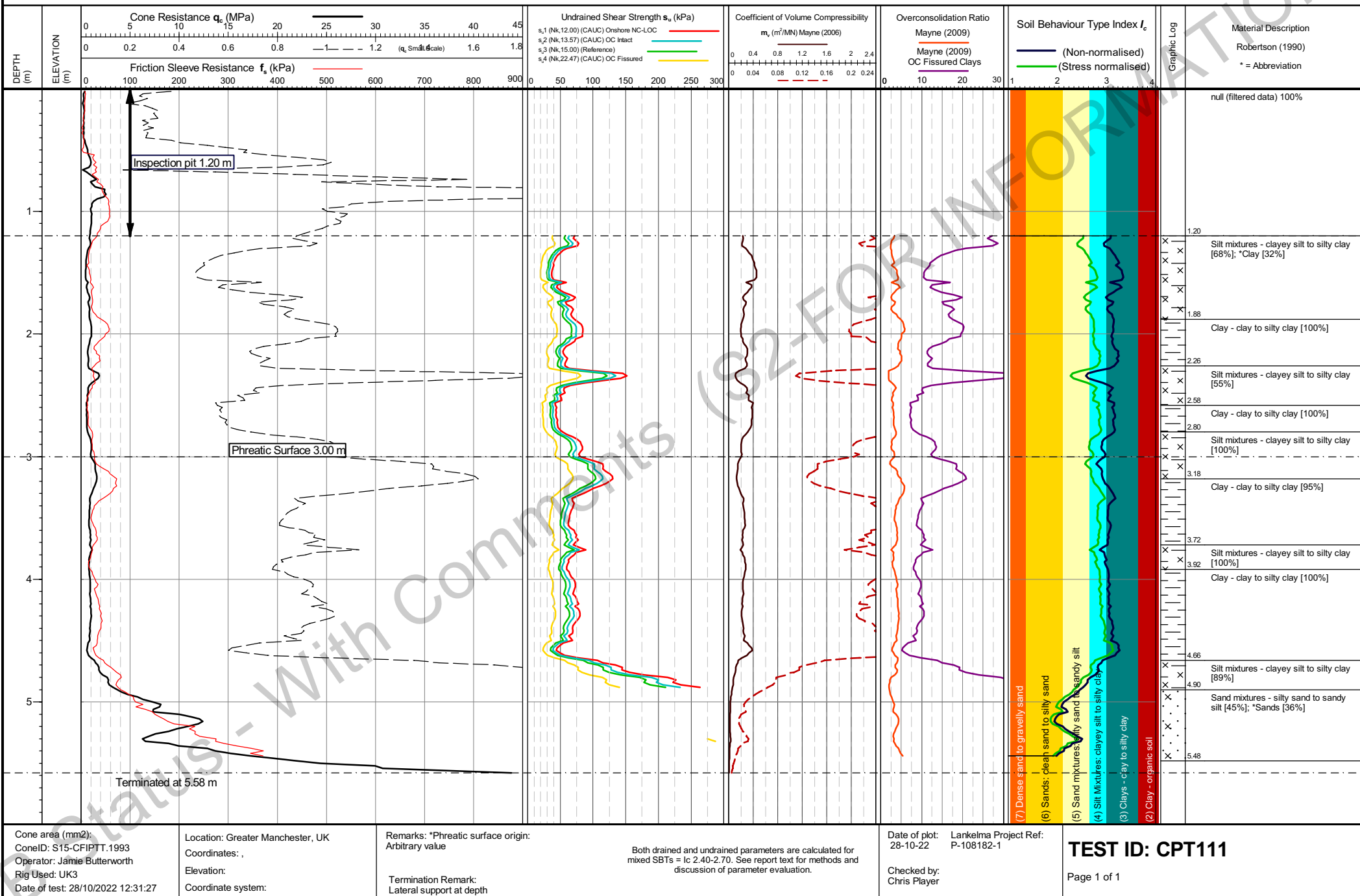
Both drained and undrained parameters are calculated for
mixed SBTs = I_c 2.40-2.70. See report text for methods and
discussion of parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

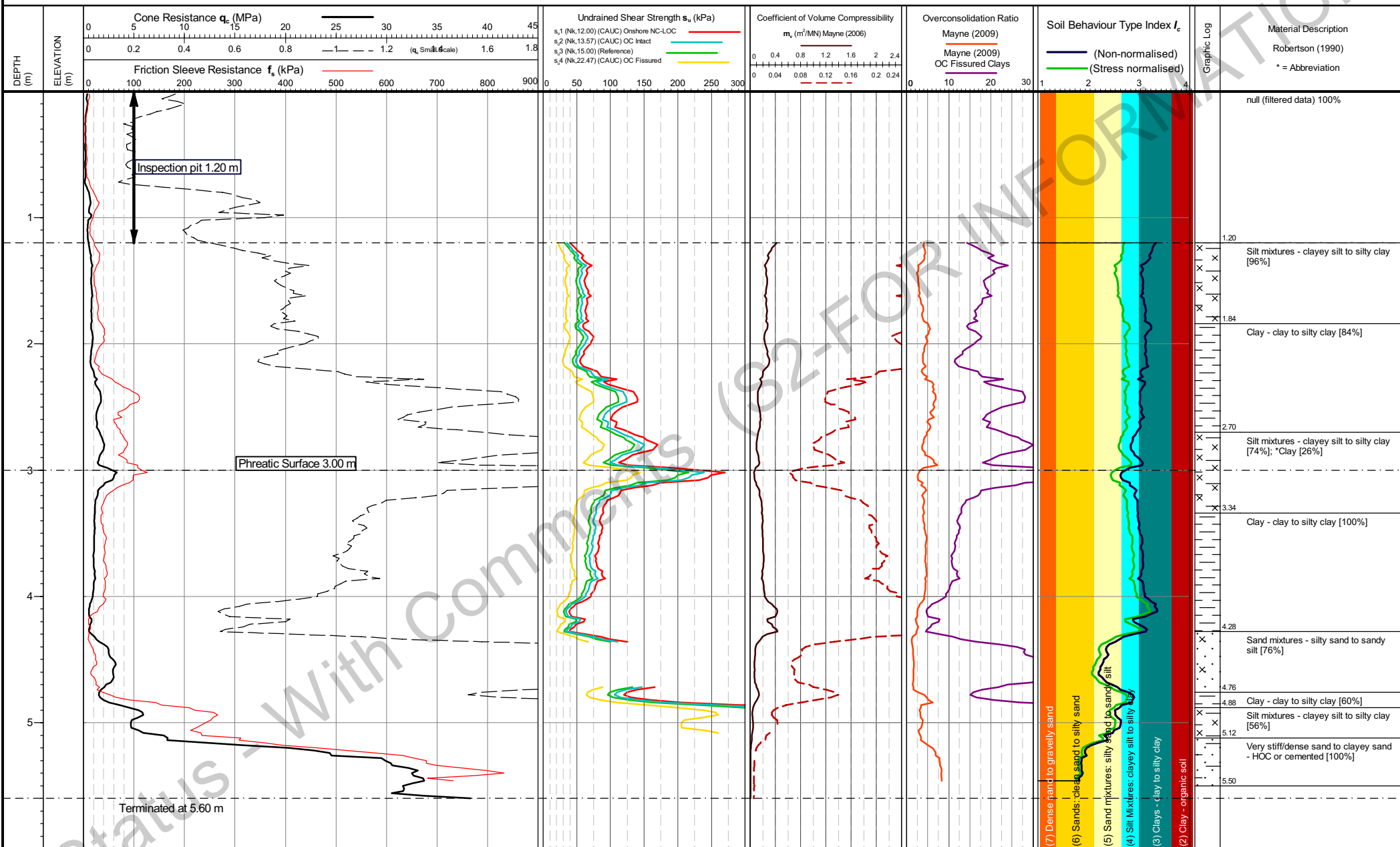
Lankelma Project Ref:
P-108182-1

TEST ID: CPT110

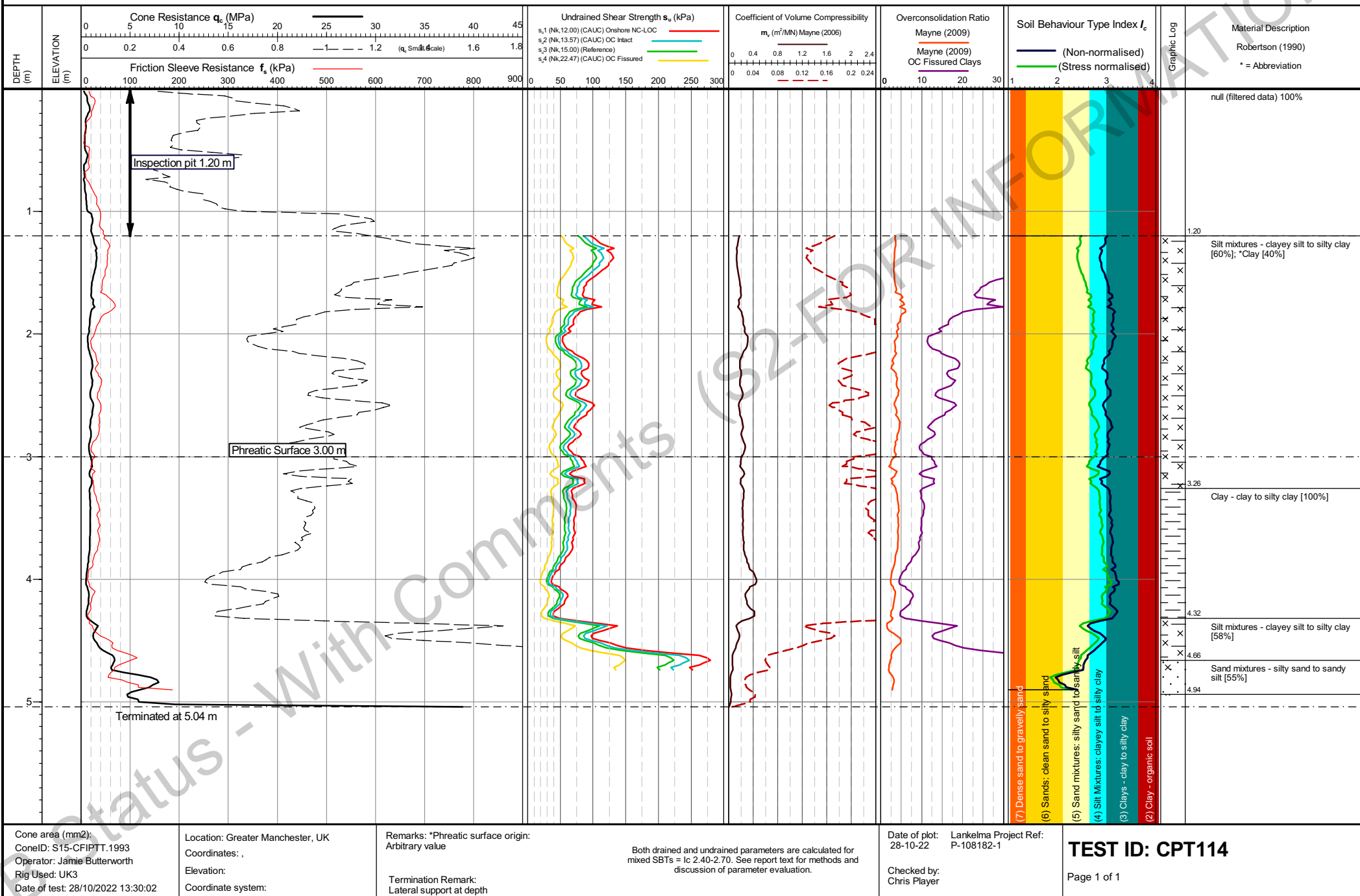
Page 1 of 1







Cone area (mm²): ConeID: S15-CFIPPT.1993 Operator: Jamie Butterworth Rig Used: UK3 Date of test: 28/10/2022 13:19:07	Location: Greater Manchester, UK Coordinates: , Elevation: Coordinate system:	Remarks: *Phreatic surface origin: Arbitrary value Termination Remark: Lateral support at depth	Both drained and undrained parameters are calculated for mixed SBTs = I_c 2.40-2.70. See report text for methods and discussion of parameter evaluation.	Date of plot: 28-10-22 Lankelma Project Ref: P-108182-1 Checked by: Chris Player	TEST ID: CPT113 Page 1 of 1
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APPENDIX F PARAMETER RESULTS 2 - SPT N60, ϕ , D_R , E , I_c

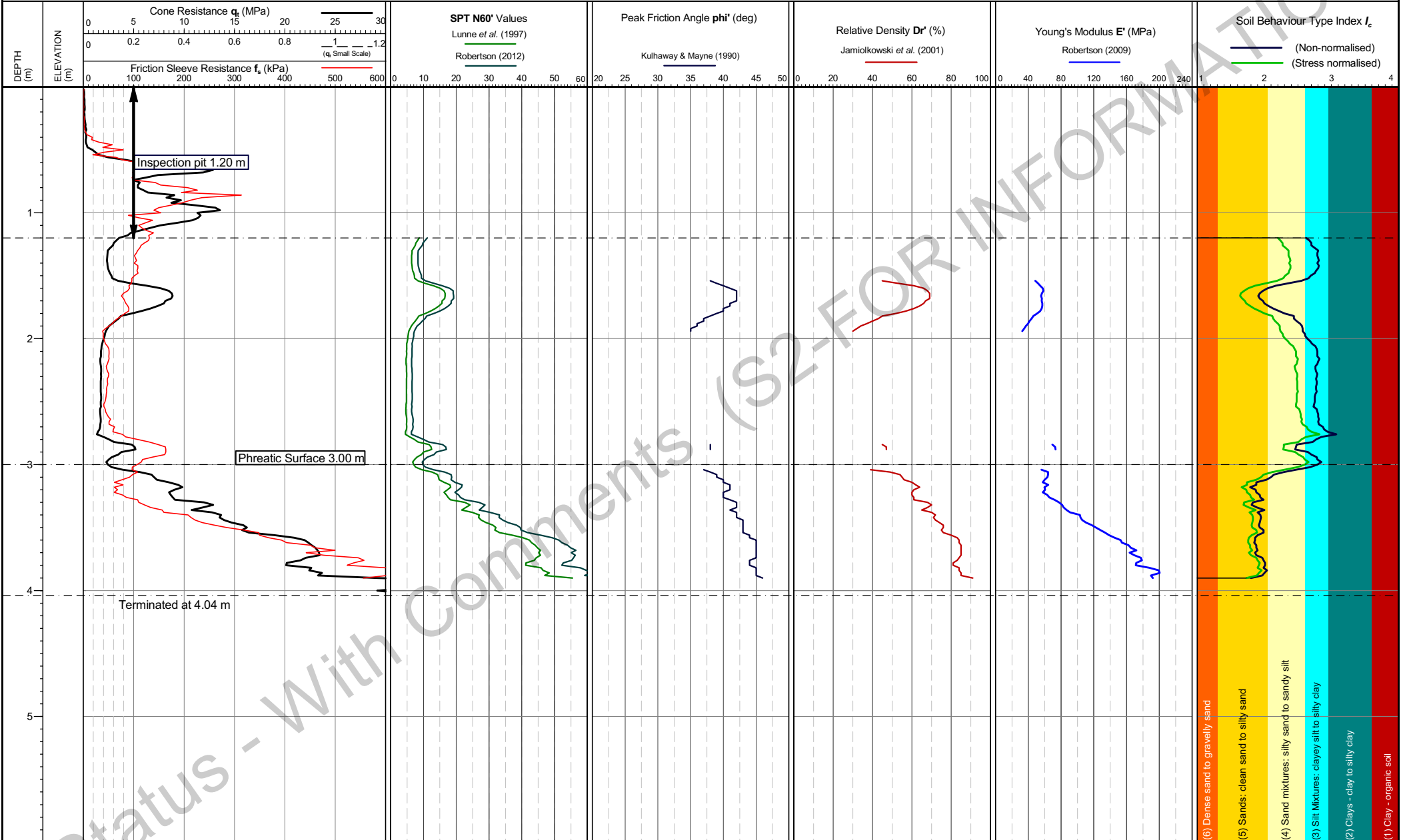
Equivalent SPT N60

Peak friction angle

Relative density

Young's modulus

SBT index I_c



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 08:46:26

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

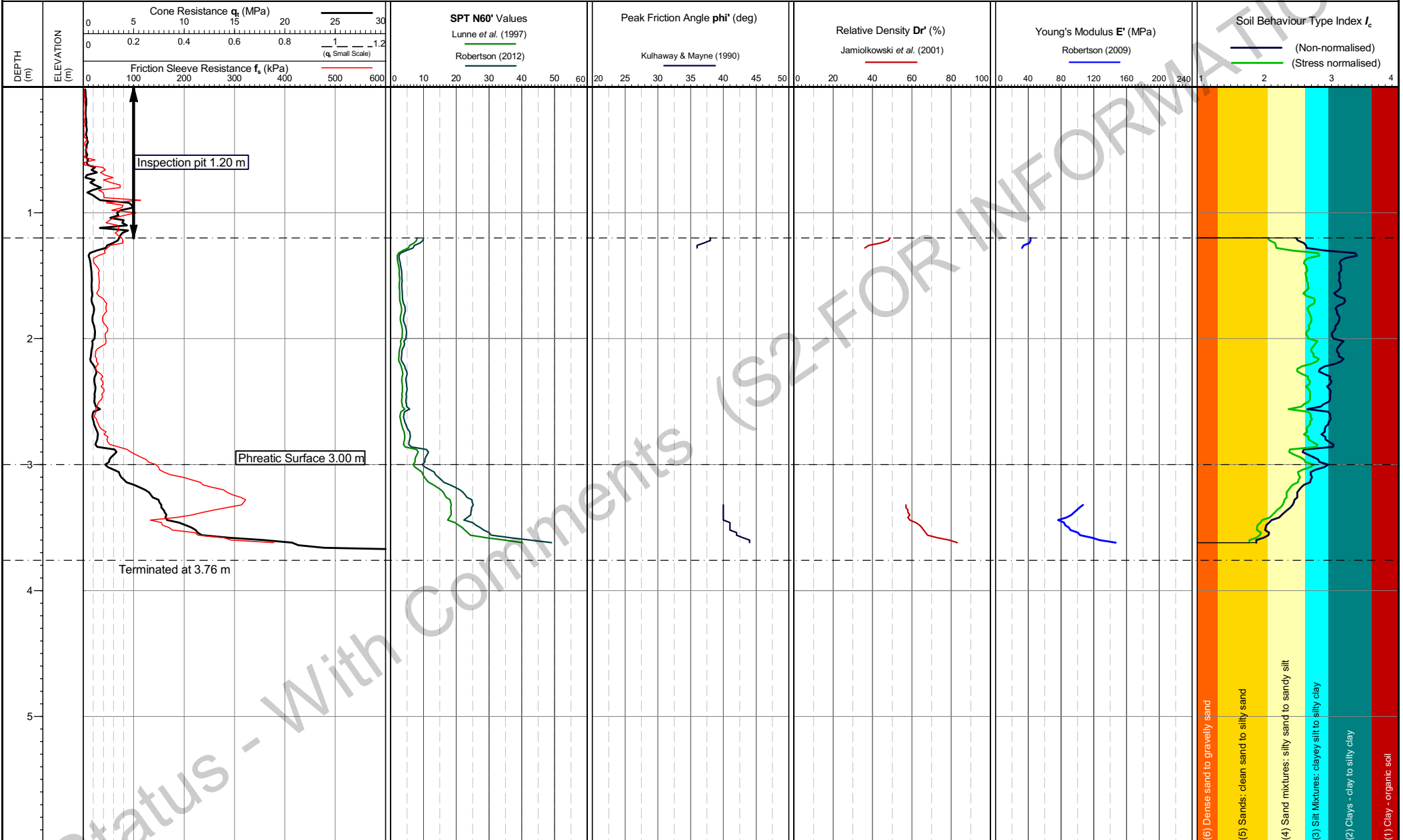
Date of plot:
28-10-22

Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT101

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 08:34:15

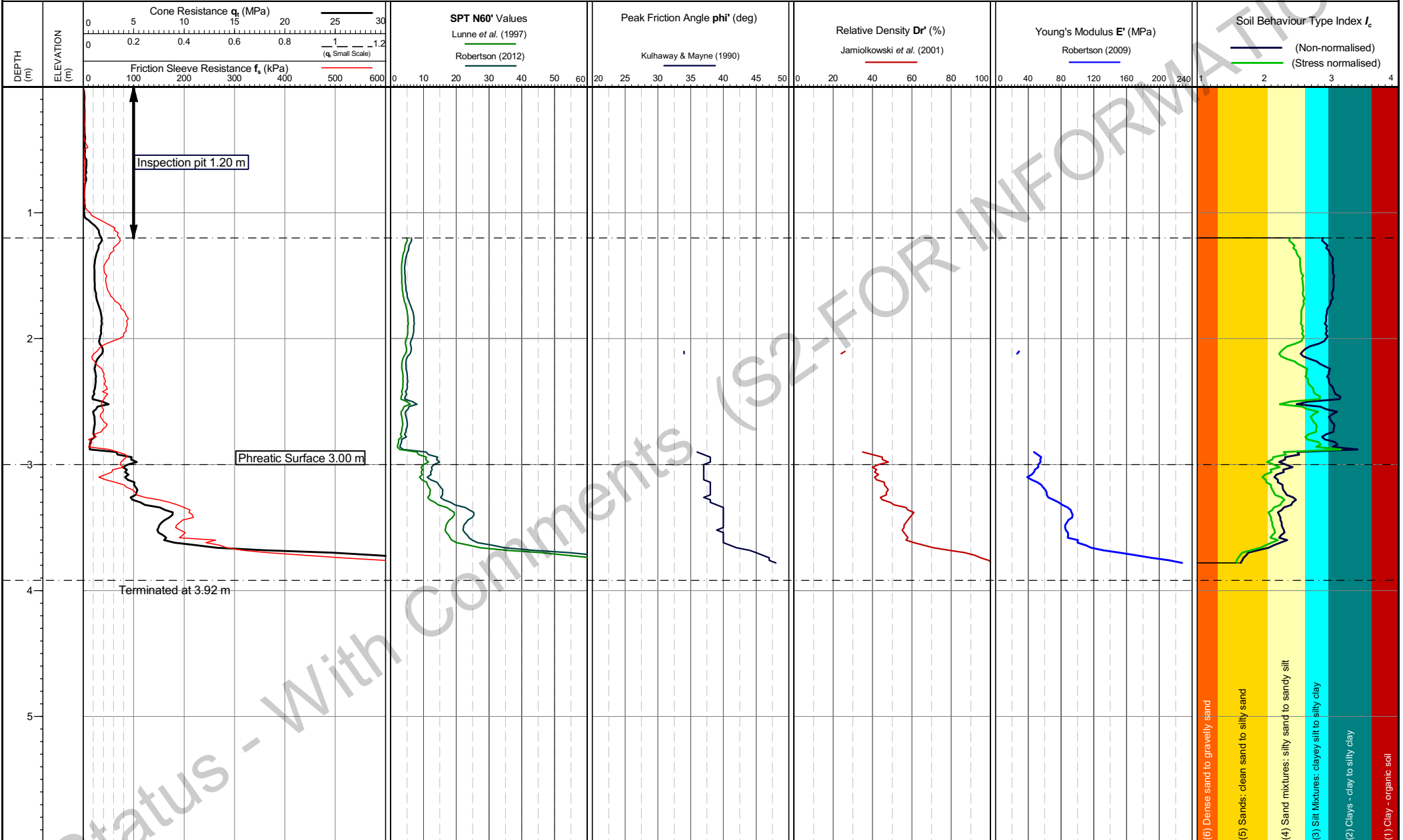
Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT102



Cone area (mm²):
 Cone ID: S15-CFIPTT.1993
 Operator: Jamie Butterworth
 Date of test: 28/10/2022 09:13:26

Location: Greater Manchester, UK
 Coordinates: ,
 Elevation:
 Coordinate system:

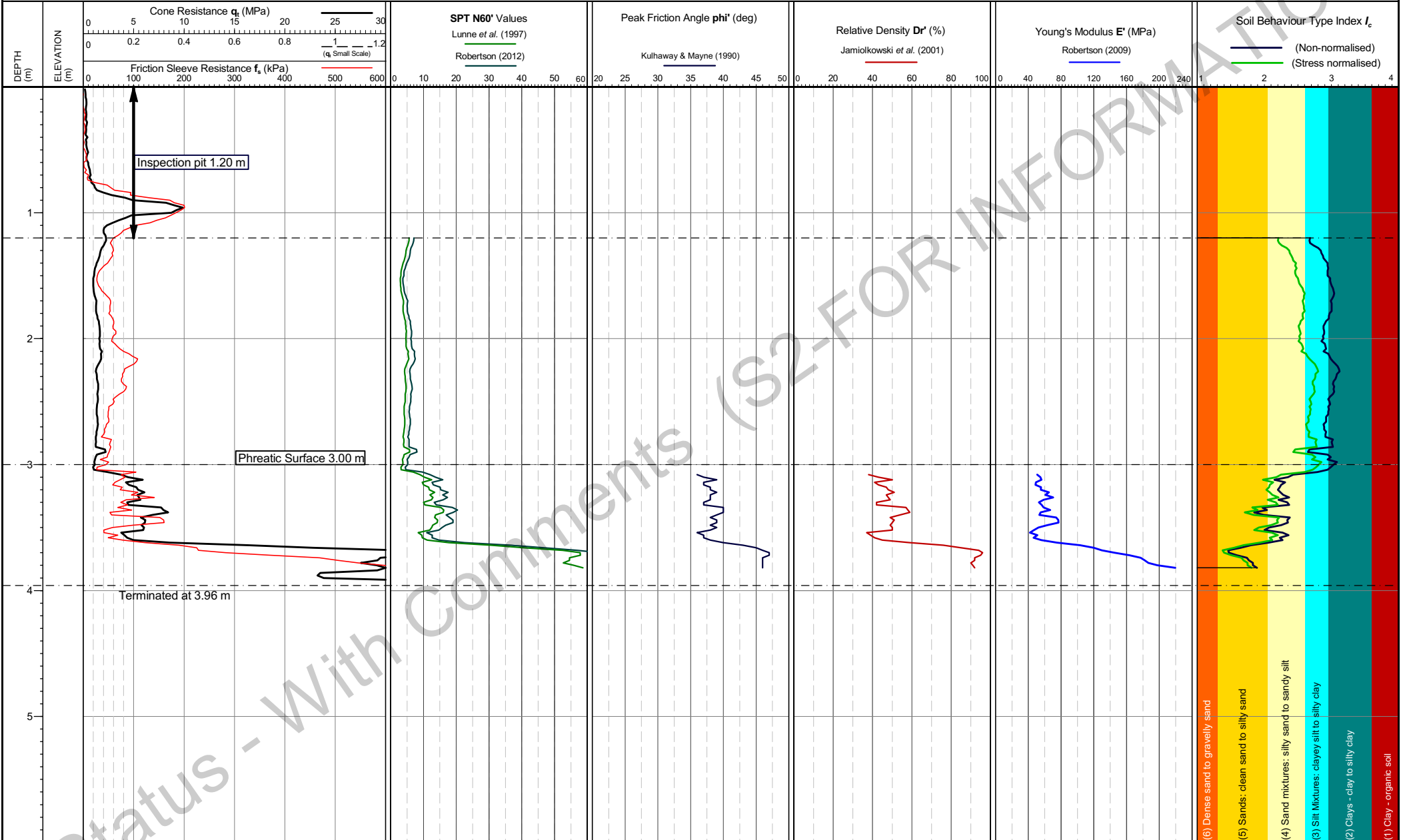
Both drained and undrained
 parameters are calculated for mixed
 SBTs = I_c 2.40-2.70. See report text
 for methods and discussion of
 parameter evaluation.

Date of plot:
 28-10-22
 Checked by:
 Chris Player

Lankelma Project Ref:
 P-108182-1

TEST ID: CPT103

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 09:24:35

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

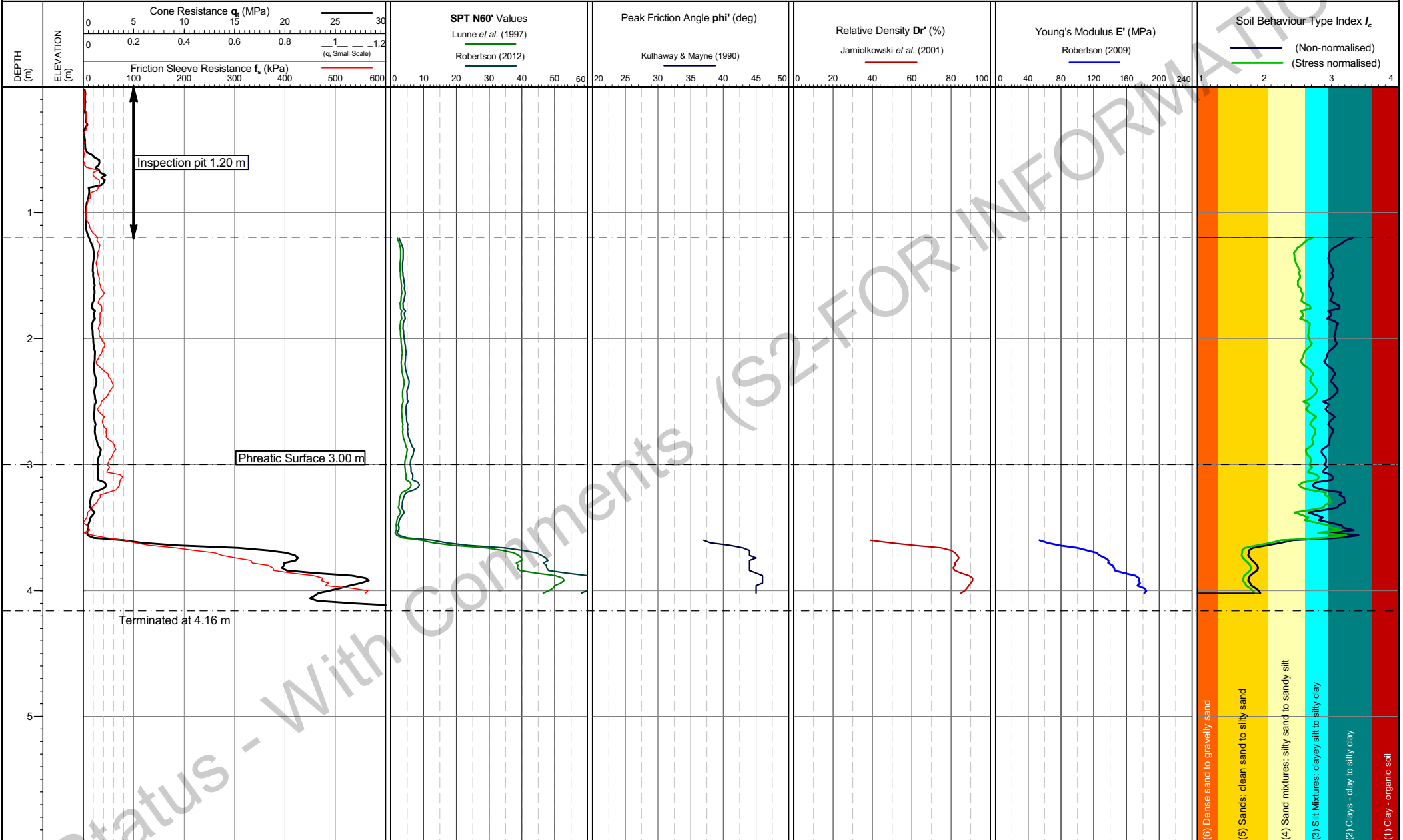
Date of plot:
28-10-22

Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT104

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 09:43:40

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

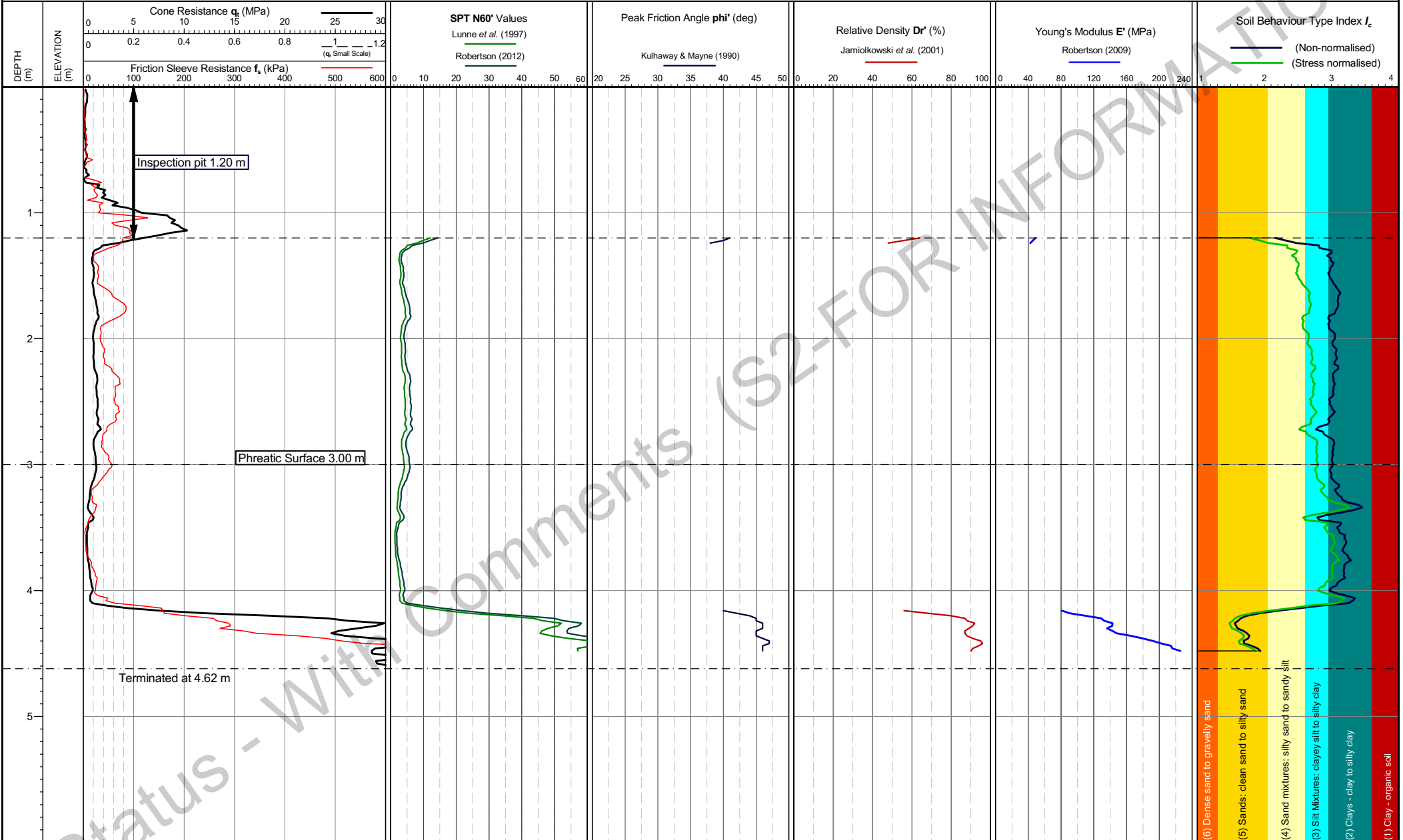
Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT105

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 10:04:22

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

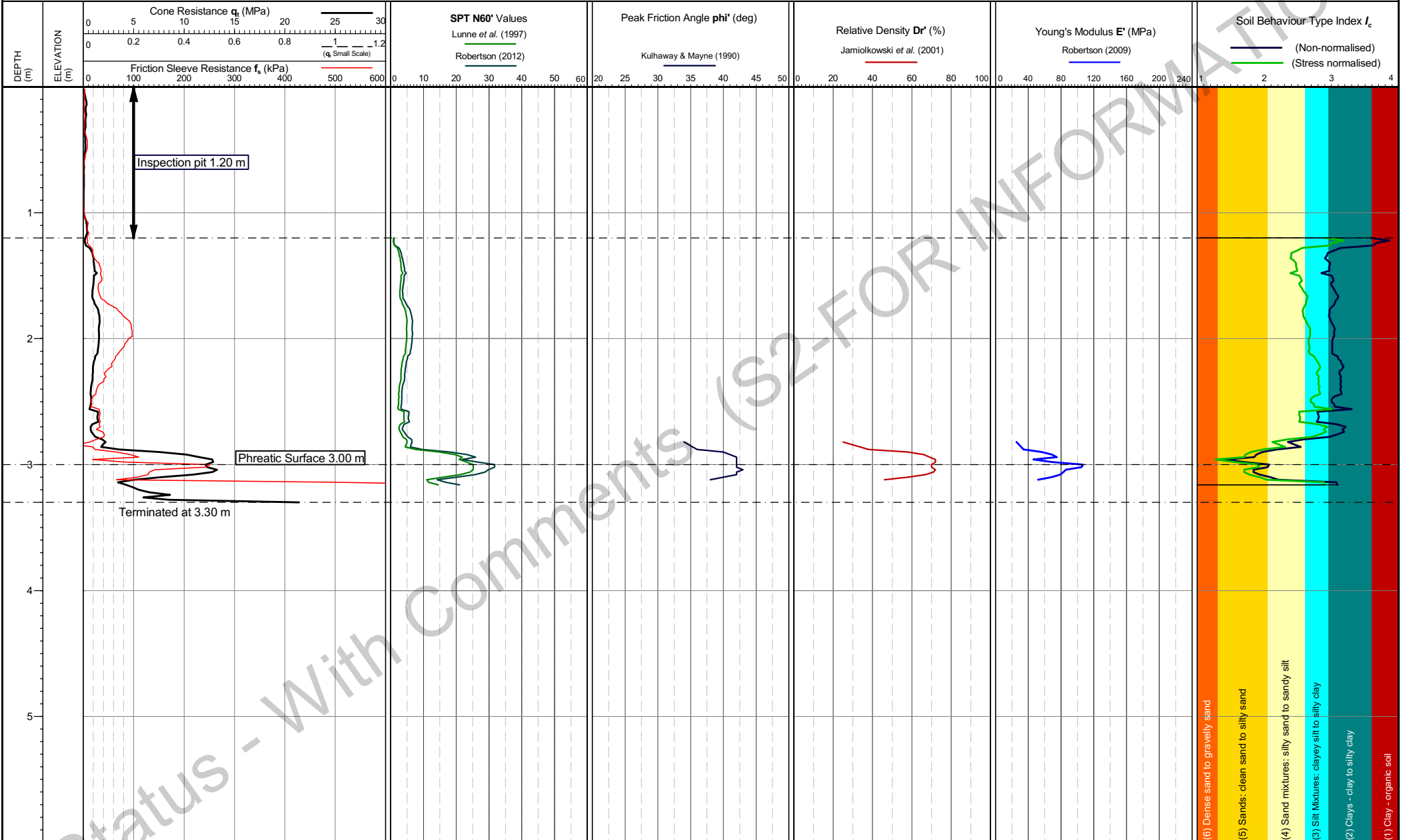
Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT106

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 11:07:01

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

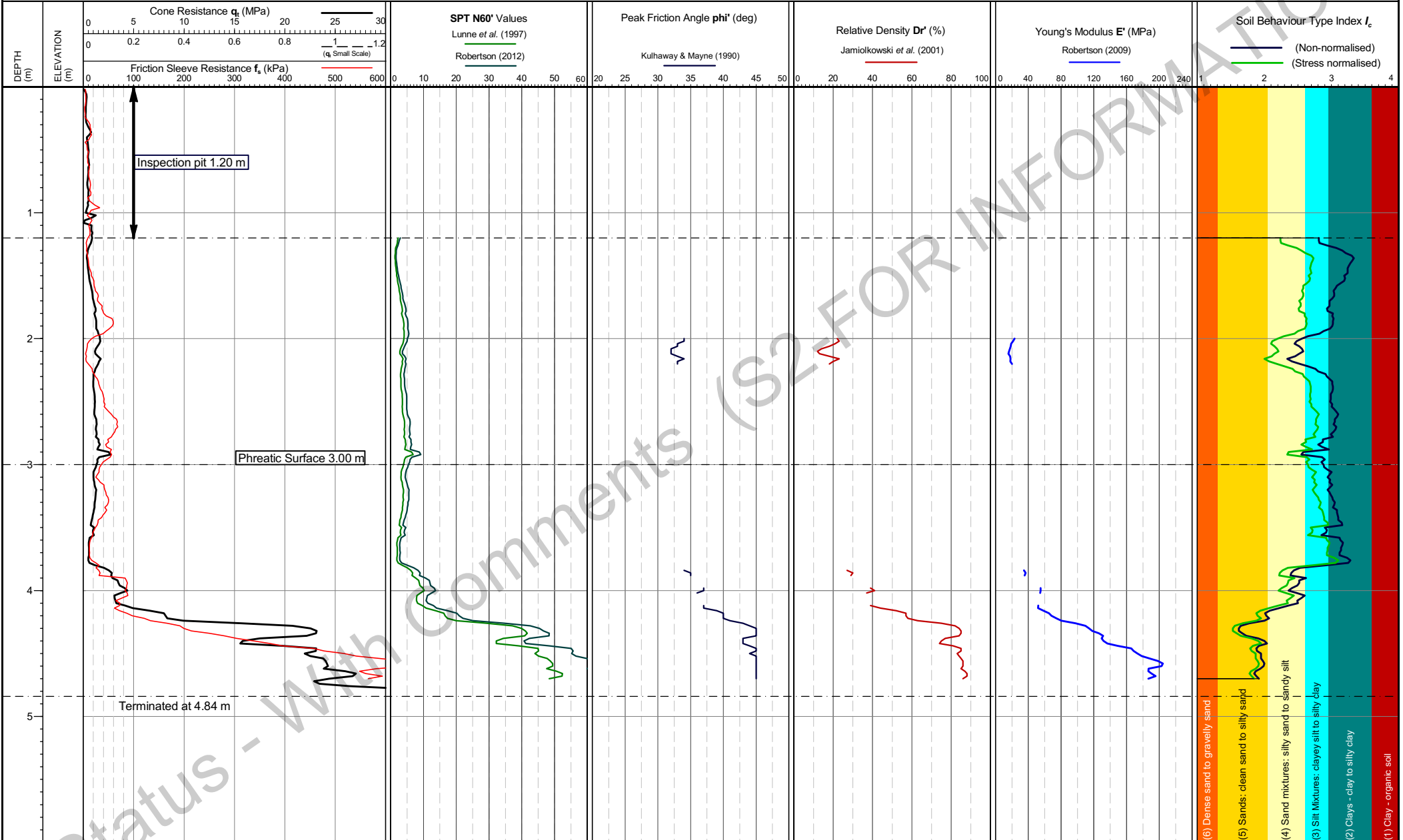
Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT107

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 10:35:41

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

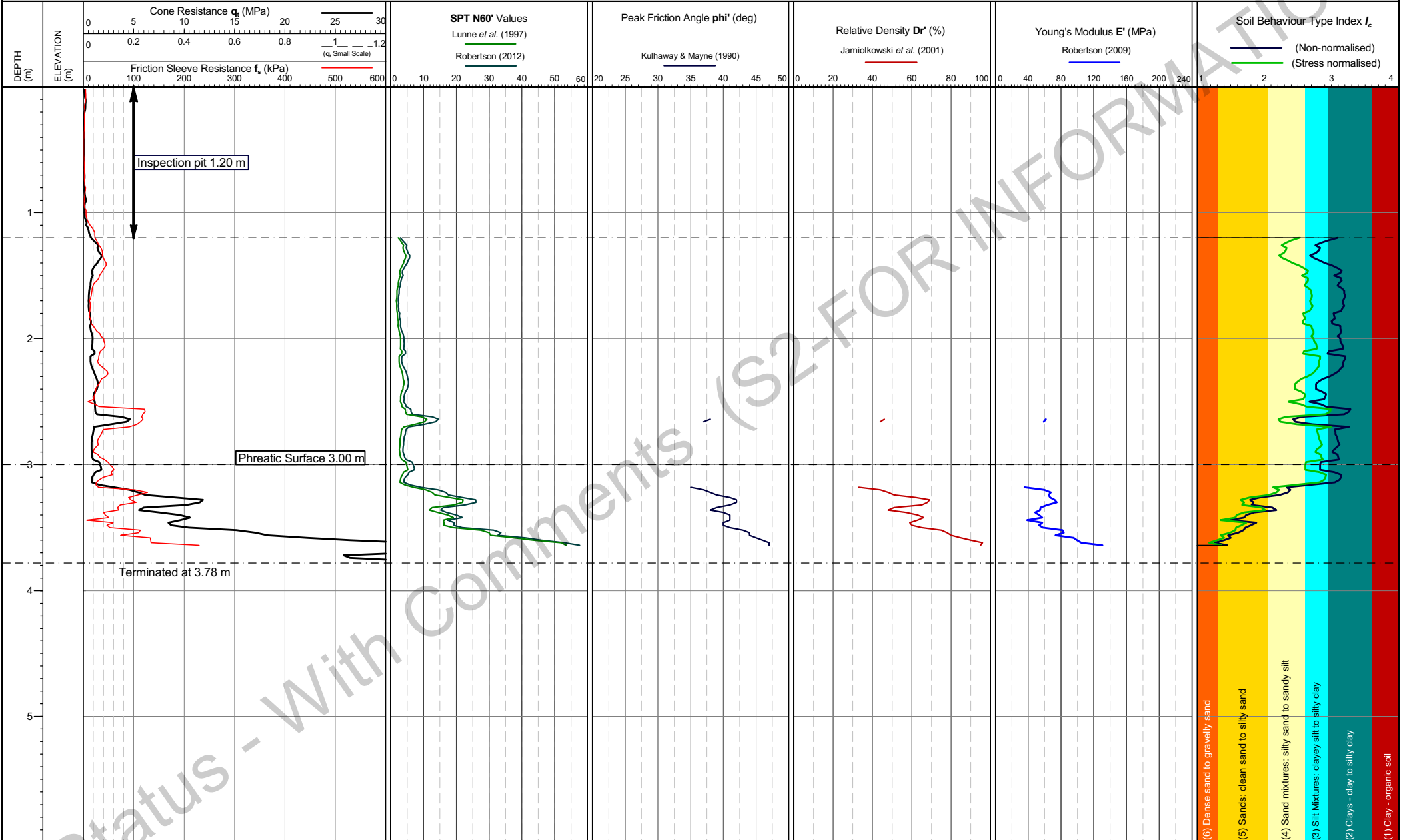
Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT108

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 11:25:17

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

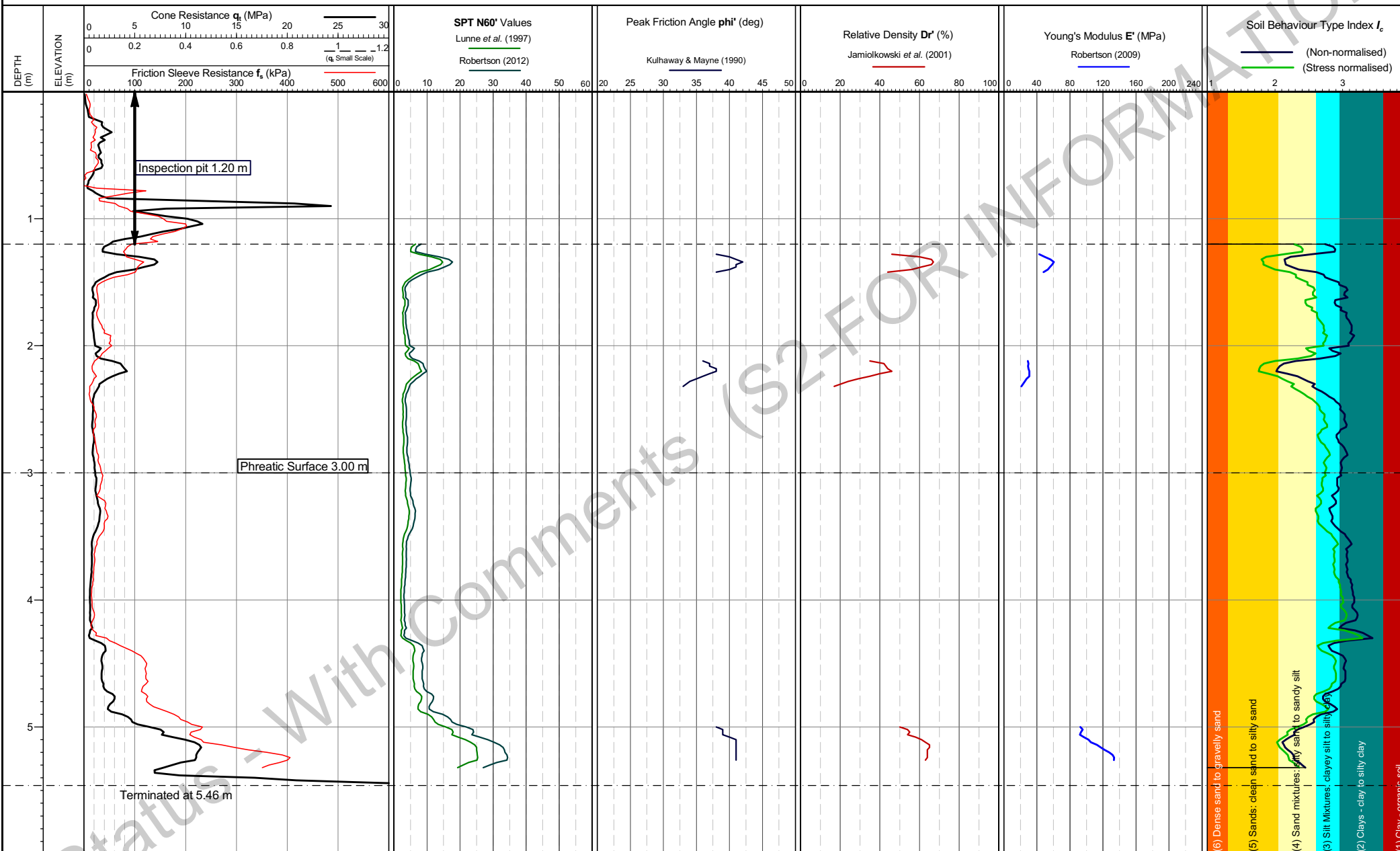
Date of plot:
28-10-22

Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT109

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 11:47:20

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

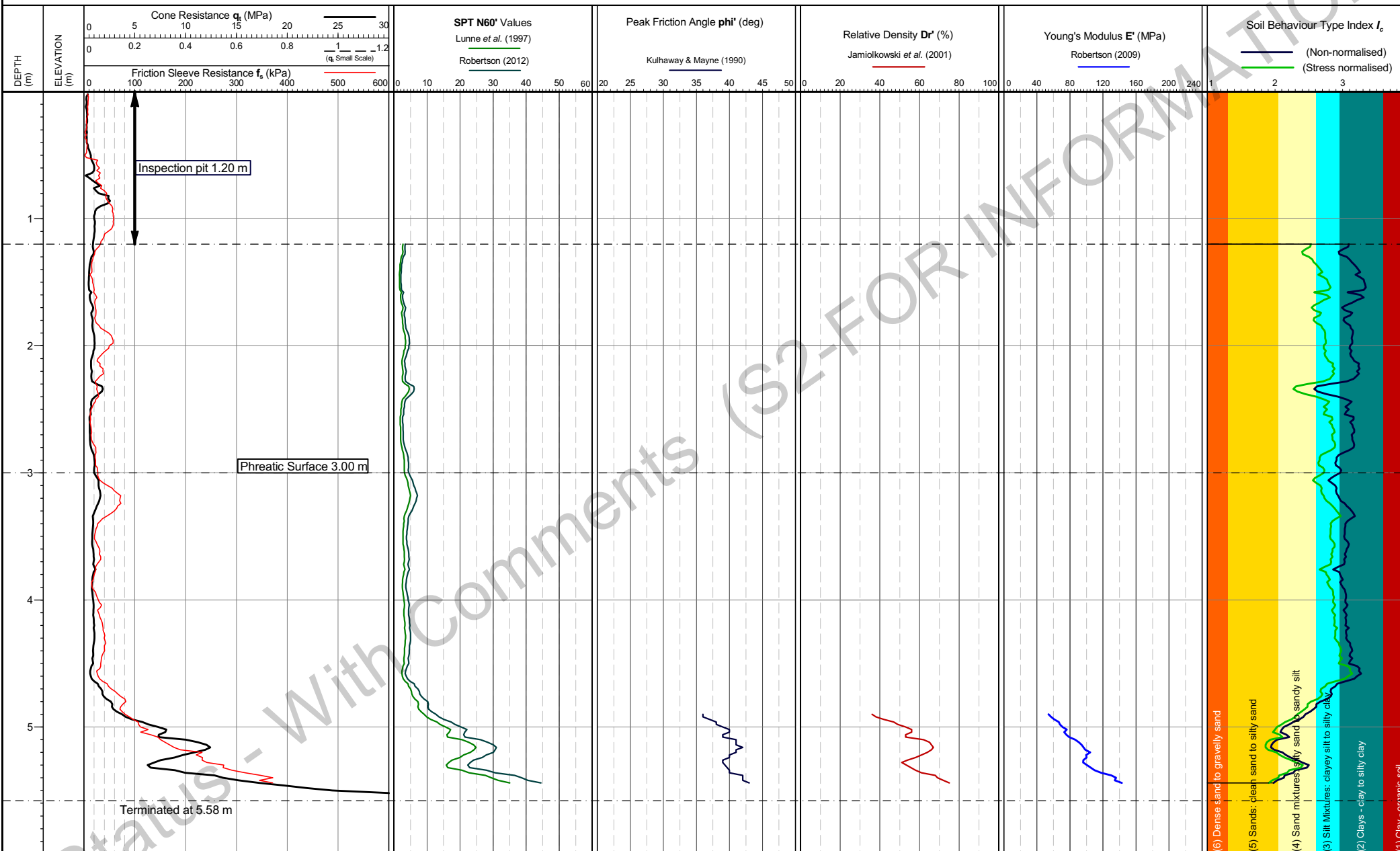
Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT110

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 12:31:27

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

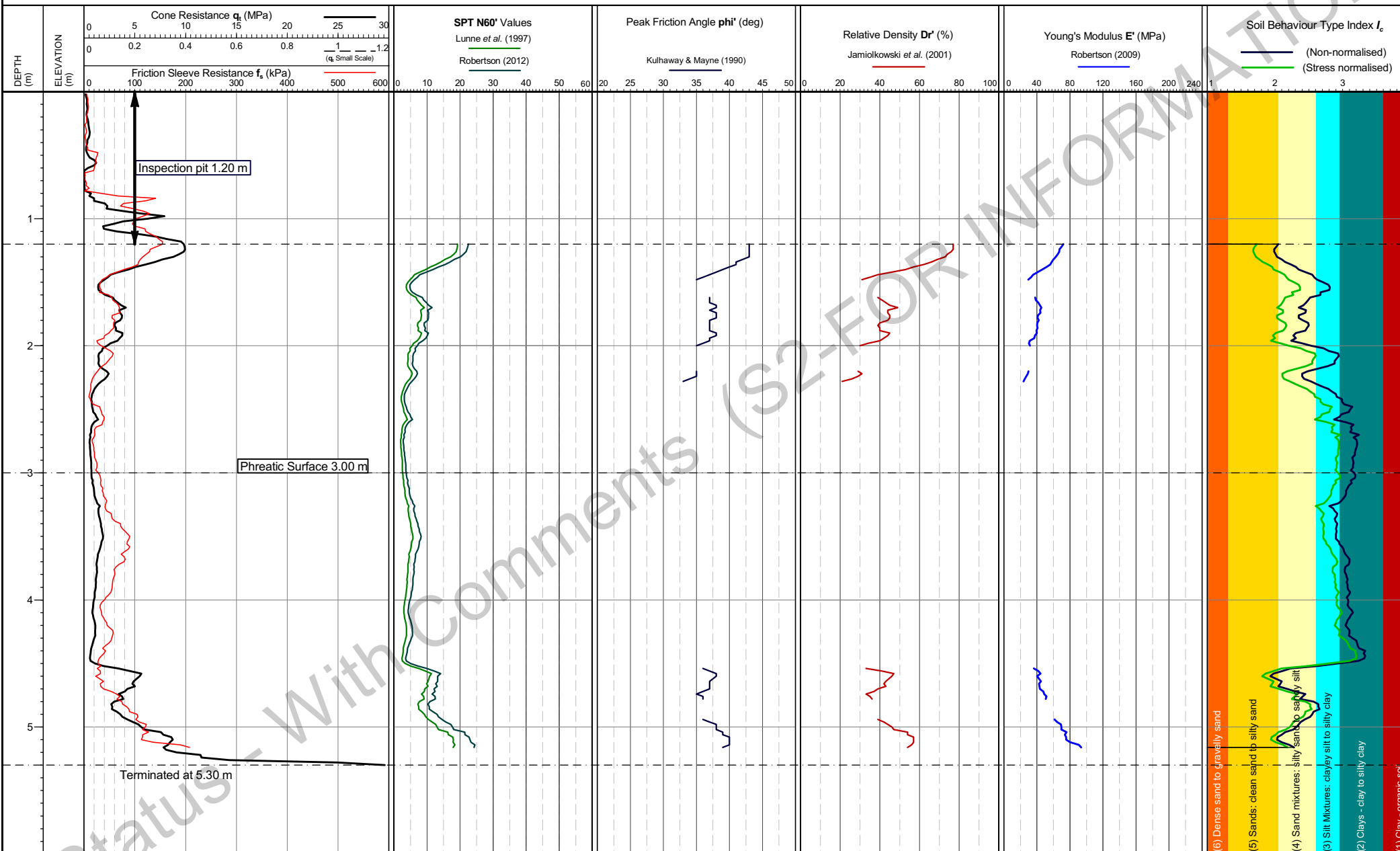
Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT111

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 12:51:34

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

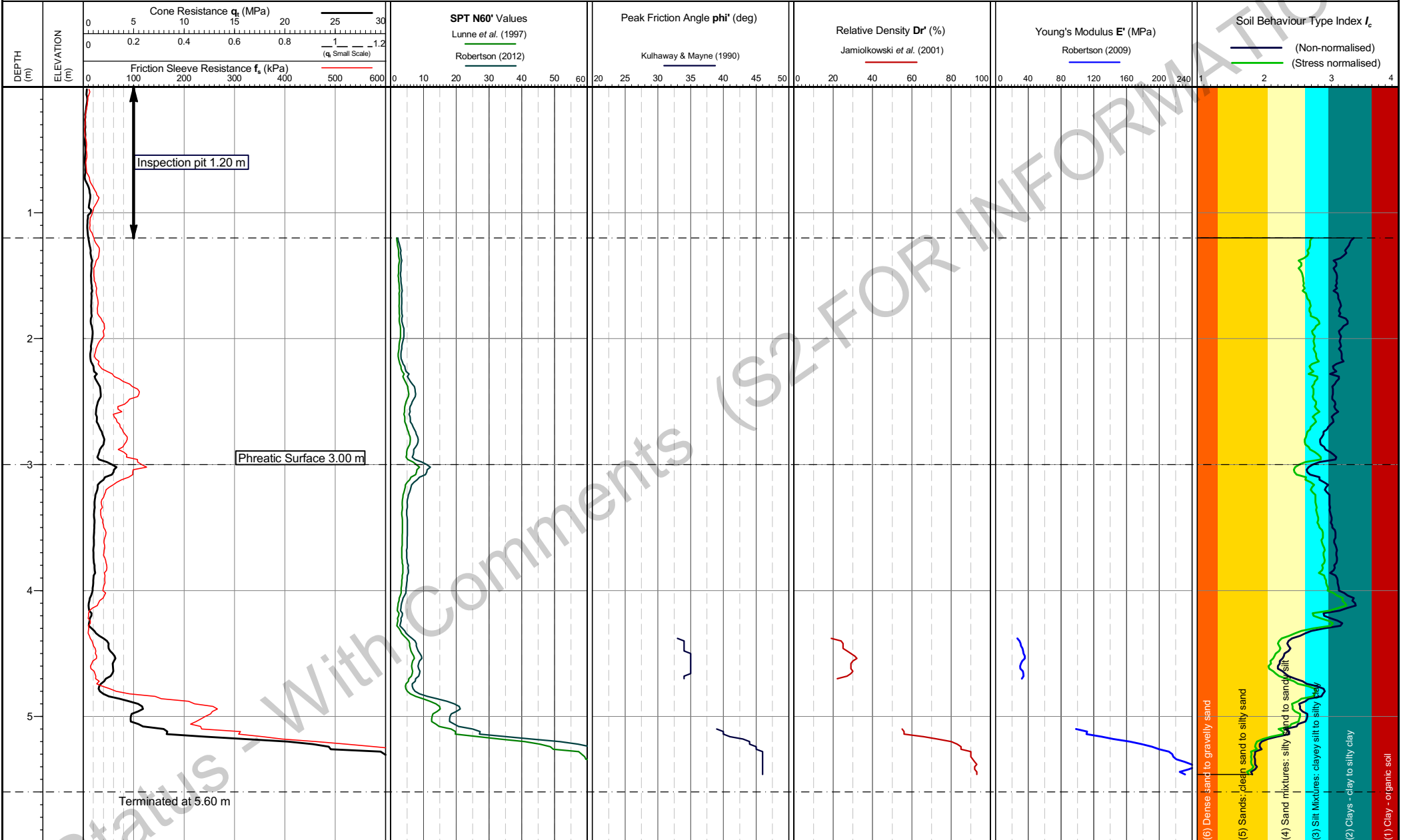
Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT112

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 13:19:07

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

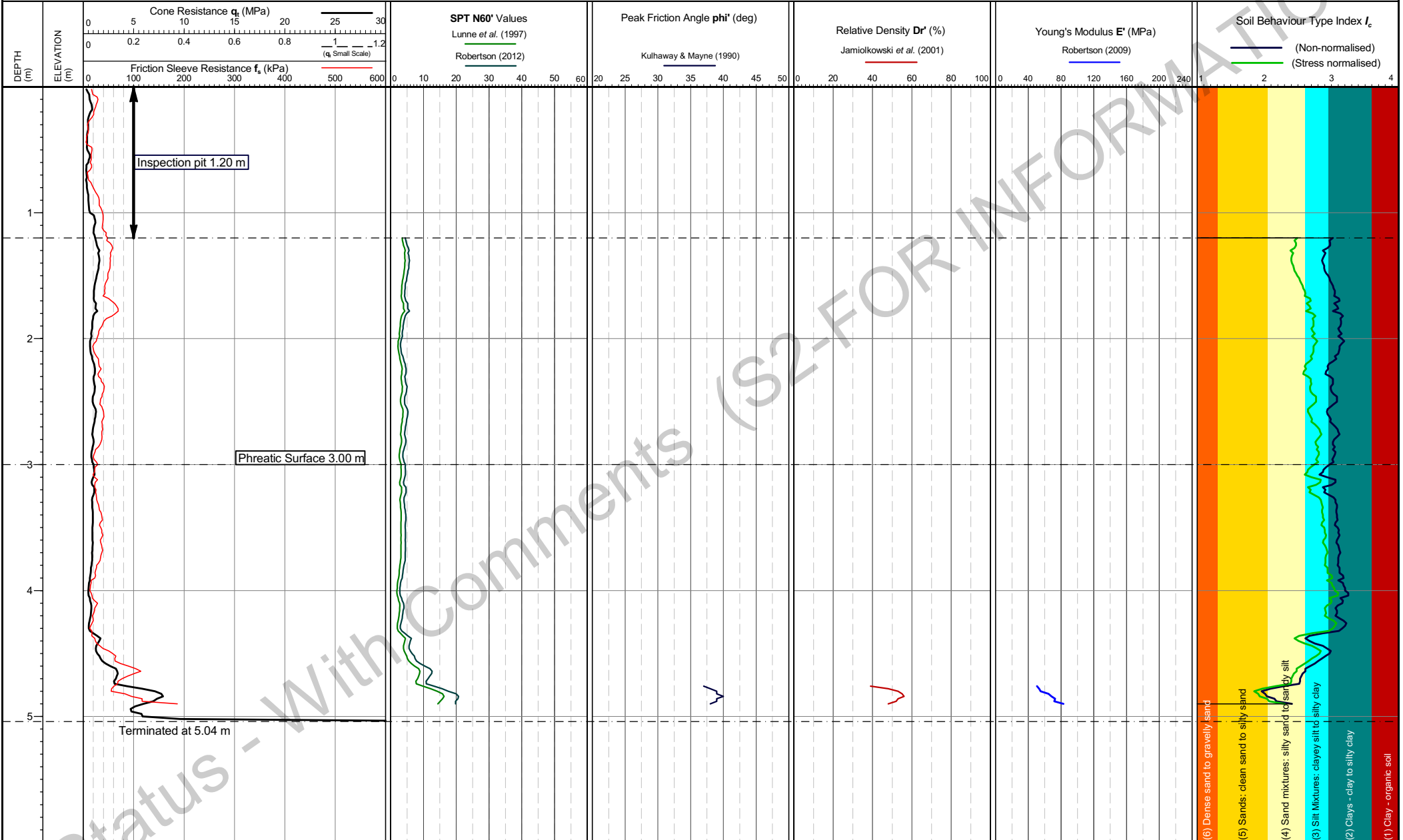
Date of plot:
28-10-22

Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT113

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Cone area (mm²):
Cone ID: S15-CFIPPT.1993
Operator: Jamie Butterworth
Date of test: 28/10/2022 13:30:02

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Both drained and undrained
parameters are calculated for mixed
SBTs = I_c 2.40-2.70. See report text
for methods and discussion of
parameter evaluation.

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT114

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APPENDIX G PENETROMETER TEMPERATURE RESULTS

The temperature values in these logs represent the internal load cell temperature of the penetrometer and are used for QC purposes by comparison to the measured temperature response indicated on the calibration certificate. The CPT results have been corrected for transient and static temperature effects during post processing.

Ground temperature is only represented following a penetration pause of > 11 minutes.

Plots are provided for locations performed with a digital penetrometer measuring internal load cell temperature.



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 08:46:26

Zero drift (Pre/post test)
 q_{0i} (kPa): 6.2
 f_{s0i} (kPa): 0.2 ($f_{s0i} = q_{0i} - u_{2i}$)
 u_{2i} (kPa): 0.4

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Tip load

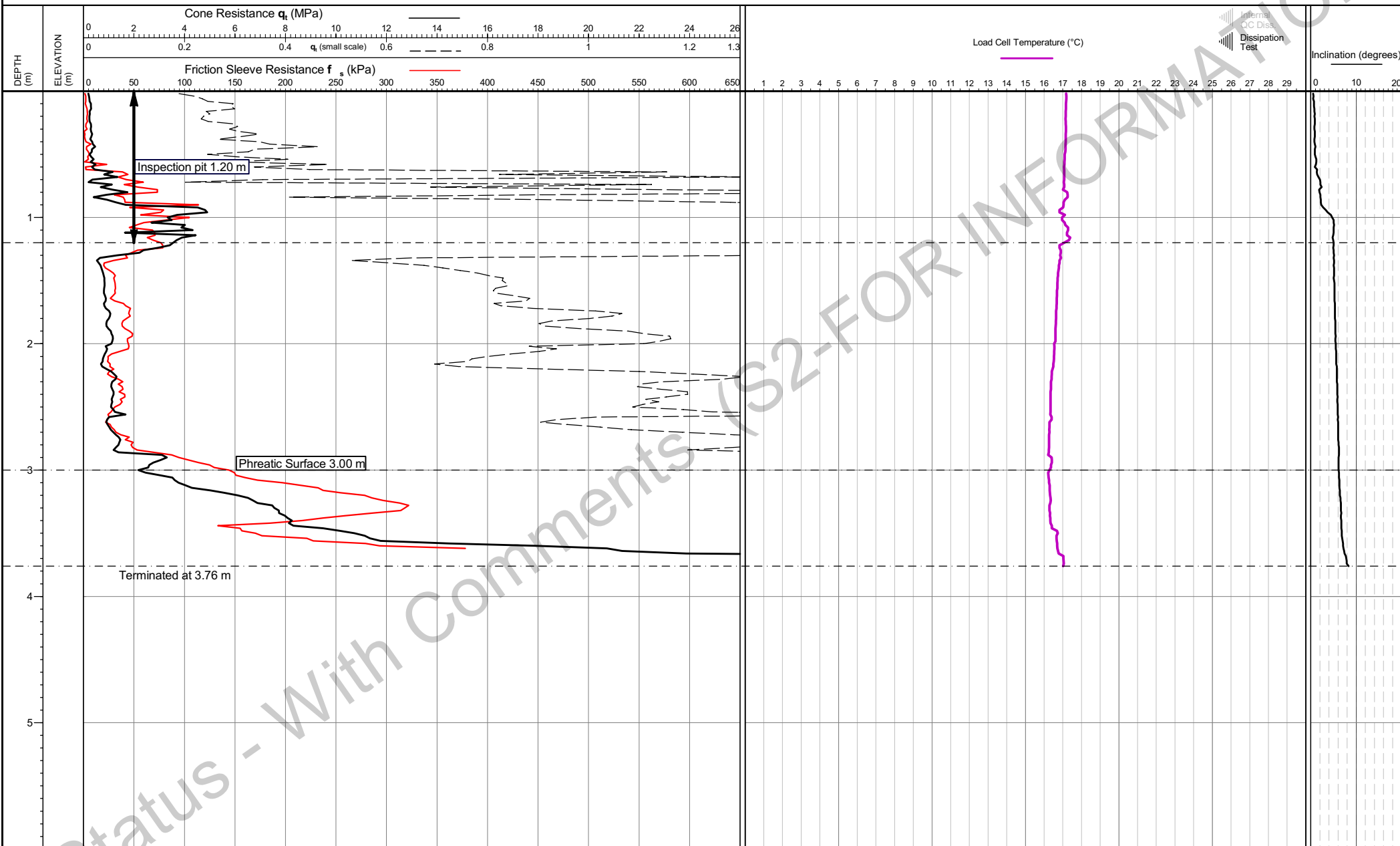
Date of plot:
28-10-22

Lankelma Project Ref:
P-108182-1

Checked by:
Chris Player

TEST ID: CPT101

Page 1 of 1



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 08:34:15

Zero drift (Pre/post test)
 q_{0i} (kPa): -57.6
 f_{s0} (kPa): 0.8 ($f_{s0} = q_{0i} - q_{0d}$)
 u_{2i} (kPa): -2.4

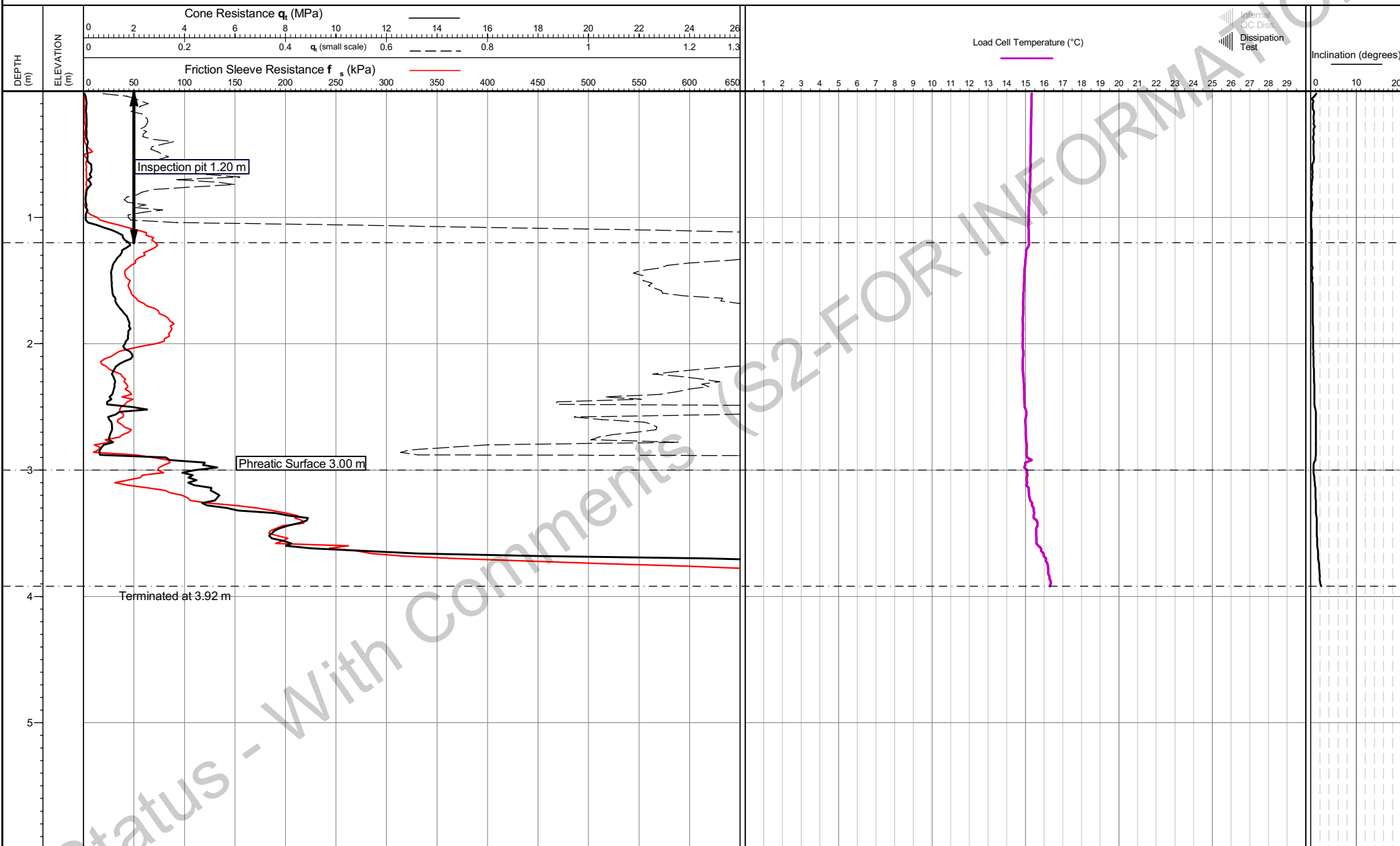
Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Tip load

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT102



Cone area (mm²):
Cone ID: S15-CFIPPT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 09:13:26

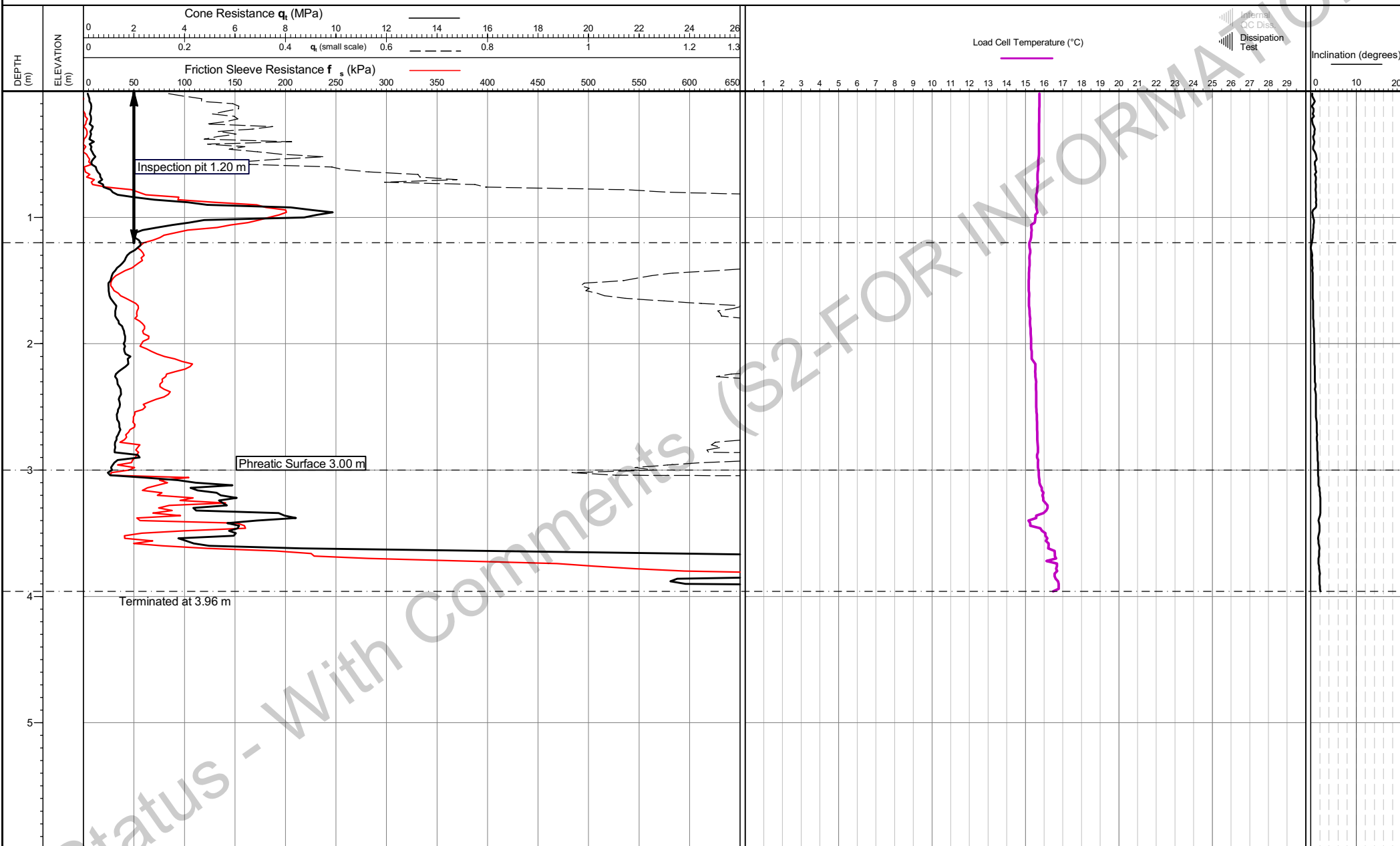
Zero drift (Pre/post test)
 q_{0c} (kPa): -26.2
 f_{s0} (kPa): 1.1 ($f_{s0} = q_{0c} \cdot \text{drift}$)
 u_z (kPa): -4.6

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at surface

Date of plot: 28-10-22
Lankelma Project Ref: P-108182-1
Checked by: Chris Player

TEST ID: CPT103



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 09:24:35

Zero drift (Pre/post test)
 q_c (kPa): -15.4
 f_s (kPa): 1.2 ($f_{s\text{ drift}} - q_{c\text{ drift}}$)
 u_2 (kPa): -1.2

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Tip load

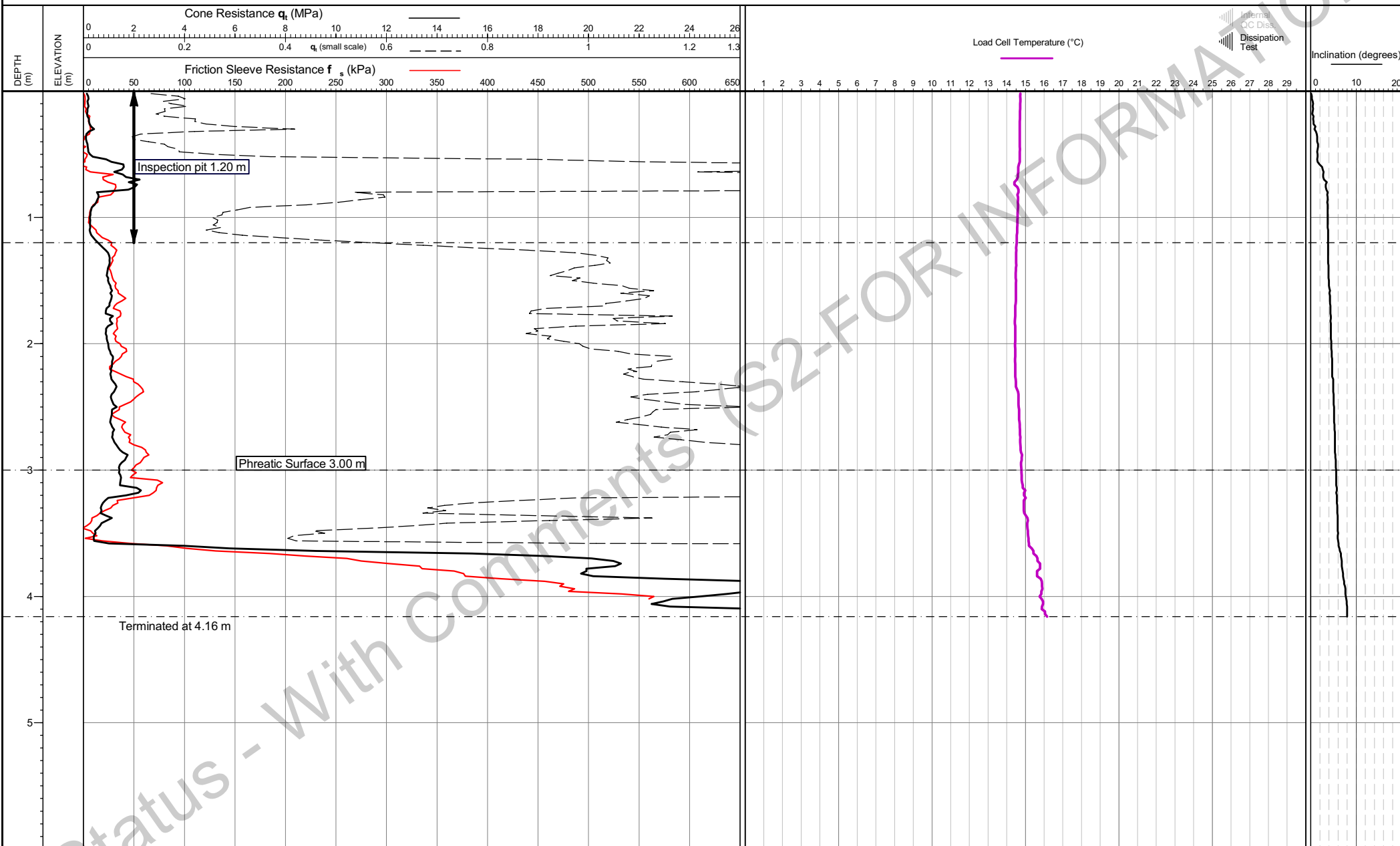
Date of plot:
28-10-22

Lankelma Project Ref:
P-108182-1

Checked by:
Chris Player

TEST ID: CPT104

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Cone area (mm²):
Cone ID: S15-CFIPPT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 09:43:40

Zero drift (Pre/post test)
 q_c (kPa): 27.6
 f_s (kPa): -1.7 ($f_{s, drift} - q_{c, drift}$)
 u_z (kPa): -1.0

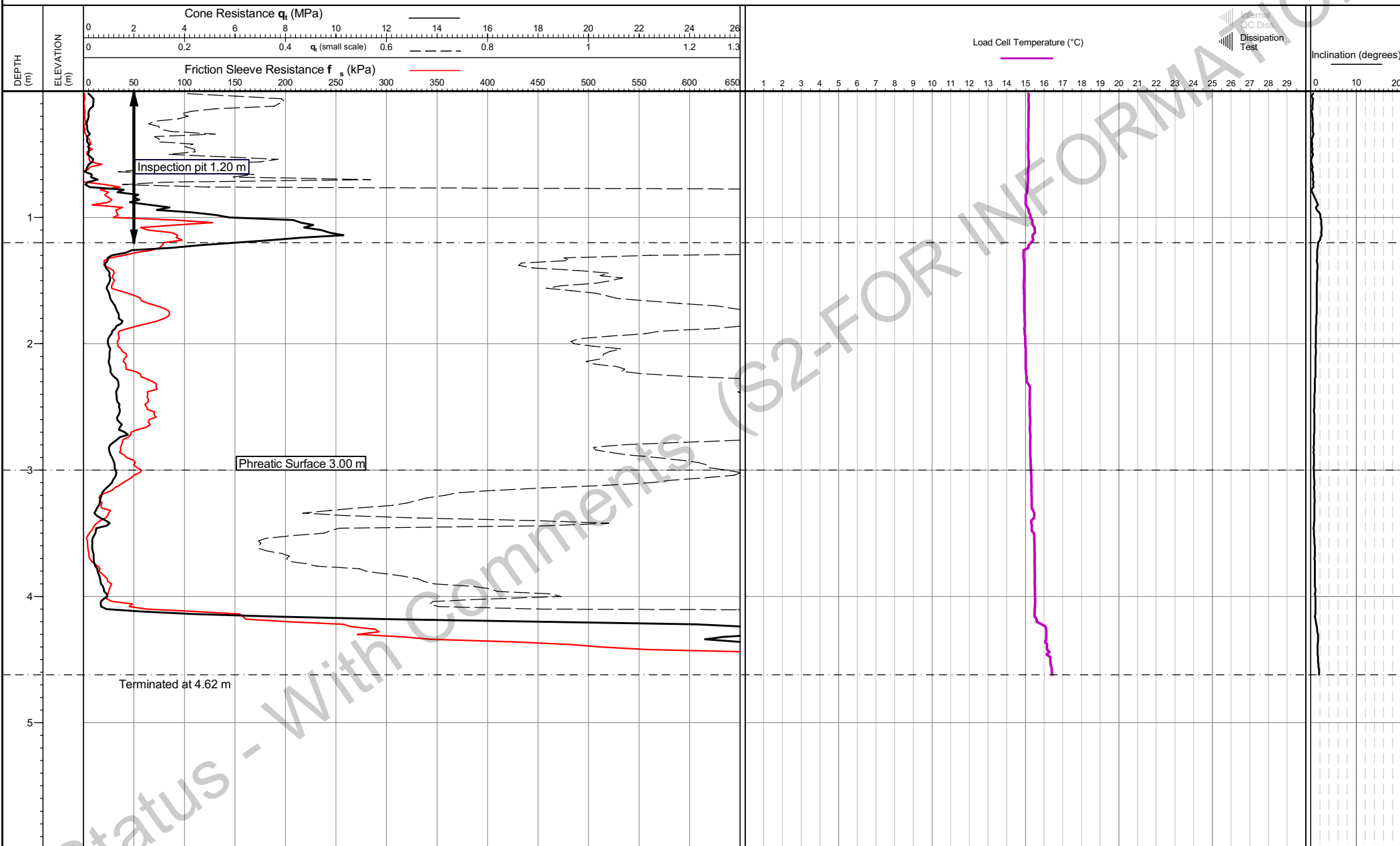
Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at surface

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT105



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 10:04:22

Zero drift (Pre/post test)
 q_{c0} (kPa): -7.6
 f_{s0} (kPa): 0.7 ($f_{s0} = q_{c0} - q_{c0}$)
 u_z (kPa): -0.4

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

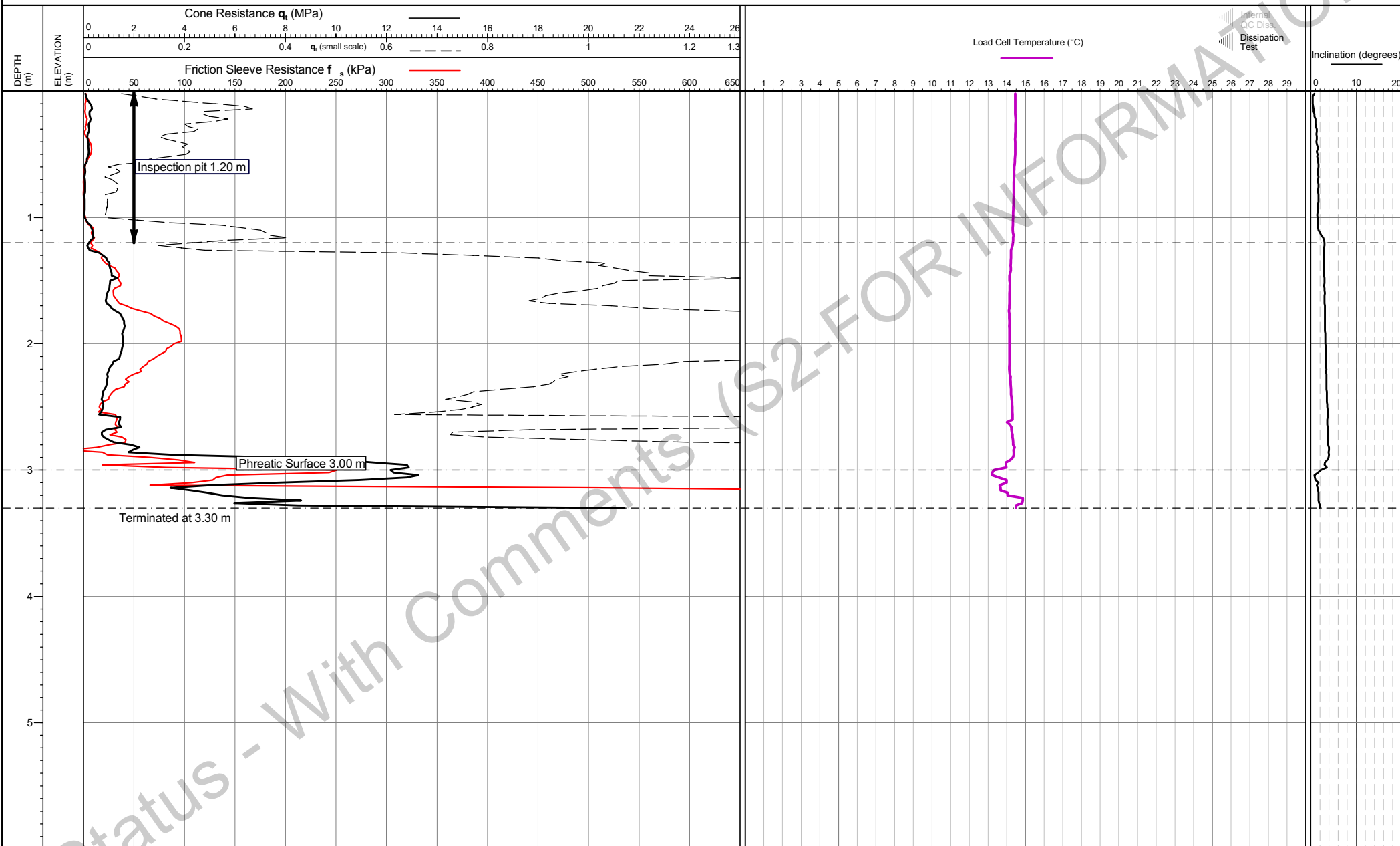
Date of plot:
28-10-22

Lankelma Project Ref:
P-108182-1

Checked by:
Chris Player

TEST ID: CPT106

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 11:07:01

Zero drift (Pre/post test)
 q_c (kPa): -16.4
 f_s (kPa): 1.5 ($f_{s, \text{drift}} - q_{c, \text{drift}}$)
 u_2 (kPa): -1.7

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

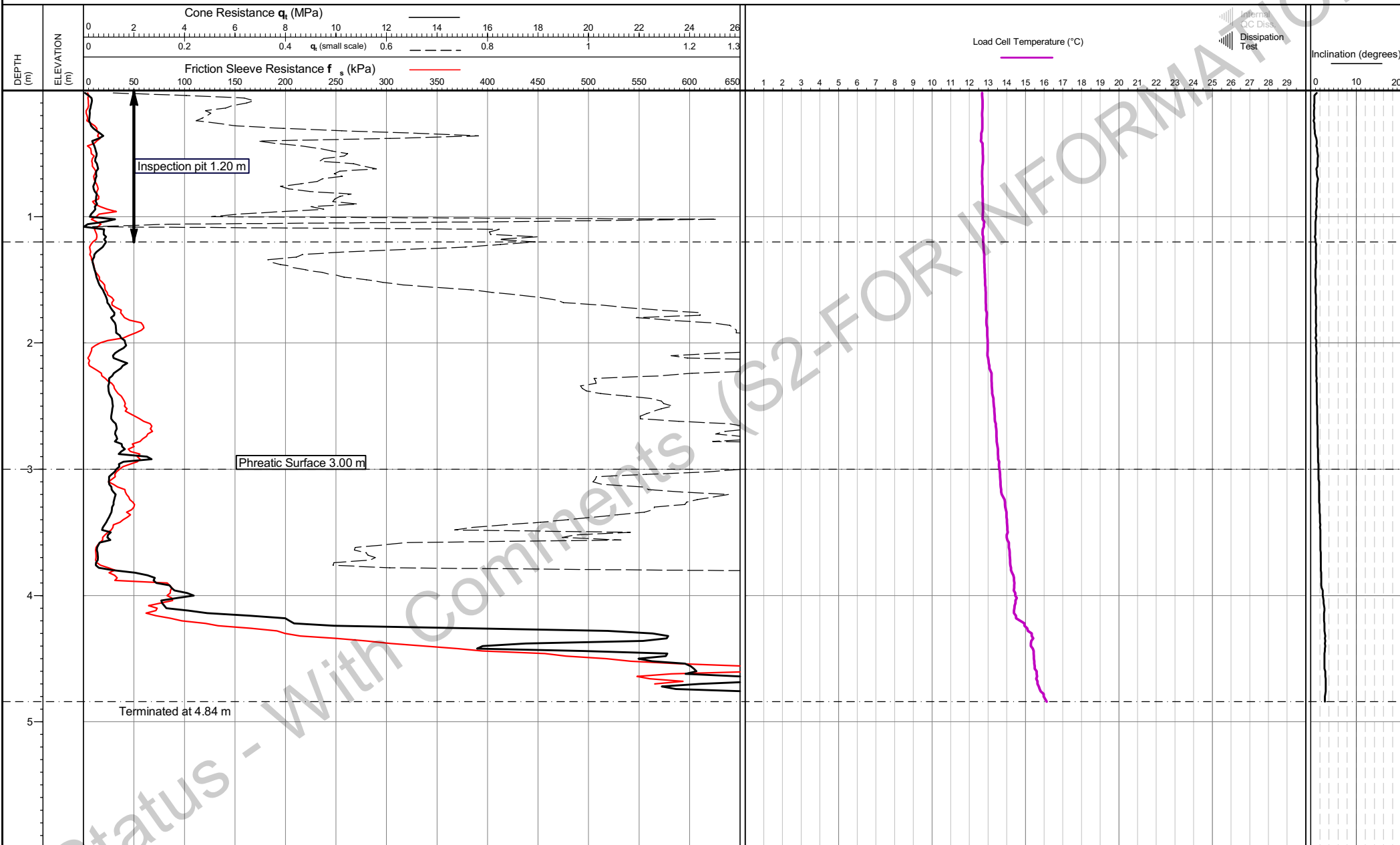
Date of plot:
28-10-22

Lankelma Project Ref:
P-108182-1

Checked by:
Chris Player

TEST ID: CPT107

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Cone area (mm²):
Cone ID: S15-CFIPPT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 10:35:41

Zero drift (Pre/post test)
 q_c (kPa): -7.8
 f_s (kPa): 0.4 ($f_{s\text{ drift}} - q_{c\text{ drift}}$)
 u_2 (kPa): -0.6

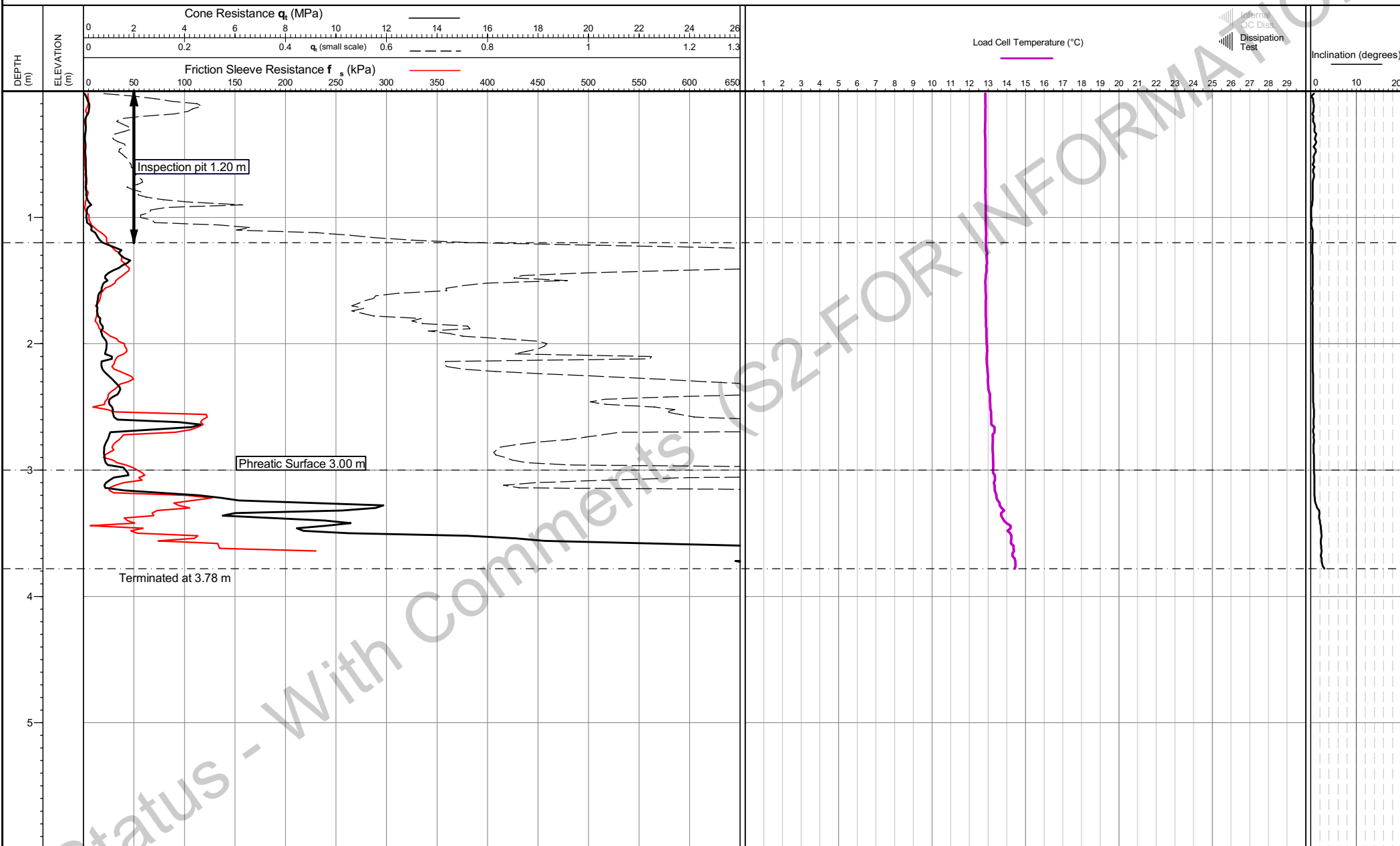
Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT108



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 11:25:17

Zero drift (Pre/post test)
 q_{0i} (kPa): 10.0
 f_{s0} (kPa): 0.1 ($f_{s0} = q_{0i} - q_{0d}$)
 u_{2i} (kPa): 1.1

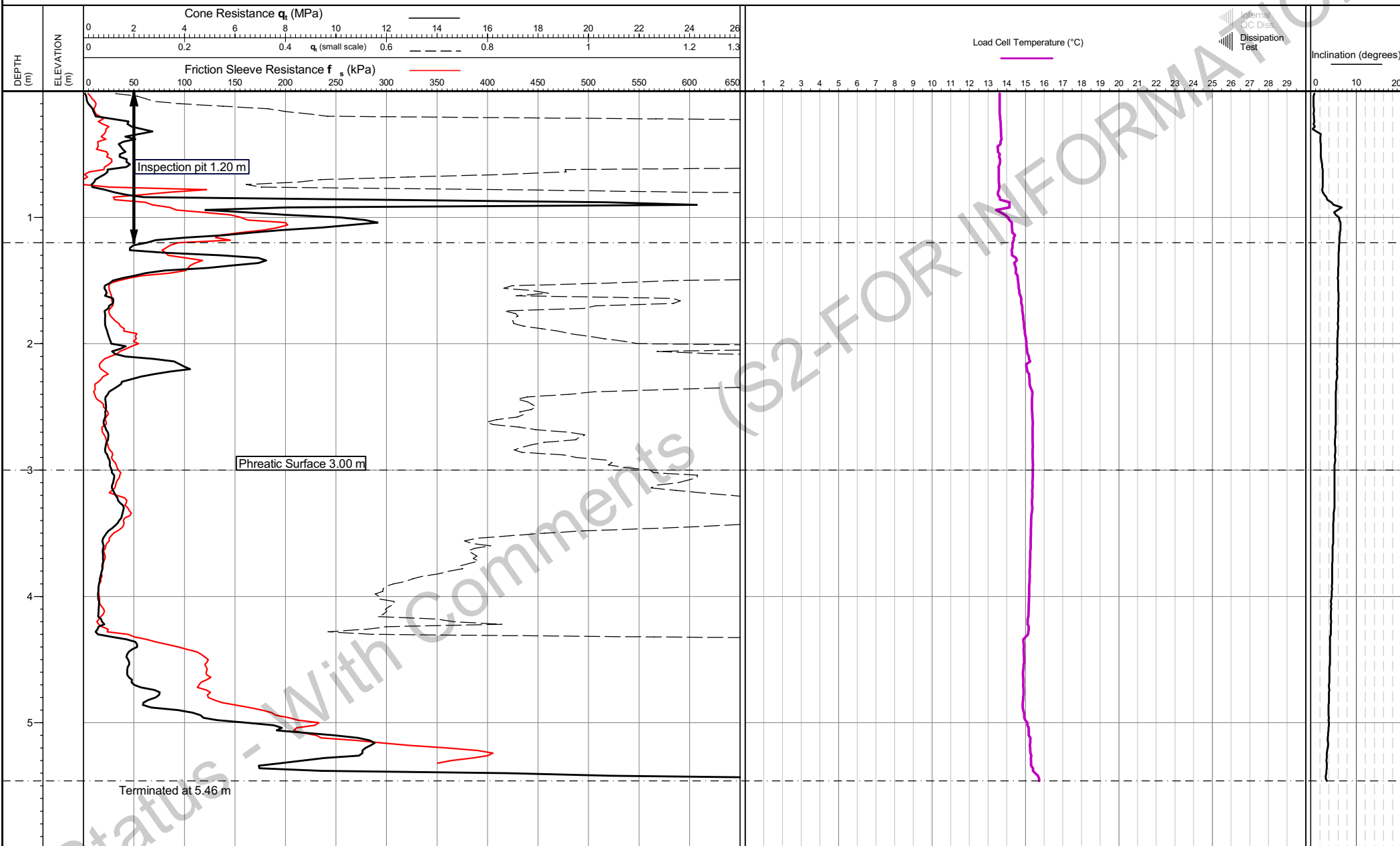
Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT109



Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 11:47:20

Zero drift (Pre/post test)
 q_c (kPa): 5.0
 f_s (kPa): -0.3 ($f_{s, drift} - q_{c, drift}$)
 u_2 (kPa): -1.4

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

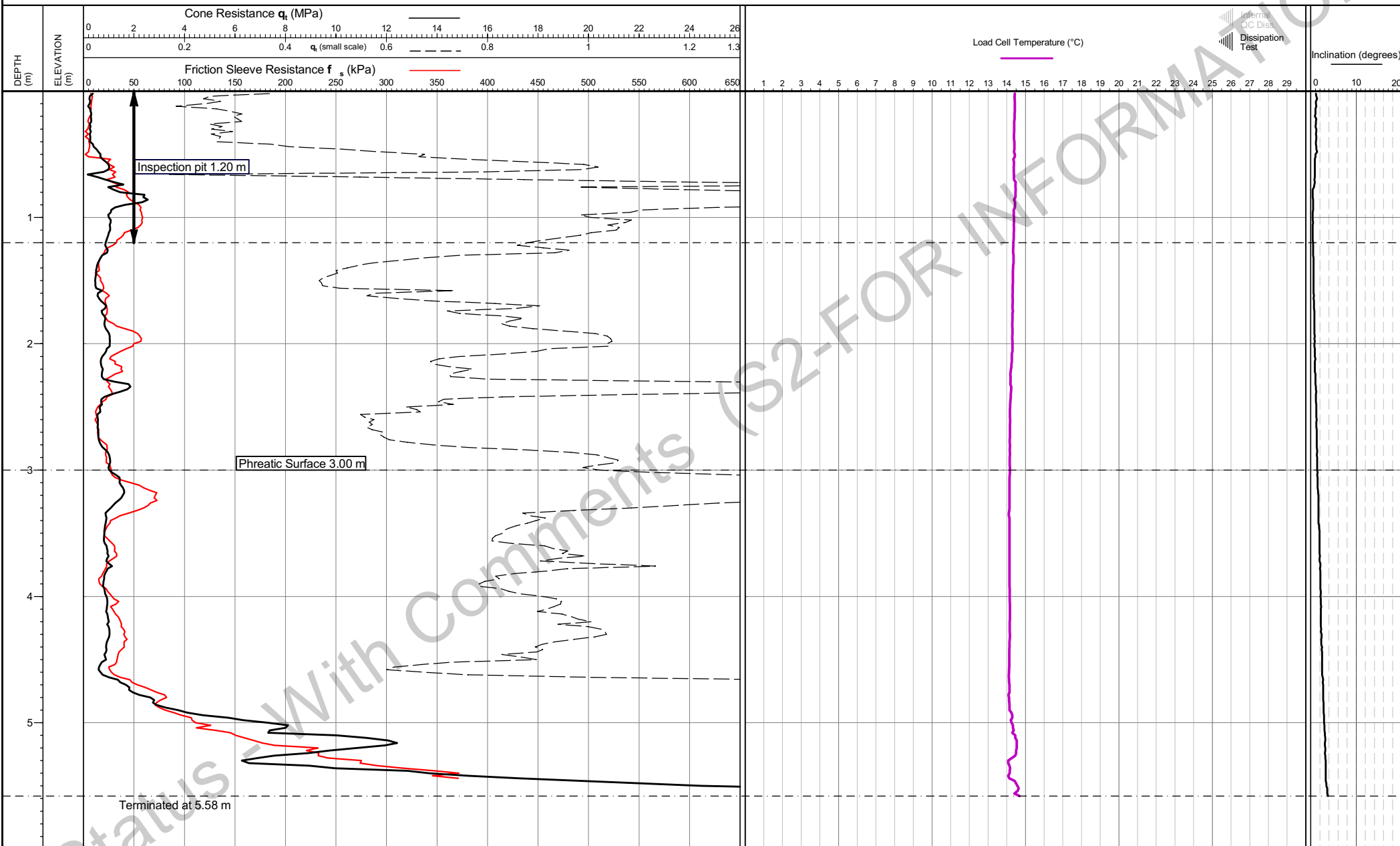
Date of plot:
28-10-22

Lankelma Project Ref:
P-108182-1

Checked by:
Chris Player

TEST ID: CPT110

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 12:31:27

Zero drift (Pre/post test)
 q_c (kPa): 7.2
 f_s (kPa): -0.4 ($f_{s, \text{drift}} - q_{c, \text{drift}}$)
 u_2 (kPa): -0.3

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

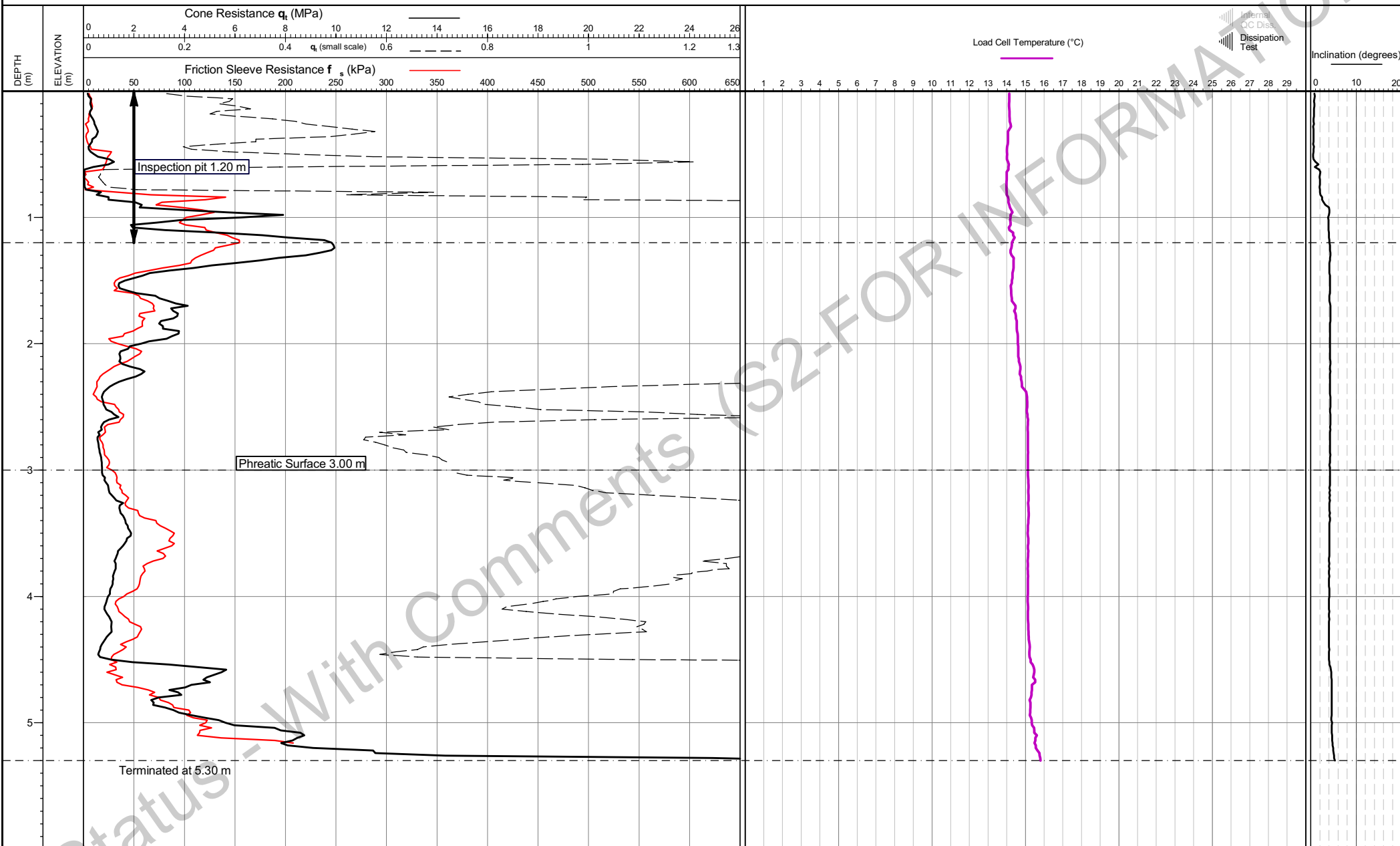
Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT111

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Cone area (mm²):
Cone ID: S15-CFIPPT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 12:51:34

Zero drift (Pre/post test)
 q_c (kPa): -17.4
 f_s (kPa): 0.7 ($f_{s, drift} - q_{c, drift}$)
 u_2 (kPa): 0.4

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

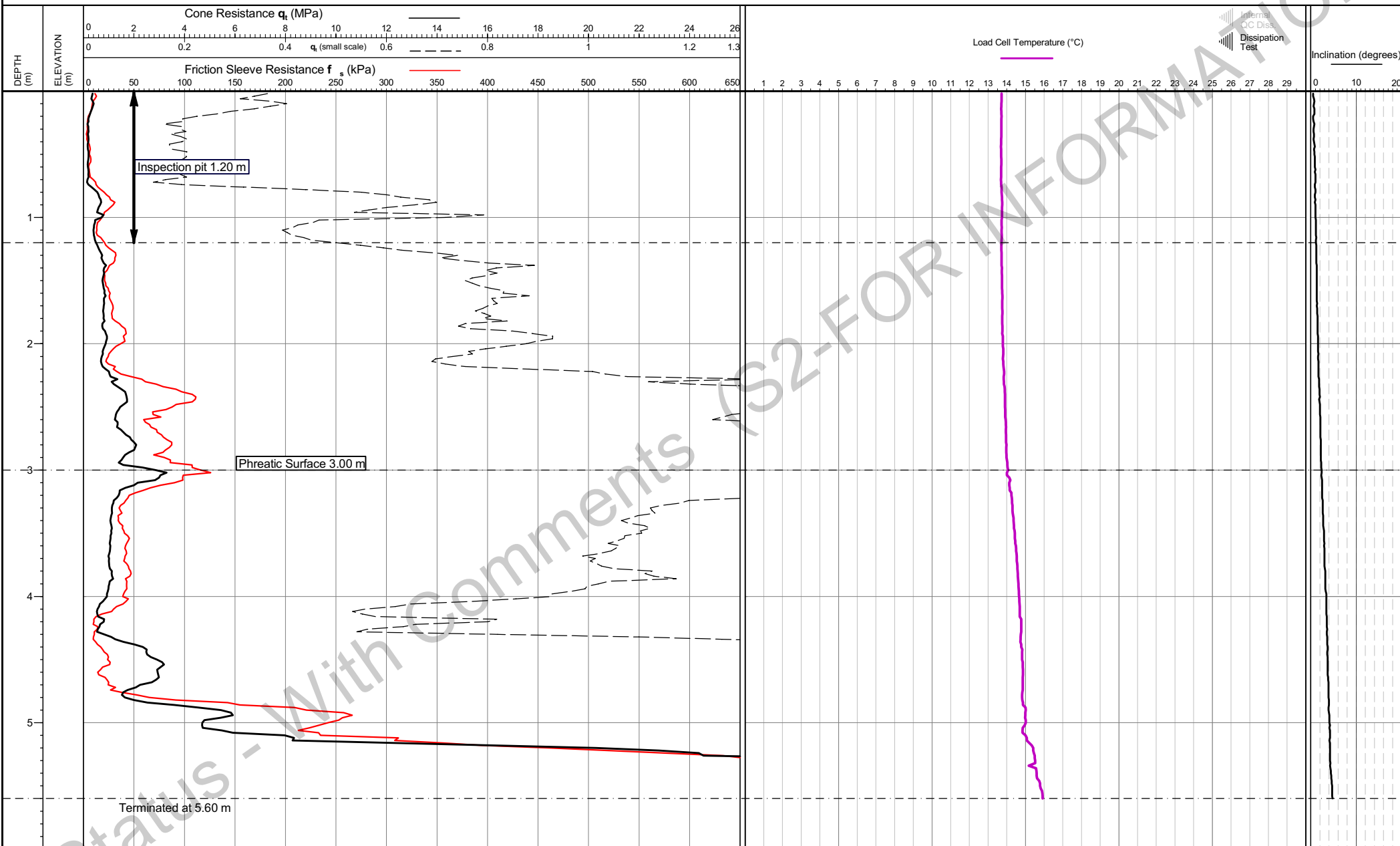
Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT112

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 13:19:07

Zero drift (Pre/post test)
 q_c (kPa): -41.4
 f_s (kPa): 1.4 ($f_{s, drift} - q_{c, drift}$)
 u_2 (kPa): -0.3

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

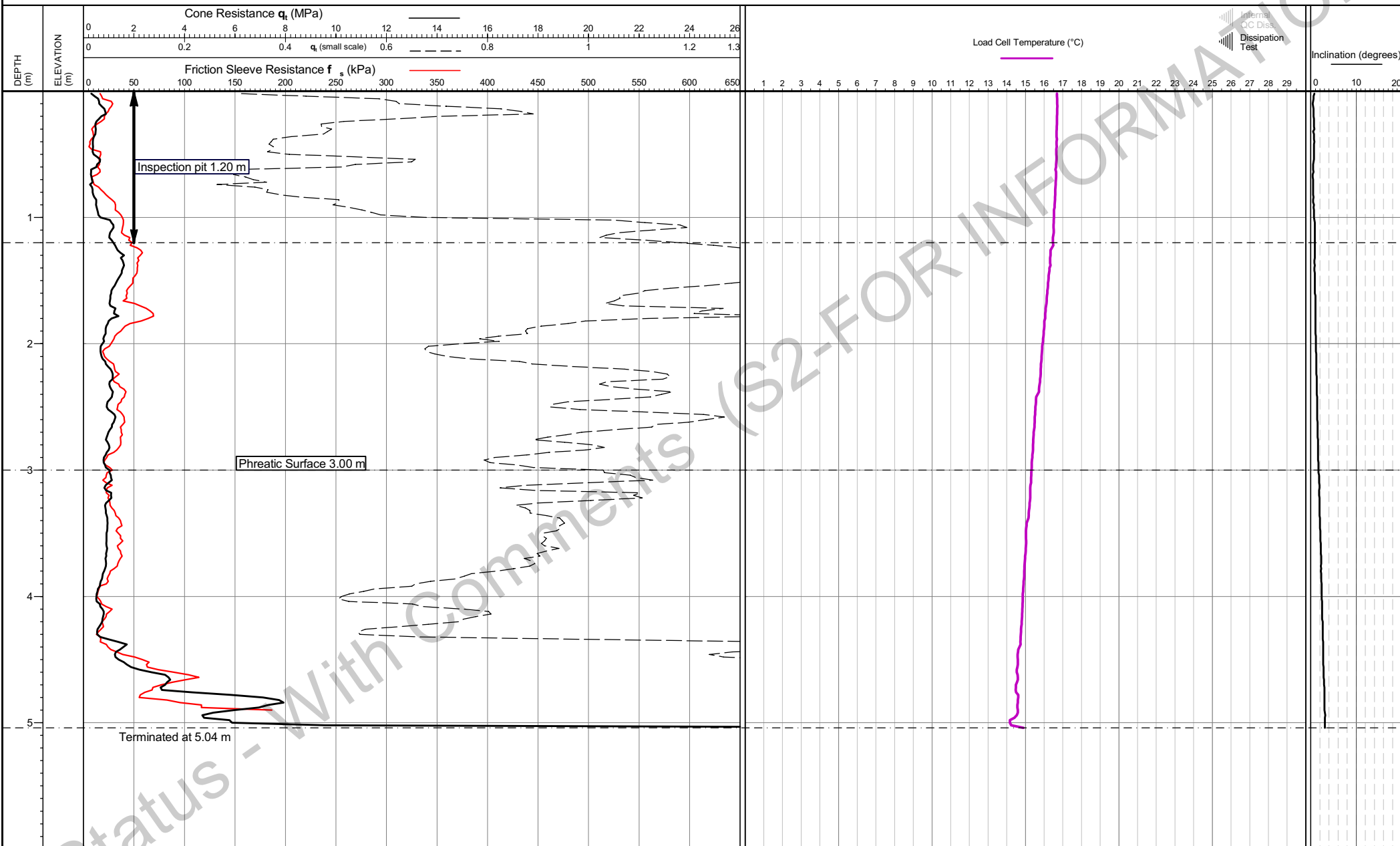
Date of plot:
28-10-22

Lankelma Project Ref:
P-108182-1

Checked by:
Chris Player

TEST ID: CPT113

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Cone area (mm²):
Cone ID: S15-CFIPTT.1993
Operator: Jamie Butterworth
Rig Used: UK3
Date of test: 28/10/2022 13:30:02

Zero drift (Pre/post test)
 q_c (kPa): 64.6
 f_s (kPa): -1.8 ($f_{s, \text{drift}} - q_{c, \text{drift}}$)
 u_z (kPa): 1.5

Location: Greater Manchester, UK
Coordinates: ,
Elevation:
Coordinate system:

Remarks:
*Phreatic surface origin: Arbitrary value
Termination Remark: Lateral support at depth

Date of plot:
28-10-22
Checked by:
Chris Player

Lankelma Project Ref:
P-108182-1

TEST ID: CPT114

Appendix D – Chemical Laboratory Testing Results

- Envirolab, Environmental Chemistry Analysis Results, Soils
 - Final Analytical Test Report Ref. 22-05613-1
 - Final Analytical Test Report Ref. 22-075574-1

FINAL ANALYTICAL TEST REPORT

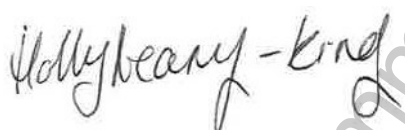
Envirolab Job Number: 22/05613
Issue Number: 1

Date: 04 July, 2022

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: EBMA/Matthew Holroyd/Russell Taylor
Project Name: Newhouse Academy
Project Ref: 079809
Order No: EBMA3411
Date Samples Received: 01/06/22
Date Instructions Received: 09/06/22
Date Analysis Completed: 04/07/22

Approved by:



Holly Neary-King
Client Services Supervisor

Envirolab Job Number: 22/05613

Client Project Name: Newhouse Academy

Client Project Ref: 079809

Lab Sample ID	22/05613/1	22/05613/2	22/05613/4	22/05613/5	22/05613/7	22/05613/8		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	RC02	RC02	RC02	RC02	RC02	RC02				
Depth to Top	1.10	3.00	1.20	1.80	4.80	6.30				
Depth To Bottom	1.20	3.30	1.65	2.25	5.25	6.75				
Date Sampled	31-May-22	31-May-22	31-May-22	31-May-22	31-May-22	31-May-22				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	6AE	6A		5	6A	6A				
% Stones >10mm _A	2.5	<0.1	-	<0.1	1.2	1.4		% w/w	0.1	A-T-044
pH _D ^{M#}	7.66	4.30	-	-	-	-		pH	0.01	A-T-031s
pH BRE _D ^{M#}	-	-	-	4.69	6.59	7.09		pH	0.01	A-T-031s
Chloride BRE, SO4 equiv. (water sol 2:1) _D	-	-	-	8	-	-		mg/l	7	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1) _D	-	-	-	<0.4	-	-		mg/l	0.4	A-T-026s
Sulphate (water sol 2:1) _D ^{M#}	0.03	<0.01	-	-	-	-		g/l	0.01	A-T-026s
Sulphate BRE (water sol 2:1) _D ^{M#}	-	-	-	12	<10	<10		mg/l	10	A-T-026s
Sulphate BRE (acid sol) _D ^{M#}	-	-	-	<0.02	<0.02	<0.02		% w/w	0.02	A-T-028s
Sulphur BRE (total) _D	-	-	-	<0.01	0.07	0.10		% w/w	0.01	A-T-024s
Cyanide (total) _A ^{M#}	<1	<1	-	-	-	-		mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	-	-	-	-		mg/kg	0.2	A-T-050s
Organic Matter _D ^{M#}	4.4	1.8	-	-	-	-		% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	<1	7	-	-	-	-		mg/kg	1	A-T-024s
Boron (water soluble) _D	<1.0	<1.0	-	-	-	-		mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5	1.1	-	-	-	-		mg/kg	0.5	A-T-024s
Copper _D ^{M#}	20	23	-	-	-	-		mg/kg	1	A-T-024s
Chromium _D ^{M#}	19	24	-	-	-	-		mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	-	-	-	-		mg/kg	1	A-T-040s
Lead _D ^{M#}	22	13	-	-	-	-		mg/kg	1	A-T-024s
Mercury _D	0.29	<0.17	-	-	-	-		mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	14	32	-	-	-	-		mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	-	-	-	-		mg/kg	1	A-T-024s
Zinc _D ^{M#}	39	59	-	-	-	-		mg/kg	5	A-T-024s
4 point Liquid & Plastic Limit by Cone Penetrometer _A	-	-	Appended	Appended	-	-				Subcon IFA
Moisture Content of Soil (Oven Dried Method) _A	-	-	Appended	Appended	-	-				Subcon IFA

Envirolab Job Number: 22/05613

Client Project Name: Newhouse Academy

Client Project Ref: 079809

Lab Sample ID	22/05613/1	22/05613/2	22/05613/4	22/05613/5	22/05613/7	22/05613/8		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	RC02	RC02	RC02	RC02	RC02	RC02				
Depth to Top	1.10	3.00	1.20	1.80	4.80	6.30				
Depth To Bottom	1.20	3.30	1.65	2.25	5.25	6.75				
Date Sampled	31-May-22	31-May-22	31-May-22	31-May-22	31-May-22	31-May-22				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	6AE	6A		5	6A	6A				
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	-	-	-	-				A-T-045
Asbestos Matrix (visual) ₀	-	-	-	-	-	-				A-T-045
Asbestos Matrix (microscope) ₀	-	-	-	-	-	-				A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ₀	N/A	N/A	-	-	-	-				A-T-045

Envirolab Job Number: 22/05613

Client Project Name: Newhouse Academy

Client Project Ref: 079809

Lab Sample ID	22/05613/1	22/05613/2	22/05613/4	22/05613/5	22/05613/7	22/05613/8		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	RC02	RC02	RC02	RC02	RC02	RC02				
Depth to Top	1.10	3.00	1.20	1.80	4.80	6.30				
Depth To Bottom	1.20	3.30	1.65	2.25	5.25	6.75				
Date Sampled	31-May-22	31-May-22	31-May-22	31-May-22	31-May-22	31-May-22				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	6AE	6A		5	6A	6A				
PAH-16MS										
Acenaphthene _A ^{M#}	0.05	<0.01	-	-	-	-		mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.06	<0.02	-	-	-	-		mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.18	<0.04	-	-	-	-		mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.21	<0.04	-	-	-	-		mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.28	<0.05	-	-	-	-		mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.16	<0.05	-	-	-	-		mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.10	<0.07	-	-	-	-		mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.21	<0.06	-	-	-	-		mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	-	-	-	-		mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.42	<0.08	-	-	-	-		mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.04	<0.01	-	-	-	-		mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.17	<0.03	-	-	-	-		mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	-	-	-	-		mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.31	<0.03	-	-	-	-		mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.35	<0.07	-	-	-	-		mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	2.54	<0.08	-	-	-	-		mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/05613

Client Project Name: Newhouse Academy

Client Project Ref: 079809

Lab Sample ID	22/05613/1	22/05613/2	22/05613/4	22/05613/5	22/05613/7	22/05613/8		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	RC02	RC02	RC02	RC02	RC02	RC02				
Depth to Top	1.10	3.00	1.20	1.80	4.80	6.30				
Depth To Bottom	1.20	3.30	1.65	2.25	5.25	6.75				
Date Sampled	31-May-22	31-May-22	31-May-22	31-May-22	31-May-22	31-May-22				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
Sample Matrix Code	6AE	6A		5	6A	6A				
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	-	-	-	-		mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	-	-	-	-		mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	2	<1	-	-	-	-		mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	2	<1	-	-	-	-		mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	41	5	-	-	-	-		mg/kg	1	A-T-055s
Total Aliphatics _A	46	5	-	-	-	-		mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1	<1	-	-	-	-		mg/kg	1	A-T-055s
Aro >C10-C12 _A	1	<1	-	-	-	-		mg/kg	1	A-T-055s
Aro >C12-C16 _A	10	1	-	-	-	-		mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	12	1	-	-	-	-		mg/kg	1	A-T-055s
Aro >C21-C35 _A	34	2	-	-	-	-		mg/kg	1	A-T-055s
Total Aromatics _A	57	5	-	-	-	-		mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	103	9	-	-	-	-		mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	-	-	-	-		mg/kg	0.01	A-T-022s

REPORT NOTES

General

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

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

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

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

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

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

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

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

Soil chemical analysis:

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

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

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

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

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

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

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

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

Asbestos:

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

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

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

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

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

Secondary Matrix Codes:

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

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

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

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

Subscript "" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these

humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

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

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	22/05613
Project:	Newhouse Academy	Date Received:	09/06/2022 (am)
Clients Project No:	079809	Cool Box Temperatures (°C):	13.6

NO DEVIATIONS IDENTIFIED

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

B Status - With Comments

Envirolab Analysis Dates

Lab Sample ID	22/05613/1	22/05613/2	22/05613/4	22/05613/5	22/05613/7	22/05613/8
Client Sample No						
Client Sample ID/Depth	RC02 1.10-1.20m	RC02 3.00-3.30m	RC02 1.20-1.65m	RC02 1.80-2.25m	RC02 4.80-5.25m	RC02 6.30-6.75m
Date Sampled	31/05/22	31/05/22	31/05/22	31/05/22	31/05/22	31/05/22
A-T-019s	14/06/2022	14/06/2022				
A-T-022s	15/06/2022	15/06/2022				
A-T-024s	15/06/2022	15/06/2022		17/06/2022	17/06/2022	17/06/2022
A-T-026s	15/06/2022	15/06/2022		21/06/2022	17/06/2022	17/06/2022
A-T-027s	14/06/2022	14/06/2022				
A-T-028s				17/06/2022	17/06/2022	17/06/2022
A-T-031s	15/06/2022	15/06/2022		17/06/2022	17/06/2022	17/06/2022
A-T-032 OM	15/06/2022	15/06/2022				
A-T-040s	15/06/2022	15/06/2022				
A-T-042sTCN	13/06/2022	13/06/2022				
A-T-044	14/06/2022	14/06/2022		16/06/2022	16/06/2022	16/06/2022
A-T-045	10/06/2022	10/06/2022				
A-T-050s	14/06/2022	14/06/2022				
A-T-055s	15/06/2022	15/06/2022				

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

EBMA Testing

Curtins
Merchant Exchange
17-19 Whitworth Street West
Manchester
M1 5WG

e: EBMA.Testing@curtins.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 22-75574

Project / Site name: Newhouse Academy

Samples received on: 02/08/2022

Your job number: 79809

**Samples instructed on/
Analysis started on:** 03/08/2022

Your order number:

Analysis completed by: 12/08/2022

Report Issue Number: 1

Report issued on: 12/08/2022

Samples Analysed: 3 soil samples

Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-75574
Project / Site name: Newhouse Academy

Lab Sample Number				2374958	2374959	2374960
Sample Reference				RC01	RC03	RC03
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.40	0.50	1.40
Date Sampled				26/07/2022	29/07/2022	01/08/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	100
Moisture Content	%	0.01	NONE	9.1	13	1.2
Total mass of sample received	kg	0.001	NONE	1.3	1.3	1.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	SSZ	SSZ	SSZ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	8.5	10.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	100	230	500
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.05	0.11	0.25
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	49.8	114	252
Organic Matter (automated)	%	0.1	MCERTS	5.8	1.3	1.1

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.33	< 0.05	0.25
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.67	< 0.05	0.41
Pyrene	mg/kg	0.05	MCERTS	0.69	< 0.05	0.35
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.42	< 0.05	0.23
Chrysene	mg/kg	0.05	MCERTS	0.36	< 0.05	0.2
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.31	< 0.05	0.24
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.32	< 0.05	0.19
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.38	< 0.05	0.19
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.24	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.27	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	3.99	< 0.80	2.06
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Analytical Report Number: 22-75574
Project / Site name: Newhouse Academy

Lab Sample Number	2374958	2374959	2374960
Sample Reference	RC01	RC03	RC03
Sample Number	None Supplied	None Supplied	None Supplied
Depth (m)	0.40	0.50	1.40
Date Sampled	26/07/2022	29/07/2022	01/08/2022
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.5	3.4	4.9
Boron (water soluble)	mg/kg	0.2	MCERTS	0.2	< 0.2	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.3
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	19	13
Copper (aqua regia extractable)	mg/kg	1	MCERTS	50	25	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	61	18	23
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	18	9.7
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	80	35	51

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-75574

Project / Site name: Newhouse Academy

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2374958	RC01	None Supplied	0.4	Brown sandy loam with gravel and vegetation.
2374959	RC03	None Supplied	0.5	Brown clay and sand with gravel.
2374960	RC03	None Supplied	1.4	Non Soil

Analytical Report Number : 22-75574

Project / Site name: Newhouse Academy

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Analytical Report Number : 22-75574
Project / Site name: Newhouse Academy

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 22-75574
Project / Site name: Newhouse Academy

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
RC01	None Supplied	S	2374958	c	Total cyanide in soil	L080-PL	c

Appendix E – Geotechnical Analysis Results

- Ian Farmer Associates
 - Final Test Report ref. 2281091/1
 - Final Test Report ref. 2281092/1
- i2 Analytical
 - Test Certificate Ref. 22-76562
 - Test Certificate Ref. 22-76565

F.A.O.

Final Test Report - 2281091 / 1

Site: Newhouse Academy

Job Number: 2281091

Originating Client: Envirolab

Originating Reference: 22/05613

Date Sampled: Not Given

Date Scheduled: 15/06/2022

Date Testing Started: 16/06/2022

Date Testing Finished: 21/06/2022

Previous Reports		Amendments	Date Issued

Amendments:

Authorised By:



Tim Robinson
Quality Supervisor

Report Issue Date: 22/06/2022

Site: Newhouse Academy

Job Number: 2281091

Client: Envirolab

Page: 2

Determination of Moisture Content, Liquid Limit and Plastic Limit and Derivation of Plasticity and Liquidity Index

Borehole / Trial Pit	Depth (m)	Sample	Natural Moisture Content %	Natural - Stones removed by hand Sieved - Washed on 425 µm sieve			Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	Description / Remarks
				Natural / Sieved	Percentage Passing %	Moisture Content %						
RC02	1.20	D	16	Natural	96	16	27	16	11	0.04	CL	Brown slightly gravelly, slightly sandy, silty CLAY
RC02	1.80	D	13	Natural	95	13	28	14	14	-0.04	CL	Brown silty CLAY

Method of Preparation: BS 1377 : Part 1 : 1990 : Clause 7 Preparation of disturbed samples for testing
BS 1377 : Part 1 : 2016 : Clause 8.4.3 Preparation of samples for plasticity tests
BS 1377 : Part 2 : 1990 : Clause 4.2 Preparation of samples for plastic limit tests

Method of Test: BS 1377 : Part 2 : 1990 : Clause 3.2 Determination of moisture content
BS 1377 : Part 2 : 1990 : Clause 4.3 or 4.4 Determination of the liquid limit
BS 1377 : Part 2 : 1990 : Clause 5.3 Determination of the plastic limit and plasticity index



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Results reported relate only to the samples tested.

Final Test Report - 2281091 / 1

Site: Newhouse Academy

Job Number: 2281091

Originating Client: Envirolab

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

This test report shall not be reproduced, except in full and only with the written permission of Ian Farmer Associates Ltd.

Samples will be retained for 28 days from date of issue of the final test report before being disposed of, unless we receive written instruction to the contrary.

Report Issue Date: 22/06/2022

F.A.O.

Final Test Report - 2281092 / 1

Site: Newhouse Academy

Job Number: 2281092

Originating Client: Envirolab

Originating Reference: 22/05757

Date Sampled: Not Given

Date Scheduled: 15/06/2022

Date Testing Started: 21/06/2022

Date Testing Finished: 27/06/2022

Previous Reports	Amendments	Date Issued

Amendments:

Authorised By:



Tim Robinson
Quality Supervisor

Report Issue Date: 27/06/2022



Site: Newhouse Academy

Job Number: 2281092

Client: Envirolab

Page: 2

UNIAXIAL COMPRESSION TEST ON ROCK - SUMMARY OF RESULTS

Hole No.	Depth m	Sample	Rock Type	Specimen Dimensions ²			Bulk Density ² Mg/m ³	Water Content ¹ %	Uniaxial Compression ³				Remarks
				Dia. mm	Length mm	H/D			Condition	Stress Rate MPa/s	Mode of failure	UCS MPa	
RC02	13.44	C	Grey SILTSTONE	100.7	190.6	*1.9	2.59	3.7	as received	0.4938	AC	12.2	
RC02	14.50	C	Grey SILTSTONE	100.8	303.1	3	2.60	3.2	as received	0.4925	MS	22.9	
RC02	16.45	C	Grey SILTSTONE	100.8	104.9	*1	2.57	4.3	as received	0.4927	AC	7.5	

Notes ¹ ISRM p87 test 1, water content at 105 ± 3 °C, specimen as tested for UCS

*Denotes length diameter ratio outside ISRM specification

² ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

Mode of failure :

³ ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

S - Single shear MS - multiple shear

above notes apply unless annotated otherwise in the remarks

AC - Axial cleavage F - Fragmented

Method of Preparation: International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007

Method of Test: International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007

Results reported relate only to the samples tested.

Site: Newhouse Academy

Job Number: 2281092

Client: Envirolab

Page: 3

Point Load Strength Index Tests Summary of Results

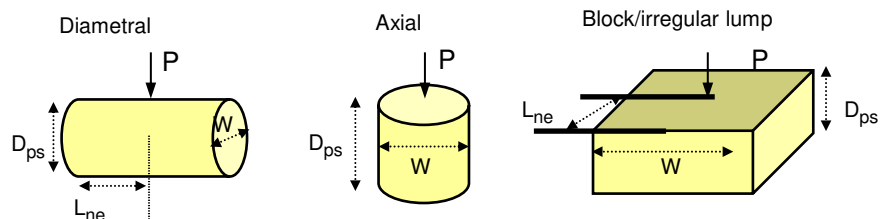
Borehole No.	Depth m	Sample	Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index		Remarks (including water content if measured)
				Type (D, A, I, B)	Direction (PL, PD or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is (50) MPa	
RC02	5.82	C	Grey SILTSTONE As received	A	PD	YES		101.5	48.2	25.2	6.5	78.9	1.05	1.29	
RC02	6.54	C	Grey SILTSTONE As received	A	PD	YES		102.6	19.3	14.3	1.6	50.2	0.65	0.65	
RC02	7.25	C	Grey SILTSTONE As received	A	PD	YES		100.8	57.0	30.0	5.8	85.5	0.79	1.01	
RC02	7.93	C	Grey SILTSTONE As received	A	PD	YES		102.5	32.3	22.3	8.6	64.9	2.04	2.30	
RC02	9.2	C	Grey SILTSTONE As received	A	PD	YES		100.9	19.5	14.5	0.4	50.0	0.17	0.17	
RC02	10.31	C	Grey SILTSTONE As received	A	PD	YES		98.5	41.2	34.2	1.5	71.9	0.29	0.35	
RC02	11	C	Grey SILTSTONE As received	A	PD	YES		100.4	29.7	22.7	1.0	61.6	0.26	0.29	
RC02	12.6	C	Grey SILTSTONE As received	A	PD	YES		106.1	41.8	31.8	1.3	75.1	0.22	0.27	
RC02	12.97	C	Grey SILTSTONE As received	A	PD	YES		101.4	37.9	33.9	1.7	70.0	0.36	0.42	
RC02	14.12	C	Grey SILTSTONE As received	A	PD	YES		101.3	50.6	42.6	1.9	80.8	0.29	0.36	
RC02	15.49	C	Grey SILTSTONE As received	A	PD	YES		103.5	40.8	37.8	1.9	73.3	0.35	0.42	

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block

Direction
PL - Parallel to planes of weakness
PD - Perpendicular to planes of weakness
U - Unknown or random

Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P
Size factor, $F = (De/50)^{0.45}$ for all tests.

Detailed legend for test and dimensions, based on ISRM



Method of Preparation: ISRM 2007 Suggested method for point load strength index (pages 125 - 132)

Method of Test: ISRM 2007 Suggested method for point load strength index (pages 125 - 132)

Results reported relate only to the samples tested.

Final Test Report - 2281092 / 1

Site: Newhouse Academy

Job Number: 2281092

Originating Client: Envirolab

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

This test report shall not be reproduced, except in full and only with the written permission of Ian Farmer Associates Ltd.

Samples will be retained for 28 days from date of issue of the final test report before being disposed of, unless we receive written instruction to the contrary.

Report Issue Date: 27/06/2022

4041

Client: CURTINS
Client Address: 17-19 Whitworth Street West, Manchester,
M1 5WG

Contact: Matthew Holroyd
Site Address: Newhouse Academy

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 79809
Job Number: 22-76562
Date Sampled: 26/07/2022
Date Received: 02/08/2022
Date Tested: 12/08/2022
Sampled By: Not Given

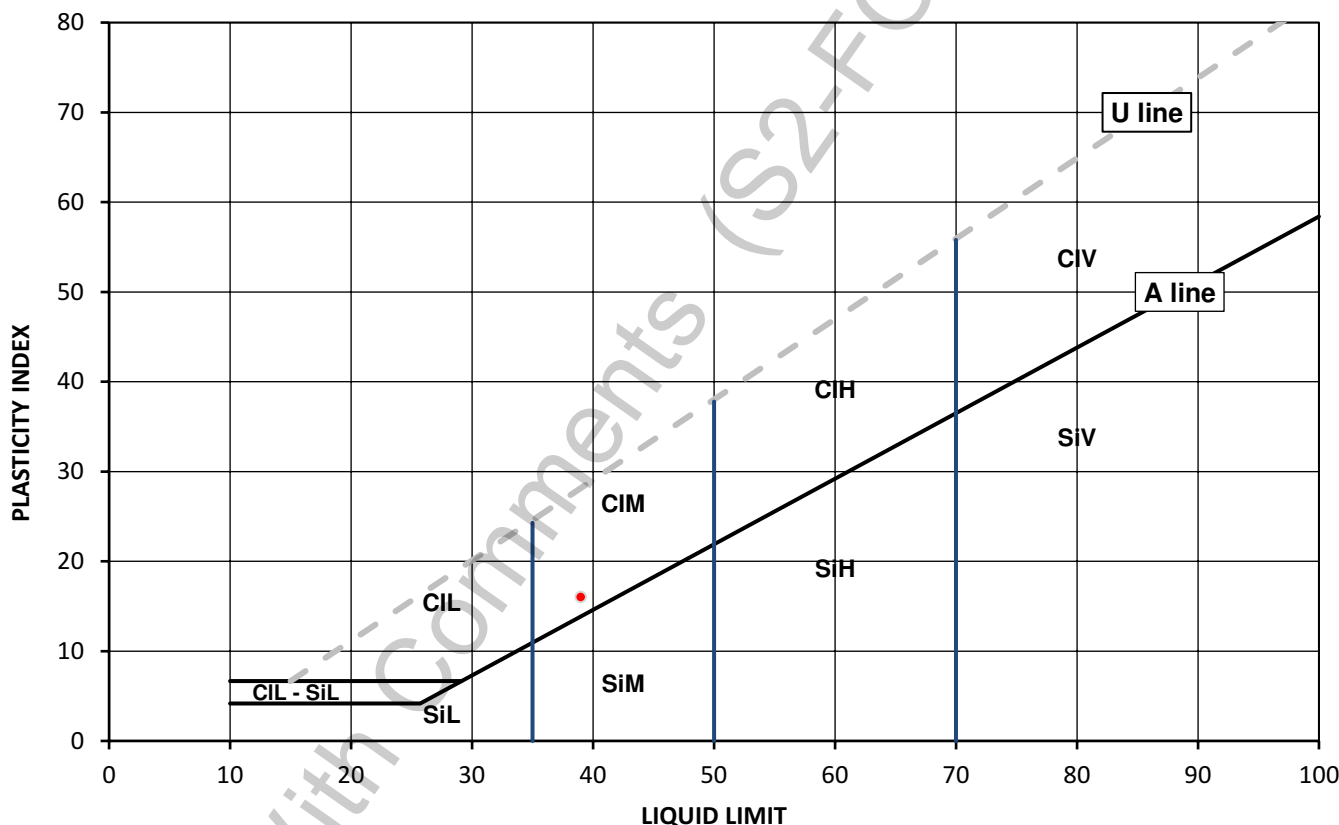
Test Results:

Laboratory Reference: 2380206
Hole No.: RC01
Sample Reference: Not Given
Sample Description: Grey slightly gravelly sandy CLAY

Depth Top [m]: 6.00
Depth Base [m]: 6.00
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
11	39	23	16	67



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	Liquid Limit
Si	Silt	L Low	below 35
		M Medium	35 to 50
		H High	50 to 70
		V Very high	exceeding 70
		O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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4041

Client: CURTINS
Client Address: 17-19 Whitworth Street West, Manchester,
M1 5WG

Contact: Matthew Holroyd
Site Address: Newhouse Academy

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 79809
Job Number: 22-76562
Date Sampled: 28/07/2022
Date Received: 02/08/2022
Date Tested: 12/08/2022
Sampled By: Not Given

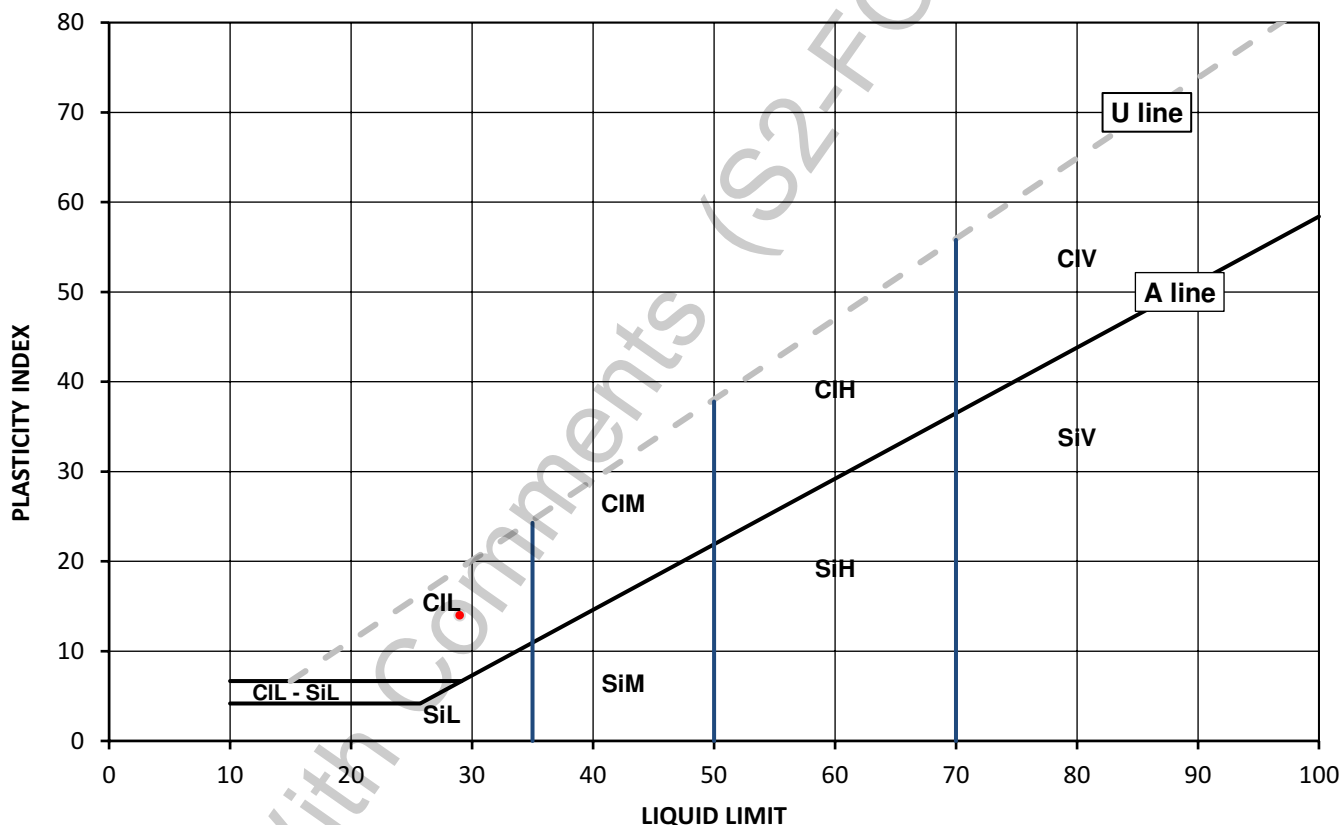
Test Results:

Laboratory Reference: 2380217
Hole No.: RC03
Sample Reference: Not Given
Sample Description: Brownish grey slightly gravelly very sandy CLAY

Depth Top [m]: 3.50
Depth Base [m]: 3.50
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	29	15	14	88



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	Liquid Limit
Si	Silt	L	Low
		M	Medium
		H	High
		V	Very high
		O	Organic
			below 35
			35 to 50
			50 to 70
			exceeding 70
			append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



4041

Client: CURTINS
Client Address: 17-19 Whitworth Street West, Manchester,
M1 5WG

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990:
Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2:
1990: Clause 8.2

Client Reference: 79809
Job Number: 22-76562
Date Sampled: 26/07 - 28/07/2022
Date Received: 02/08/2022
Date Tested: 12/08/2022
Sampled By: Not Given

Contact: Matthew Holroyd
Site Address: Newhouse Academy

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W] %	Water Content BS EN ISO 17892-2 [W] %	Atterberg				Density			Total Porosity# %		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
2380206	RC01	Not Given	6.00	6.00	D	Grey slightly gravelly sandy CLAY	Atterberg 4 Point	11		67	39	23	16						
2380217	RC03	Not Given	3.50	3.50	D	Brownish grey slightly gravelly very sandy CLAY	Atterberg 4 Point	23		88	29	15	14						

Note: # Non accredited; NP - Non plastic

Comments:

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Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd



4041

Client:

CURTINS

Client Address:

17-19 Whitworth Street West, Manchester,
M1 5WG

Contact:

Matthew Holroyd

Site Address:

Newhouse Academy

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client Reference: 79809

Job Number: 22-76562

Date Sampled: 26/07 - 28/07/2022

Date Received: 02/08/2022

Date Tested: 12/08/2022

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type							
2380206	RC01	Not Given	6.00	6.00	D	Grey slightly gravelly sandy CLAY		11	Sample was quartered, oven dried at 106.3 °C			
2380217	RC03	Not Given	3.50	3.50	D	Brownish grey slightly gravelly very sandy CLAY		23	Sample was quartered, oven dried at 106.3 °C			

Comments:

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Signed:

*Monika Siewior*Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Client: CURTINS
Client Address: 17-19 Whitworth Street West, Manchester,
M1 5WG

Contact: Matthew Holroyd
Site Address: Newhouse Academy

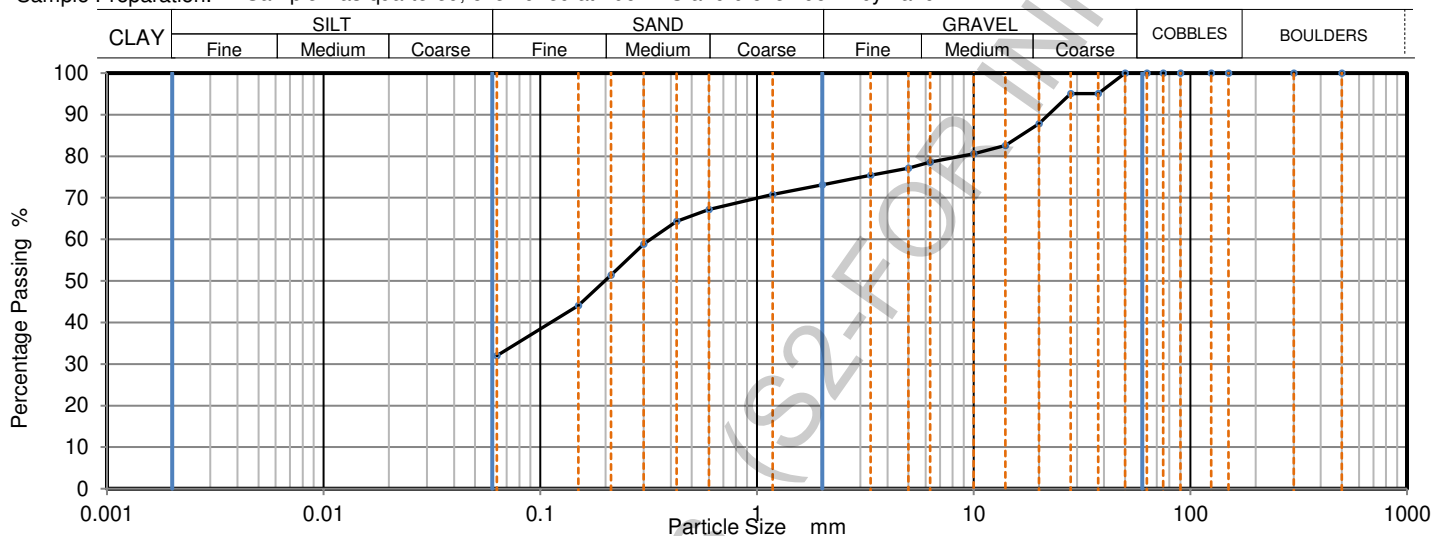
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 79809
Job Number: 22-76562
Date Sampled: 26/07/2022
Date Received: 02/08/2022
Date Tested: 17/08/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2380204
Hole No.: RC01
Sample Reference: Not Given
Sample Description: Dark brown very gravelly very clayey SAND
Sample Preparation: Sample was quartered, oven dried at 106.2 °C and broken down by hand.

Depth Top [m]: 0.90
Depth Base [m]: 1.20
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	95		
20	88		
14	83		
10	81		
6.3	79		
5	77		
3.35	75		
2	73		
1.18	71		
0.6	67		
0.425	64		
0.3	59		
0.212	51		
0.15	44		
0.063	33		

Sample Proportions	% dry mass
Very coarse	0
Gravel	27
Sand	40
Fines <0.063mm	33

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 5.1
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:



Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Client: CURTINS
Client Address: 17-19 Whitworth Street West, Manchester,
M1 5WG

Contact: Matthew Holroyd
Site Address: Newhouse Academy

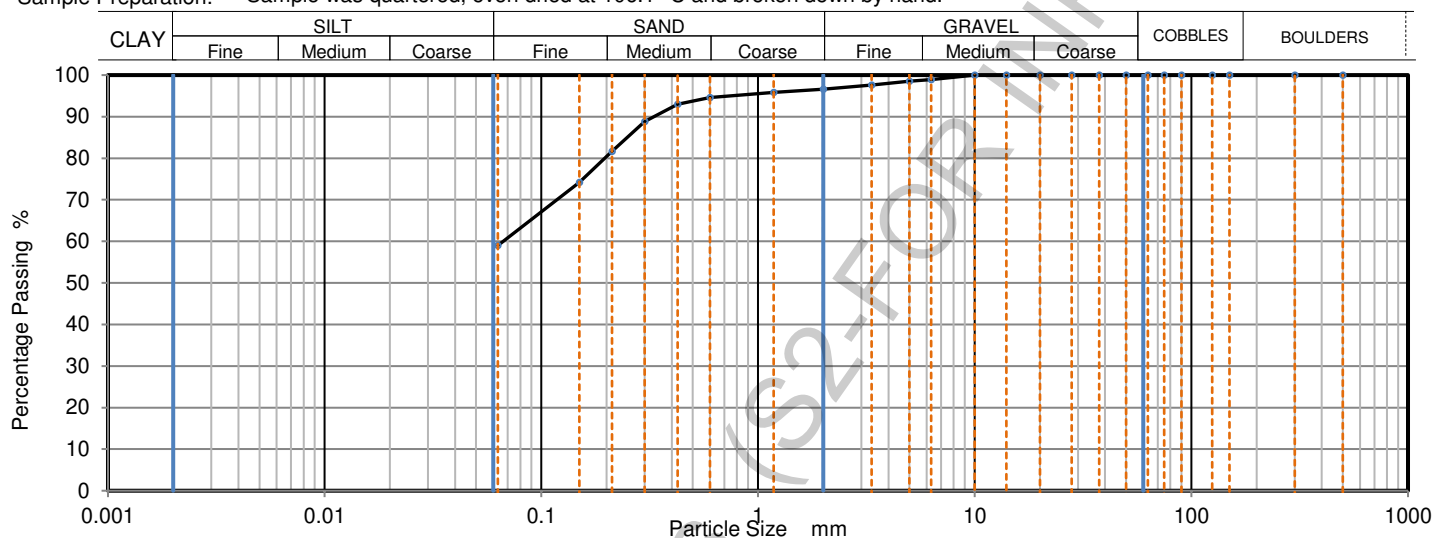
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 79809
Job Number: 22-76562
Date Sampled: 26/07/2022
Date Received: 02/08/2022
Date Tested: 12/08/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2380205
Hole No.: RC01
Sample Reference: Not Given
Sample Description: Brownish grey slightly gravelly very sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 106.1 °C and broken down by hand.

Depth Top [m]: 3.00
Depth Base [m]: 3.00
Sample Type: D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	98		
2	97		
1.18	96		
0.6	95		
0.425	93		
0.3	89		
0.212	82		
0.15	74		
0.063	59		

Sample Proportions	% dry mass
Very coarse	0
Gravel	3
Sand	38
Fines <0.063mm	59

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 1.1
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



4041

Client: CURTINS

Client Address: 17-19 Whitworth Street West, Manchester,
M1 5WG

Contact: Matthew Holroyd

Site Address: Newhouse Academy

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 79809

Job Number: 22-76562

Date Sampled: 26/07 - 29/07/2022

Date Received: 02/08/2022

Date Tested: 17/08/2022

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa
2380207	RC01	Not Given	9.41	9.50	C	Grey SILTSTONE	WC = 2.6%	1	A	U	YES	-	99.6	68.0	60.0	5.9	87.2	0.78	1.00
2380208	RC01	Not Given	10.38	10.50	C	Grey SILTSTONE	WC = 3.2%	1	D	L	YES	62.1	100.1	99.0	96.0	0.8	98.0	0.08	0.11
2380209	RC01	Not Given	12.70	13.00	C	Grey SANDSTONE	WC = 3.1%	1	D	U	YES	99.8	98.6	99.0	90.0	13.5	94.2	1.52	2.02
2380210	RC01	Not Given	13.88	14.00	C	Grey SILTSTONE	WC = 3.0%	1	A	U	YES	-	99.7	50.0	46.0	3.0	76.4	0.51	0.62
2380211	RC01	Not Given	14.82	15.03	C	Grey SILTSTONE	WC = 3.4%	1	A	U	YES	-	100.2	54.0	49.0	2.8	79.1	0.44	0.54
2380212	RC01	Not Given	15.81	15.90	C	Grey SILTSTONE	WC = 3.8%	1	A	U	YES	-	100.2	68.0	63.0	10.5	89.7	1.31	1.70
2380214	RC01	Not Given	17.24	17.64	C	Grey SILTSTONE	WC = 3.6%	1	A	U	YES	-	99.9	54.0	43.0	16.8	74.0	3.06	3.65
2380215	RC01	Not Given	17.79	17.92	C	Grey SILTSTONE	WC = 3.7%	1	A	U	YES	-	100.1	37.0	32.0	13.8	63.9	3.38	3.78
2380216	RC01	Not Given	18.94	19.08	C	Grey SILTSTONE	WC = 3.5%	1	D	U	YES	71.3	100.1	100.0	95.0	15.3	97.5	1.60	2.17
2380218	RC03	Not Given	7.34	7.44	C	Grey SILTSTONE	WC = 3.3%	1	D	U	YES	63.5	102.5	103.0	97.0	16.7	99.7	1.67	2.28

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen separation), Dps' - all failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Comments:

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Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd



SUMMARY REPORT

DETERMINATION OF POINT LOAD STRENGTH

Tested in Accordance with: ISRM: 2007, pages 125-132

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



4041

Client: CURTINS

Client Address: 17-19 Whitworth Street West, Manchester,
M1 5WG

Contact: Matthew Holroyd

Site Address: Newhouse Academy

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 79809

Job Number: 22-76562

Date Sampled: 29/07 - 02/08/2022

Date Received: 02/08/2022

Date Tested: 17/08 - 19/08/2022

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks # (including water content if measured)	Specimen Reference	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P kN	Equivalent diameter, De mm	Point Load Strength Index	
		Reference	Depth Top m	Depth Base m	Type				Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is MPa	Is(50) MPa
2380219	RC03	Not Given	10.59	10.74	C	Grey SILTSTONE	WC = 3.6%	1	D	U	YES	77.8	101.8	102.0	96.0	7.5	98.9	0.77	1.05
2380220	RC03	Not Given	11.77	11.99	C	Grey SILTSTONE	WC = 2.8%	1	A	U	YES	-	99.8	102.0	97.0	8.3	111.0	0.67	0.96
2380222	RC03	Not Given	12.77	12.94	C	Grey SILTSTONE	WC = 2.9%	1	D	U	YES	135.1	99.7	99.0	95.0	1.9	97.3	0.20	0.26
2380223	RC03	Not Given	13.70	13.91	C	Grey SILTSTONE	WC = 2.4%	1	D	U	YES	110.7	99.9	100.0	95.0	8.1	97.4	0.85	1.15
2380224	RC03	Not Given	15.12	15.22	C	Grey SILTSTONE	WC = 3.6%	1	A	U	YES	-	100.6	66.0	64.0	0.4	90.5	0.04	0.06
2380225	RC03	Not Given	15.58	15.76	C	Grey SILTSTONE	WC = 3.4%	1	A	L	YES	-	99.9	80.0	68.0	4.5	93.0	0.52	0.69
2380226	RC03	Not Given	17.55	17.73	C	Grey SILTSTONE	WC = 3.4%	1	D	U	YES	91.6	99.6	100.0	94.0	4.5	96.8	0.48	0.64
2380227	RC03	Not Given	18.44	18.61	C	Grey SILTSTONE	WC = 3.2%	1	D	U	YES	60.5	99.6	98.0	94.0	3.6	96.8	0.38	0.52

Note: # non accredited; Test Type: D - Diametral, A - Axial, I - Irregular Lump, B - Block; Direction: L - parallel to planes of weakness, P - perpendicular to planes of weakness, U - unknown or random;
Dimensions: Dps - Distance between platens (platen separation), Dps' - all failure (see ISRM note 6), Lne - Length from platens to nearest free end W - Width of shortest dimension perpendicular to load, P;
Detailed legend for test and dimensions, based on ISRM, is shown above; Size factor, F = (De/50)0.45 for all tests

Comments:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Matthew Holroyd
Curtins
17-19 Whitworth Street West
Manchester
M1 5WG

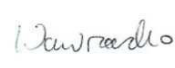
e: matthew.holroyd@curtins.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 22-76565

Project / Site name:	Newhouse Academy	Samples received on:	02/08/2022
Your job number:	79809	Samples instructed on/ Analysis started on:	09/08/2022
Your order number:	EBMA3487	Analysis completed by:	22/08/2022
Report Issue Number:	1	Report issued on:	22/08/2022
Samples Analysed:	9 soil samples		


Signed:

Joanna Wawrzeczko
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-76565
Project / Site name: Newhouse Academy
Your Order No: EBMA3487

Lab Sample Number				2380240	2380241	2380242	2380243	2380244
Sample Reference				RC01	RC01	RC01	RC01	RC01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00-1.00	6.00-6.00	10.38-10.50	13.88-14.00	17.79-17.92
Date Sampled				26/07/2022	26/07/2022	26/07/2022	27/07/2022	28/07/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	12	1.2	1.5	1.9
Total mass of sample received	kg	0.001	NONE	1.2	0.5	0.8	0.8	0.8

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.6	8	8	8.1	8.2
Total Sulphate as SO ₄	%	0.005	MCERTS	0.006	0.024	< 0.005	< 0.005	< 0.005
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0067	0.076	0.01	0.012	0.014
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	6.7	76.2	10	12.3	13.5
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	0.8	7.9	2.6	3.1	2.1
Total Sulphur	%	0.005	MCERTS	0.011	0.077	0.019	0.023	0.01
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	5.5	14	< 5.0	< 5.0	< 5.0
Magnesium (leachate equivalent)	mg/l	2.5	NONE	2.7	7.1	< 2.5	< 2.5	< 2.5

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-76565
Project / Site name: Newhouse Academy
Your Order No: EBMA3487

Lab Sample Number				2380245	2380246	2380247	2380248
Sample Reference				RC03	RC03	RC03	RC03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				7.34-7.44	11.77-11.99	15.12-15.22	18.44-18.61
Date Sampled				29/07/2022	29/07/2022	01/08/2022	02/08/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	1.6	1.2	1.2	1.3
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.8	0.8

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	9.2	8.2	9
Total Sulphate as SO ₄	%	0.005	MCERTS	< 0.005	< 0.005	< 0.005	< 0.005
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0066	0.012	0.013	0.013
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	6.6	11.9	12.8	12.9
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	4	3.3	2.8	2.6
Total Sulphur	%	0.005	MCERTS	0.009	0.019	0.022	0.023
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	5.8	< 5.0	< 5.0	< 5.0
Magnesium (leachate equivalent)	mg/l	2.5	NONE	2.9	< 2.5	< 2.5	< 2.5

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-76565

Project / Site name: Newhouse Academy

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2380240	RC01	None Supplied	1.00-1.00	Brown clay and sand.
2380241	RC01	None Supplied	6.00-6.00	Brown clay and sand.
2380242	RC01	None Supplied	10.38-10.50	Light grey clay.
2380243	RC01	None Supplied	13.88-14.00	Light grey clay.
2380244	RC01	None Supplied	17.79-17.92	Light grey clay.
2380245	RC03	None Supplied	7.34-7.44	Light grey clay.
2380246	RC03	None Supplied	11.77-11.99	Light grey clay.
2380247	RC03	None Supplied	15.12-15.22	Grey clay.
2380248	RC03	None Supplied	18.44-18.61	Grey clay.

Analytical Report Number : 22-76565
Project / Site name: Newhouse Academy

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Appendix F – Ground Gas and Groundwater Monitoring Results

- Curtins Gas Monitoring Results Visits 1 – 6

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

**GAS MONITORING LOG SHEET**

Project: Newhouse Academy **Date:** 16/06/2022
Job Number: B079809 **Visit:** 1
Client: Morgan Sindall **Weather:** Cloudy
Barometric State: Steady **Ground Conditions:** Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
RC02s	1009	-0.5	-0.4	0.0	0.0	0.6	0.6	20.3	0	0	2.11	2.14	1
RC02d	1009	0.0	0.0	0.0	0.0	1.7	1.3	18.3	0	2	2.62	15.46	2

Notes

- 1 Steady state gas flow achieved after 4 mins
2 Steady state gas flow achieved instantly

Logged by

RT

*1% gas volume = 10,000 ppm**Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.**All other gases recorded at 'steady state' unless otherwise stated*

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

**GAS MONITORING LOG SHEET**

Project: Newhouse Academy **Date:** 28/06/2022
Job Number: B079809 **Visit:** 2
Client: Morgan Sindall **Weather:** Cloudy
Barometric State: Falling **Ground Conditions:** Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
RC02s	1011	-40.8	0.0	0.0	0.0	0.7	0.7	19.9	0	3	Dry	2.14	1
RC02d	1011	-4.4	0.0	0.0	0.0	0.6	0.5	20.2	0	1	2.95	15.46	2

Notes

- 1 Steady state gas flow reached after 3 mins
2 Steady state gas flow reached after 30 seconds

Logged by

TW

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

**GAS MONITORING LOG SHEET**

Project: Newhouse Academy **Date:** 18/07/2022
Job Number: B079809 **Visit:** 3
Client: Morgan Sindall **Weather:** Sunny, Hot
Barometric State: Steady **Ground Conditions:** Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
RC02s	1019	0.0	0.0	0.0	0.0	0.4	0.4	20.4	0	1	Dry	2.14	
RC02d	1019	0.0	0.0	0.0	0.0	0.5	0.4	20.6	0	3	2.70	15.46	

Notes**Logged by**

TW

*1% gas volume = 10,000 ppm**Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.**All other gases recorded at 'steady state' unless otherwise stated*

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

**GAS MONITORING LOG SHEET**

Project: Newhouse Academy **Date:** 15/08/2022
Job Number: B079809 **Visit:** 4
Client: Morgan Sindall **Weather:** Sunny
Barometric State: Steady **Ground Conditions:** Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
RC02s	985	0.0	0.0	0.0	0.0	0.6	0.6	20.3	0	0	Dry	1.96	
RC02d	985	0.0	0.0	0.0	0.0	0.9	0.9	19.4	0	0	2.85	15.25	
RC01s	985	0.0	0.0	0.0	0.0	2.7	2.7	16.4	0	0	1.74	3.96	
RC01d	985	0.0	0.0	0.0	0.0	0.1	0.1	21.4	0	0	3.43	13.00	
RC03s	985	0.0	0.0	0.0	0.0	0.6	0.6	19.3	0	0	3.15	3.88	
RC03d	985	0.0	0.0	0.0	0.0	1.2	1.2	13.6	0	0	3.17	10.15	

Notes**Logged by**

JP

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

**GAS MONITORING LOG SHEET**

Project: Newhouse Academy **Date:** 08/09/2022
Job Number: B079809 **Visit:** 5
Client: Morgan Sindall **Weather:** Cloudy
Barometric State: Steady **Ground Conditions:** Damp

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
RC02s	1004	0.0	0.0	0.0	0.0	0.7	0.7	19.90	0	0	Dry	2.07	1
RC02d	1004	6.0	0.0	0.0	0.0	0.8	0.8	19.6	0	0	3.20	15.31	
RC01s	1004	0.0	0.0	0.0	0.0	3.8	3.8	13.6	0	0	2.44	4.05	
RC01d	1004	0.0	0.0	0.0	0.0	0.3	0.3	19.9	0	0	3.36	12.80	
RC03s	1004	2.6	0.0	0.0	0.0	0.9	0.9	17.5	0	0	Dry	2.95	1
RC03d	1004	-	-	-	-	-	-	-	-	-	3.34	10.10	2

Notes**Logged by**

- 1 Steady state gas flow rate reached after 15 seconds.
2 Gas bung loose - no gas data recorded.

TW

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

**GAS MONITORING LOG SHEET**

Project: Newhouse Academy **Date:** 21/09/2022
Job Number: B079809 **Visit:** 6
Client: Morgan Sindall **Weather:** Sunny
Barometric State: Steady **Ground Conditions:** Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
RC02s	1007	-0.7	-0.4	0.0	0.0	0.5	0.5	20.2	0	0	Dry	2.07	
RC02d	1007	0.0	0.0	0.0	0.0	1.4	1.4	18.3	0	0	3.10	15.14	
RC01s	1007	0.0	0.0	0.0	0.0	4.5	4.5	11.2	0	0	2.45	4.00	
RC01d	1007	0.0	0.0	0.0	0.0	0.3	0.3	20.2	0	0	3.33	12.69	
RC03s	1007	0.0	0.0	0.0	0.0	1.8	1.8	13.3	0	0	Dry	2.91	
RC03d	1007	0.0	0.0	0.0	0.0	0.0	0.0	20.5	0	0	3.30	9.98	

Notes**Logged by**

JP

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Appendix G – GAC Screening Thresholds

- Curtins GAC Thresholds

Adopted Soil Generic Assessment Criteria
Sandy loam with 6% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 21	6 21	1.8 170	33 49	7.7 21	220 250
Lead	200	310	80	2,300	630	1,300
Mercury (elemental)	1	1	26	26	16	26⁽⁸⁾ [30]
Mercury (inorganic)	170	240	80	3600	120	240
Nickel	130⁽¹⁰⁾	180⁽¹⁰⁾	53⁽¹¹⁾	980⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 79	170 170
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
EC ₅ - EC ₆	160	160	3900	12000	600000	180000
EC ₆ - EC ₈	530	530	13000	40000	620000	320000
EC ₈ - EC ₁₀	150	150	1700	11000	13000	21000
EC ₁₀ - EC ₁₂	760	770	7300	47000	13000	24000
EC ₁₂ - EC ₁₆	4300	4400	13000	90000	13000	26000
EC ₁₆ - EC ₃₅	110000	110000	270000	1800000	250000	490000
EC _{>35} - EC ₄₄	110000	110000	270000	1800000	250000	490000
Aromatic risk banded hydrocarbons - TPHCWG method						
EC _{>5} - EC ₇	300	1400	57	86000	56000	92000
EC _{>7} - EC ₈	660	3900	120	180000	56000	100000
EC ₈ - EC ₁₀	190	270	51	17000	5000	9300
EC ₁₀ - EC ₁₂	380	1200	74	34000	5000	10000
EC ₁₂ - EC ₁₆	660	2500	130	38000	5000	10000
EC _{>16} - EC ₂₁	930	1900	260	28000	3800	7800
EC _{>21} - EC ₃₅	1700	1900	1600	28000	3800	7900
EC _{>35} - EC ₄₄	1700	1900	1600	28000	3800	7900
Aliph + Arom EC >44-70	1900	1900	3000	28000	3800	7900
Aromatic						
Benzene	0.33 0.87	1.0 3.3	0.07 0.18	95 98	73 140	110 230
Ethyl benzene	350	840	90	2800⁽⁸⁾ [66000]	2800⁽⁸⁾ [25000]	2800⁽⁸⁾ [27000]
Toluene	610	2700	120	4400⁽⁸⁾ [190000]	4400⁽⁸⁾ [56000]	4400⁽⁸⁾ [100000]
Xylene ⁽⁹⁾	230	290	160	2600⁽⁸⁾ [32000]	2600⁽⁸⁾ [43000]	2600⁽⁸⁾ [31000]
Phenol	420	520	280	3200⁽¹⁴⁾ (38000)	3200⁽¹⁴⁾ (10000)	3200⁽¹⁴⁾ (9300)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	13	13	24	1100	4900	3000
Acenaphthylene	920	6000	160	100000	15000	30000
Acenaphthene	1100	6000	200	100000	15000	30000
Fluorene	860	4500	160	71000	9900	20000
Phenanthrene	440	1500	90	23000	3100	6300
Anthracene	11000	37000	2200	540000	74000	150000
Fluoranthene	890	1600	290	23000	3100	6400
Pyrene	2000	3800	620	54000	7400	15000
Benz(a)anthracene	13	15	13	180	29	62
Chrysene	27	32	19	350	57	120
Benzo(b)fluoranthene	3.7	4.0	3.9	45	7.2	16.0
Benzo(k)fluoranthene	100	110	130	1200	190	440
Benzo(a)pyrene	3.0 5.0	3.2 5.3	3.5 5.7	36 77	5.7 10	13 21
Indeno(123cd)pyrene	41	46	39	510	82	180
Dibenzo(ah)anthracene	0.3	0.32	0.43	3.6	0.58	1.4
Benzo(ghi)perylene	350	360	640	4000	640	1600
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.0014	0.0015	0.0018	0.12	3.5	5.4
Trichloroethene (TCE)	0.075	0.08	0.21	5.7	120	120
1,1,1,2 Tetrachlorethane	6.4	8.2	4.4	560	1400	2100
Tetrachlorethane (PCE)	0.90	0.92	3.6	95	1400	1500
1,1,1 Trichlorethane	39	40	240	3000	140000	100000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs
- Soil organic matter (SOM) is assumed to be 6% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA / [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 2.5% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10 ⁽¹³⁾ <u>22</u>	85 ⁽¹³⁾ <u>150</u>	1.8 <u>3.9</u>	230 <u>410</u>	120 <u>220</u>	560 <u>880</u>
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 <u>21</u>	6 <u>21</u>	1.8 <u>170</u>	33 <u>49</u>	7.7 <u>21</u>	220 <u>250</u>
Lead	200	310	80	2,300	630	1,300
Mercury (elemental)	1	1	26	26	16	26 ⁽⁸⁾ [30]
Mercury (inorganic)	170	240	80	3600	120	240
Nickel	130 ⁽¹⁰⁾	180 ⁽¹⁰⁾	53 ⁽¹¹⁾	980 ⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32 ⁽¹²⁾ <u>37</u>	35 ⁽¹²⁾ <u>40</u>	43 ⁽¹²⁾ <u>49</u>	640 ⁽¹²⁾ <u>640</u>	79 <u>79</u>	170 <u>170</u>
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
EC ₅ - EC ₆	78	78	1700	5900	590000	130000
EC ₅₋₆ - EC ₈	230	230	5600	17000	610000	220000
EC ₈ - EC ₁₀	65	65	770	4800	13000	18000
EC ₁₀ - EC ₁₂	330	330	4400	23000	13000	23000
EC ₁₂ - EC ₁₆	2400	2400	13000	82000	13000	25000
EC ₅₋₁₆ - EC ₃₅	92000	92000	270000	1700000	250000	480000
EC ₃₅ - EC ₄₄	92000	92000	270000	1700000	250000	480000
Aromatic risk banded hydrocarbons - TPHCWG method						
EC ₅ - EC ₇	140	690	27	46000	56000	84000
EC ₇ - EC ₈	290	1800	51	110000	56000	95000
EC ₈ - EC ₁₀	83	110	21	8100	5000	8500
EC ₁₀ - EC ₁₂	180	590	31	28000	5000	9700
EC ₁₂ - EC ₁₆	330	2300	57	37000	5100	10000
EC ₁₆ - EC ₂₁	540	1900	110	28000	3800	7700
EC ₂₁ - EC ₃₅	1500	1900	820	28000	3800	7800
EC ₃₅ - EC ₄₄	1500	1900	820	28000	3800	7800
Aliph + Arom EC >44-70	1800	1900	2100	28000	3800	7800
Aromatic						
Benzene	0.16	0.49	0.035	50	72	100
Ethyl benzene	150	380	39	1200 ⁽⁸⁾ [35000]	1200 ⁽⁸⁾ [24000]	1200 ⁽⁸⁾ [22000]
Toluene	270	1300	51	1900 ⁽⁸⁾ [110000]	1900 ⁽⁸⁾ [56000]	1900 ⁽⁸⁾ [95000]
Xylene ⁽⁹⁾	98	120	70	1200 ⁽⁸⁾ [14000]	1200 ⁽⁸⁾ [42000]	1200 ⁽⁸⁾ [23000]
Phenol	290	420	140	1500 ⁽¹⁴⁾ (35000)	1500 ⁽¹⁴⁾ (10000)	1500 ⁽¹⁴⁾ (8300)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	5.6	5.6	10	460	4900	1900
Acenaphthylene	420	4600	69	97000	15000	30000
Acenaphthene	510	4700	85	97000	15000	30000
Fluorene	400	3800	67	68000	9900	20000
Phenanthrene	220	1500	38	22000	3100	6200
Anthracene	5400	35000	950	540000	74000	150000
Fluoranthene	560	1600	130	23000	3100	6300
Pyrene	1200	3800	270	54000	7400	15000
Benz(a)anthracene	11	14	6.5	170	29	56
Chrysene	22	31	9.4	350	57	110
Benzo(b)fluoranthene	3.3	4.0	2.1	44	7.2	15
Benzo(k)fluoranthene	93	110	75	1200	190	410
Benzo(a)pyrene	2.7	3.2	2	35	5.7	12
Indeno(123cd)pyrene	36	46	21	510	82	170
Dibenzo(ah)anthracene	0.28	0.32	0.27	3.6	0.57	1.3
Benzo(ghi)perylene	340	360	470	4000	640	1500
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.00087	0.001	0.001	0.077	3.5	5
Trichloroethene (TCE)	0.034	0.036	0.091	2.6	120	91
1,1,1,2 Tetrachlorethane	2.8	3.5	1.9	250	1400	1800
Tetrachlorethane (PCE)	0.39	0.4	1.5	42	1400	1100
1,1,1 Trichlorethane	18	18	110	1300	140000	76000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in *italics* are S4ULs, numbers in **bold-italics** are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs
- Soil organic matter (SOM) is assumed to be 2.5% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA / [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 1% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 21	6 21	1.8 170	33 49	7.7 21	220 250
Lead	200	310	80	2,300	630	1,300
Mercury (elemental)	1	1	26	26	16	26⁽⁸⁾ [30]
Mercury (inorganic)	170	240	80	3600	120	240
Nickel	130⁽¹⁰⁾	180⁽¹⁰⁾	53⁽¹¹⁾	980⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 79	170 170
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
EC ₅₋₆ - EC ₆	42	42	730	3200	570000	95000
EC ₆₋₈ - EC ₈	100	100	2300	7800	600000	150000
EC ₈₋₁₀ - EC ₁₀	27	27	320	2000	13000	14000
EC ₁₀₋₁₂ - EC ₁₂	130	130	2200	9700	13000	21000
EC ₁₂₋₁₆ - EC ₁₆	1100	1100	11000	59000	13000	25000
EC ₁₆₋₃₅ - EC ₃₅	65000	65000	260000	1600000	250000	450000
EC ₃₅₋₄₄ - EC ₄₄	65000	65000	260000	1600000	250000	450000
Aromatic risk banded hydrocarbons - TPHCWG method						
EC ₅₋₇ - EC ₇	70	370	13	26000	56000	76000
EC ₇₋₈ - EC ₈	130	860	22	56000	56000	87000
EC ₈₋₁₀ - EC ₁₀	34	47	8.6	3500	5000	7200
EC ₁₀₋₁₂ - EC ₁₂	74	250	13	16000	5000	9200
EC ₁₂₋₁₆ - EC ₁₆	140	1800	23	36000	5100	10000
EC ₁₆₋₂₁ - EC ₂₁	260	1900	46	28000	3800	7600
EC ₂₁₋₃₅ - EC ₃₅	1100	1900	370	28000	3800	7800
EC ₃₅₋₄₄ - EC ₄₄	1100	1900	370	28000	3800	7800
Aliph + Arom EC >44-70	1600	1900	1200	28000	3800	7800
Aromatic						
Benzene	0.08	0.3	0.017	28	72	90
Ethyl benzene	65	170	16	520⁽⁸⁾ [17000]	520⁽⁸⁾ [24000]	520⁽⁸⁾ [17000]
Toluene	120	610	22	860⁽⁸⁾ [59000]	860⁽⁸⁾ [56000]	860⁽⁸⁾ [87000]
Xylene ⁽⁹⁾	41	53	28	480⁽⁸⁾ [69000]	480⁽⁸⁾ [41000]	480⁽⁸⁾ [17000]
Phenol	180	310	66	760⁽¹⁴⁾ (31000)	760⁽¹⁴⁾ (10000)	760⁽¹⁴⁾ (7600)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	2.3	2.3	4.1	190	4900	1200
Acenaphthylene	170	2900	28	83000	15000	29000
Acenaphthene	210	3000	34	84000	15000	29000
Fluorene	170	2800	27	63000	9900	20000
Phenanthrene	95	1300	15	22000	3100	6200
Anthracene	2400	31000	380	520000	74000	150000
Fluoranthene	280	1500	52	23000	3100	6300
Pyrene	620	3700	110	54000	7400	15000
Benz(a)anthracene	7.2	11	2.9	170	29	49
Chrysene	15	30	4.1	350	57	93
Benzo(b)fluoranthene	2.6	3.9	0.99	44	7.1	13
Benzo(k)fluoranthene	77	110	37	1200	190	370
Benzo(a)pyrene	2.2	3.2	0.97	35	5.7	11
Indeno(123cd)pyrene	27	45	9.5	500	82	150
Dibenzo(ah)anthracene	0.24	0.31	0.14	3.5	0.57	1.1
Benzo(ghi)perylene	320	360	290	3900	640	1400
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.00064	0.00077	0.00055	0.059	3.5	4.8
Trichloroethene (TCE)	0.016	0.017	0.041	1.2	120	70
1,1,1,2 Tetrachlorethane	1.2	1.5	0.79	110	1400	1500
Tetrachlorethane (PCE)	0.18	0.18	0.65	19	1400	810
1,1,1 Trichlorethane	8.8	9	48	660	140000	57000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs
- Soil organic matter (SOM) is assumed to be 1% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
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- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Appendix H – Risk Assessment Methodology

The site-specific risk assessment, presented in this report, follows the principle of establishing whether there is a viable linkage between a contaminant source to a potential receptor, via an exposure pathway.

The risk assessment corresponds with the total site area and incorporates both descriptive (qualitative) and, where available, numerical (quantitative) lines of evidence.

Risk assessment is the process of collating known information on a hazard or set of hazards to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore, the presence of contaminant source on a site does not necessarily mean there is a risk.

The risk assessment considers the likelihood of an event taking place (accounting for the presence of the source and receptor and the viability of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment, the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

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

Phase 2 Ground Investigation Report

In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to an ecosystem or organisation forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in an ecosystem or organism forming part of such ecosystem.	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary A aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater (inc. Secondary B aquifers). Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

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In accordance with DoE guidance, the following categorisation of **probability** has been developed.

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

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

Classification	Definition
Very High Risk	There is a <i>high probability</i> that <i>severe harm</i> could arise to a designated receptor from an identified hazard at the site without appropriate further action.
High Risk	<i>Harm is likely to arise</i> to a designated receptor from an identified hazard at the site without appropriate further action.
Moderate Risk	<i>It is possible</i> that without appropriate further action <i>harm could arise</i> to a designated receptor. It is relatively <i>unlikely</i> that any such harm would be <i>severe</i> , and if any harm were to occur it is <i>more likely</i> that such harm would be <i>relatively mild</i> .
Low Risk	<i>It is possible</i> that <i>harm could arise</i> to a designated receptor from an identified hazard. It is <i>likely</i> that, at <i>worst</i> , if any harm was realised any effects would be <i>mild</i> .
Very Low Risk	The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

The term 'risk' in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation.

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