



Phase 2 Site Investigation Report Proposed Laystall Street Development, Manchester

Prepared for Great Places Housing Group

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Executive Summary

Client	Great Places Housing Group
Location	Laystall Street, Manchester M1 2JZ
Description	The site was previously occupied by a large brick building, which has recently been demolished. On the western side of the site is a hard surfaced car park.
Development	It is proposed to develop the site as a nine-storey residential development with a basement level containing plant, management facilities and a cycle storage facility.
Site History	Historical Ordnance Survey mapping from 1851 indicated that the site was occupied by terraced residential housing and a Public House in the northwest. By 1908, the majority of the residential housing had been demolished and an L-shaped industrial building was present in the east. By 1965, a clothing factory was also present in the east of the site. The terraced housing in the west had been demolished by 1988. By 1993, the site appeared to be in its most recent configuration, prior to recent demolition.
Geology	British Geological Survey mapping indicates the site to be underlain by Devensian Till overlying the Chester Formation.
Mining & Ground Stability	The site is not located within a Coal Authority Development High Risk Area. No further assessment of the potential risk posed by coal mining is considered to be required.
Environmental Setting	The Devensian Till is classified as an Undifferentiated Secondary Aquifer. The underlying Chester Formation is classified as a Principal Aquifer. The site is not located within a groundwater source protection zone (SPZ) and no potable groundwater abstractions were identified within 1km of the site. The nearest surface water features readily identifiable on Ordnance Survey mapping is the Rochdale Canal, located approximately 96m to the west.
Site Investigations	A previous investigation was undertaken by E3P, including six window sample boreholes and two cable percussion boreholes, were undertaken on the western side of the site. No investigations were undertaken beneath the buildings. Clancy Consulting Ltd undertook investigations beneath the footprint of the recently demolished building in the east of the site including, one cable percussion borehole to a depth of 25.00m below ground level (bgl), and five machine excavated trial pits to a maximum depth of 4.17m bgl.
Ground Conditions	Made Ground was present at each borehole location to depths of up to 3.58m bgl. Made Ground was underlain by Devensian Till to a depth of 21.20m bgl, followed by the Chester Formation.
Contamination	Polycyclic aromatic hydrocarbon (PAH) compounds were recorded in samples of Made Ground collected from borehole TP01 and trial pit TP04 at concentrations in excess of adopted assessment criteria (AC), protective of residential site users. Amosite and chrysotile asbestos fibres were also recorded within the sample of Made Ground collected from trial pit TP04. Previous investigations recorded elevated concentrations of PAH contaminants within Made Ground sampled from two locations and asbestos fibres in another location.

Following redevelopment, the areas of the site where contaminants were recorded in Made Ground at concentrations in excess of adopted AC will be excavated and disposed of appropriately off site as part of the basement construction. Therefore, these recorded contaminants will not pose a risk to future site users.

The site is underlain by a Principal Aquifer, relating to the Chester Sandstone formation. However, the site is not located within a groundwater SPZ and the nearest groundwater abstraction is indicated to be approximately 1km from the site. Furthermore, the site is underlain by approximately 18m of predominantly cohesive Devensian Till, which will prevent the downward migration of potential contaminants of concern.

The Rochdale Canal is present approximately 96m to the west of the site. Given its distance, this watercourse is not considered to be at significant risk from the generally low concentrations of contaminants of concern recorded beneath the site.

Ground Gas

Based on monitoring undertaken at the site by E3P, the ground gas regime corresponds to CIRIA Characteristic Situation 1 (CS1). On this basis, ground gas protection measures would not be required. No further assessment of the risks posed by ground gases has been undertaken by Clancy Consulting Ltd.

Geotechnical

Given the likely high column loads from the proposed development thickness of Made Ground beneath the site, it is considered that piled foundations would be required to support the proposed development. Continuous flight auger (CFA) or bored piles, terminating in the deeper layers of the Devensian Till or Chester Formation are likely to be most suitable on the subject site from a geotechnical viewpoint.

Testing indicates that that a Design Sulphate Class of DS2 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC2 would be required for buried concrete structures in contact with the Made Ground and Devensian Till.

Further Works

On the basis of the findings no remediation is required at the site. Should visual or olfactory evidence of contamination be encountered during the groundworks phase of the development, works should be ceased immediately within the effected area and an environmental consultant contacted for a further assessment to be made and possible remedial options discussed with the Local Authority.

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1.0 Introduction

1.1 Background

Clancy Consulting Limited has been instructed by Great Places Housing Group to carry out a Phase 2 Site Investigation at on a plot located off Laystall Street, Manchester. The site was previously occupied by a large brick building, which has recently been demolished. A hard surfaced car park is present in the western section of the site.

It is proposed to develop the site with a nine-storey residential apartment building, including a basement. A proposed development plan is included in Appendix I.

1.2 Objectives

The objectives of this investigation are summarised below:

- Provide a review of the site's land use, history and geology and preliminary risk assessment by reference to previous third-party site investigation reports for the site.
- Undertake intrusive site investigation works to establish the ground conditions across the proposed development area.
- Carry out a geotechnical assessment of the ground conditions and provide preliminary recommendations for foundation design.
- Carry out chemical testing of soil and groundwater samples to determine the contamination status of the site and potential risk posed to human health and environmental receptors.
- Refine the preliminary risk assessment and conceptual site model undertaken as part of the previous investigations.
- Provide recommendations regarding the requirement for further investigations or remedial works, if required, to satisfy the Local Planning Authority and to inform detailed civil and structural design.

1.3 Limitations of the Study

Clancy Consulting Limited cannot be held responsible for any omissions, misrepresentation, errors or inaccuracies with the supplied third-party report information. The report is written in the context of an agreed scope of work and budget and should not be used in a different context. New information or improved practices and changes in legislation may require a reinterpretation of the report in whole or in part.

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It must be noted that whilst this investigation aims to characterise the general ground conditions beneath the proposed development site, Clancy Consulting Ltd cannot be held accountable for variations in ground and groundwater conditions, unidentified contamination or the presence of below ground structures present.

2.0 Previous Investigations

2.1 General

Clancy Consulting Ltd were presented with a copy of the following report, detailing investigations undertaken at the site:

Phase II Geo-environmental Site Assessment, Laystall Street, Manchester, written by E3P, report ref: 15-140-R1-1, dated March 2022.

Relevant information from this document is summarised below:

At the time of the assessment, the site was occupied by a large brick industrial building (former clothing factory) in the east, with a large L-shaped basement. The west of the site comprised a hard surfaced car park. A line of semi-mature/mature trees was present along the southwest boundary.

Historical Ordnance Survey mapping from 1851 indicated that the site was occupied by terraced residential housing and a Public House in the northwest. By 1908, the majority of the residential housing had been demolished and an L-shaped industrial building was present in the east. By 1965, a clothing factory was also present in the east of the site. The terraced housing in the west had been demolished by 1988. By 1993, the site appeared to be in its most recent configuration, prior to recent demolition.

British Geological Survey mapping indicates the site to be underlain by Devensian Till overlying the Chester Formation.

The site is not located within a Coal Authority Development High Risk Area. No further assessment of the potential risk posed by coal mining was considered to be required.

The Devensian Till is classified as an Undifferentiated Secondary Aquifer. The underlying Chester Formation is classified as a Principal Aquifer. The site is not located within a groundwater source protection zone (SPZ) and no potable groundwater abstractions were identified within 1km of the site.

The nearest surface water features readily identifiable on Ordnance Survey mapping is the Rochdale Canal, located approximately 96m to the west.

No landfills were identified within 500m of the site. A historical waste site (paper mill) was formerly located upon the site.

Intrusive investigation works, including six window sample boreholes and two cable percussion boreholes, were undertaken on the western side of the site. No investigations were undertaken beneath the buildings.

Made Ground was encountered in all locations beneath tarmac or concrete hard surfacing, to depths of between 0.80m and 2.05m below ground level (bgl). Made Ground generally comprised light grey, sandy gravel of concrete and limestone overlying brown, sandy, gravelly clay with cobbles. Gravel comprised fine to coarse, angular to subangular brick, ash and clinker. Cobbles comprised pieces of brick.

Devensian Till was encountered beneath Made Ground to the base of each exploratory hole at a maximum depth of 18.80m bgl. The Devensian Till comprised stiff to very stiff, brown-grey, mottled, slightly gravelly clay. Gravel comprised sandstone and mudstone. Dense sand was encountered in one location at depths of between 17.00m and 18.80m bgl. The underlying Chester Formation was not encountered.

Groundwater was encountered as 'occasional seepages' at depths of between 1.40 m bgl and 2.00 m bgl during the site investigation. Groundwater levels of between 0.90 m and 2.40 m bgl were recorded in wells installed in boreholes during subsequent monitoring.

In relation to the risks to human health E3P reported that the "Tier I human health risk assessment identified elevated concentrations of lead, non-volatile PAHs and asbestos. The risk to chronic human health associated

with the elevated concentrations of inorganic heavy metals and non-volatile PAH compounds can be mitigated through the installation of a suitable cover system in all proposed gardens, landscaping and public open space to remove any potential for direct exposure to impacted soils. Asbestos in the form of loose amosite fibres (<0.001 %) has also been identified within the Made Ground in WS105. No visual signs of ACM were encountered during the ground investigation. Impacted soils should be managed according to the asbestos risk mitigation conceptual site model."

E3P also reported that they considered there to be a "low risk to controlled waters, pending further assessment."

Based on monitoring undertaken at the site by E3P, the ground gas regime corresponds to CIRIA Characteristic Situation 1 (CS1). On this basis, ground gas protection measures would not be required.

The report indicated that further investigations would be required following demolition of on-site structures in order to obtain information on soils beneath previously inaccessible areas of the site.

3.0 Site Investigation

3.1 Investigation Design & Objectives

Pollutant linkages identified within the Preliminary Conceptual Site Model are currently active or will be made active upon redevelopment of the site. The investigation design approach was based on guidance provided in BS 10175 Code of Practice for Investigation of Potentially Contaminated Land (2011). The investigation also provided information on ground conditions and data for the assessment geotechnical properties of the strata underlying the site relating to areas of the site previously not investigated due to the presence of buildings.

This investigation specifically relates to an area in the east of the site, within the footprint of the former building. No exploratory holes were positioned in the area of the site previously investigated by E3P.

It must be noted that whilst this investigation aims to characterise the general ground conditions beneath the proposed development site, Clancy Consulting Ltd cannot be held accountable for variations in ground and groundwater conditions, unidentified contamination or the presence of below ground structures in areas of the site which fall outside our borehole locations.

3.2 Fieldwork

Site investigation works were carried out from 17th to 19th August 2022 and comprised:

- One cable percussion borehole (BH1) to a depth of approximately 25.00m bgl.
- In situ geotechnical testing throughout the depth of the borehole.
- Five machine excavated trial pits (TP01 to TP05) to a maximum depth of approximately 4.17m bgl.
- Soil samples were collected at regular intervals from each exploratory hole for chemical and geotechnical laboratory analysis.

A plan indicating the positions of the exploratory hole boreholes is provided in Appendix I. Exploratory hole logs are provided as Appendix II.

3.3 Laboratory Testing

3.3.1 Environmental Laboratory Testing – Soil

Three samples of the Made Ground and three samples of the Devensian Till were submitted to a UKAS/MCERTS accredited laboratory and analysed for a number of determinands including:

Inorganic Determinands:

pH, arsenic, beryllium, cadmium, chromium, hexavalent chromium, copper, lead, mercury, nickel, sulphate, selenium, vanadium, zinc and asbestos.

Organic Determinands:

Polycyclic aromatic hydrocarbons (PAH) and total petroleum hydrocarbons (TPH).

Chemical Laboratory Certificates are presented as Appendix III.

3.3.2 Geotechnical Laboratory Testing

Samples collected from the Made Ground, Devensian Till and Chester Formation were analysed by a UKAS accredited laboratory for Atterberg Limits, total stress parameters, pH and water-soluble sulphate content.

Geotechnical Laboratory Certificates are presented as Appendix IV.

4.0 Site Investigation Findings

4.1 Ground Conditions & Geotechnical Testing Parameters

The strata encountered during the intrusive investigation are summarised in the table below and described in the following section.

Table 1 – Encountered Strata

Strata	Depth to Top of Strata m bgl	Thickness (m)
Made Ground	Ground level	0.67m to 3.58m
Devensian Till	0.67m to 3.58m	19.55m
Chester Formation	21.20m	Not proven at a maximum depth of approximately 25.00m bgl

General descriptions of the strata encountered during the intrusive investigation are summarised below. Reference should be made to the borehole logs within Appendix III of this report for full descriptions of ground conditions underlying the site.

4.1.1 Made Ground

Made Ground recorded in all locations ranging in thickness from approximately 0.67m to 3.58m bgl. The stratum was encountered at greatest thickness in trial pit TP02, located in the north of the former building footprint. The Made Ground was variable in nature, but typically comprised a brown-grey, slightly clayey sand and gravel with many cobbles. Gravel comprised angular to sub-angular, fine to coarse brick and concrete. Cobbles comprised brick and concrete with fragments of wood, plastic, metal and occasional glass.

No visual or olfactory evidence of contamination was noted within this stratum.

One SPT undertaken within the Made Ground at a depth of 1.20m bgl gave a result of $N = 4$, which is indicative of a loose granular material.

4.1.2 Devensian Till

The Devensian Till was encountered beneath the Made Ground to a depth of up to 21.20m bgl in borehole BH01. The stratum was variable in nature, but generally comprised yellow-brown, slightly clayey sand or yellow-brown, slightly sandy clay.

No visual or olfactory evidence of contamination was noted within this stratum.

Atterberg Limit testing was undertaken on four soil samples collected from the Devensian Till at depths ranging from approximately 2.00m bgl to 15.60m bgl. This testing was undertaken to determine values for Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI). The results for LL ranged from 41% to 53%. The results for PL ranged from 18% to 24%. The results for PI ranged from 19% to 29%. This is indicative of an intermediate to high plasticity clay. Modified plasticity index values indicate that these samples have a low to medium-volume change potential. The natural moisture contents of these samples ranged from 14% to 23%.

11 SPTs undertaken within the Devensian Till at depths ranging from approximately 2.00m to 21.00m bgl gave results ranging from $N = 16$ to in excess of $N = 50$. The SPT results correspond approximately to undrained shear strength values ranging from 72kN/m^2 to in excess of 225kN/m^2 , which is indicative of a firm ranging to a very stiff cohesive material.

Three quick undrained triaxial compression tests were undertaken on samples collected from the Devensian Till at depths ranging from approximately 4.40m to 15.00m bgl, giving results ranging from 87kNm^2 to 126kNm^2 . This is indicative of a stiff cohesive material. The natural moisture content of these samples ranged from 11% to 22%. The bulk densities ranged from 2.21Mg/m^3 to 2.23Mg/m^3 . The dry densities ranged from 1.74Mg/m^2 to 2.22Mg/m^2 .

4.1.3 Chester Formation

The Chester Formation was recorded beneath the Devensian Till at a depth of approximately 21.20m bgl in borehole BH01. The stratum comprised orange-brown sandstone.

One SPT undertaken within the Chester Formation at a depth of approximately 21.00m bgl within borehole BH01 gave a result in excess of $N = 50$.

4.2 Groundwater

Groundwater was not encountered within any of the exploratory holes in during intrusive works.

5.0 Hazardous Ground Gas Assessment

Based on monitoring undertaken at the site by E3P, the ground gas regime corresponds to CIRIA CS1. On this basis, ground gas protection measures would not be required. No further assessment of the risks posed by ground gases has been undertaken by Clancy Consulting Ltd.

6.0 Tier 1 Contamination Analysis

The field investigation findings indicate that pathways are present by which contaminants of concern can impact identified receptors. Chemical analysis has been carried out on soils sampled from beneath the site. The concentrations of contaminants of concern within soil can be compared to assessment criteria (AC) to determine whether these represent an unacceptable risk to identified receptors. The derivation of AC to be used and the comparison of these criteria to the results of the chemical analyses are presented below.

6.1 Human Health Assessment Criteria

In order to assess risks to future site users, concentrations of contaminants of concern have been compared to Suitable 4 Use Levels (S4UL) generic AC published by Land Quality Management: Chartered Institute of Environmental Health (LQM:CIEH) in 2015.

This assessment has been based upon the use of the site for a residential purposes without plant uptake, given its proposed development as a residential apartment building without private gardens.

As a conservative measure, concentrations of contaminants of concern have been compared to the S4UL (1.00% Soil Organic Matter) values.

A notable exclusion from the S4ULs is lead. In the absence of a S4UL for lead, the Category 4 Screening Level (C4SL) has been selected, published by DEFRA in 2014. It is noted that the C4SL are based on the acceptance of a low level of toxicological concern, rather than the more conservative standard adopted in the derivation of S4ULs, which are based on a tolerable or minimal level of risk.

The potential risk posed to controlled waters from contaminants of concern within soils beneath the site is not addressed by these screening criteria.

6.2 Comparison of Soil Analyses to Human Health Assessment Criteria

Chemical analysis was undertaken on three samples of the Made Ground and three samples of Devensian Till. A comparison of soil analyses to the relevant AC is presented below.

6.2.1 Inorganic Determinands

Inorganic contaminants of concern were not recorded within soil samples analysed from beneath the site at concentrations in excess of adopted AC.

6.2.2 Organic Determinands

Benzo(a)pyrene (4.97mg/kg), benzo(b)fluoranthene (5.19mg/kg), dibenzo(ah)anthracene (0.47mg/kg) and naphthalene (17.40mg/kg) were recorded at concentrations in excess of their adopted AC within a sample of Made Ground collected from trial pit TP01 at 0.80m bgl.

Benzo(a)anthracene (18.2mg/kg), benzo(a)pyrene (11.8mg/kg), benzo(b)fluoranthene (12.5mg/kg), dibenzo(ah)anthracene (1.64mg/kg) and naphthalene (9.86mg/kg) were recorded at concentrations in excess of their adopted AC within a sample of Made Ground collected from trial pit TP04 at 1.03m bgl.

PAH contaminants of concern were not recorded within other soil samples analysed from beneath the site at concentrations in excess of adopted AC.

TPH contaminants of concern were not recorded within soil samples analysed from beneath the site at significant concentrations considered harmful to human health receptors.

6.2.3 Asbestos

Amosite and chrysotile asbestos fibres were recorded in a sample of Made Ground collected from trial pit TP04 at a depth of approximately 1.03m bgl. Asbestos containing materials (ACMs) were not identified in any of the other soil samples submitted for screening.

7.0 Contamination Assessment

7.1 Introduction

Based on the information obtained during the ground investigation and laboratory testing, the 'Preliminary Conceptual Site Model' has been amended accordingly. The Conceptual Site Model is used as a basis to identify contamination sources, pathways and receptors and is subject to constant refinement as more information becomes available.

7.2 On Site Human Health Receptors

PAH compounds were recorded in samples of Made Ground collected from borehole TP01 and trial pit TP04 at concentrations in excess of adopted AC, protective of residential site users. Amosite and chrysotile asbestos fibres were also recorded within the sample of Made Ground collected from trial pit TP04.

Previous investigations recorded elevated concentrations of PAH contaminants within Made Ground sampled from two locations and asbestos fibres in another location.

Following redevelopment, the areas of the site where contaminants were recorded in Made Ground at concentrations in excess of adopted AC will be excavated and disposed of appropriately off site as part of the basement construction. Therefore, these recorded contaminants will not pose a risk to future site users.

Significant concentrations of volatile contaminants of concern were not recorded within soil sampled from beneath the site. Therefore, future site users are not considered to be at significant risk from contaminants in soil via the vapour inhalation pathway in indoor areas.

Based on the available information and recommended mitigation measures being implemented, concentrations of contaminants of concern detected within soil sampled from beneath the site are not considered to represent a potentially significant risk to future site users.

7.3 Off-site Human Health Receptors

Following redevelopment, the site will be covered by building footprint, and limited hardstanding and there is limited potential for the air-borne migration of soil or dust to impact neighbouring receptors.

Given the predominant building cover and hard surfacing (and absence of private gardens) on neighbouring properties, pathways to neighbouring human health receptors from potential contaminants of concern migrating off-site via groundwater are considered unlikely to be active.

7.4 Construction / Maintenance Workers

S4UL screening criteria cannot be used to assess the acute (short term exposure) risk that personnel in close contact with exposed soils may experience during construction/site maintenance duties.

Potential risks to construction/maintenance workers can be controlled by the use of appropriate personal protection equipment (e.g. disposable coveralls, gloves and particulate/vapour masks) and by adopting high levels of personal hygiene.

Amosite and chrysotile asbestos fibres were recorded in a sample of Made Ground collected from trial pit TP04 at a depth of approximately 1.03m bgl. It is recommended that an asbestos management plan be put in place during the proposed development. If significant quantities of asbestos are encountered during the works, a specialist should be contacted regarding its treatment and removal.

7.5 Groundwater

The site is underlain by a Principal Aquifer, relating to the Chester Sandstone formation. However, the site is not located within a groundwater SPZ and the nearest groundwater abstraction is indicated to be approximately

1km from the site. Furthermore, the site is underlain by approximately 18m of predominantly cohesive Devensian Till, which will prevent the downward migration of potential contaminants of concern.

7.6 Surface Water

The Rochdale Canal is present approximately 96m to the west of the site. Given its distance, this watercourse is not considered to be at significant risk from the generally low concentrations of contaminants of concern recorded beneath the site.

7.7 Polymeric Utility Pipes

Elevated concentrations of hydrocarbon contaminants were recorded within a soil sample collected from the Made Ground. Standard polymeric utility pipes may therefore not be suitable for the proposed development. Barrier pipe may be required, or utility pipes laid in dedicated trenches and backfilled with clean, inert material.

Requirements for buried utility pipes should be discussed with service providers before the development stage.

7.8 Revised Conceptual Site Model

The potential source-pathway-receptor linkages and associated risks upon completion of the proposed development at the site, as identified following completion of the assessment, are summarised in the table below.

Table 2 – Revised Conceptual Site Model

Potential Source	Via	Potential Pathways	Linkage Potentially Active? (Yes/No)	Receptors
On site: Asbestos and PAH compounds recorded in Made Ground	Soil	Direct contact/ingestion	No	Site users
		Inhalation of volatiles	No	Site users
		Airborne migration of soil or dust	No	Off-site users
		Leaching of mobile contaminants	No	Principal Aquifer
	Groundwater	Direct contact/ingestion	No	Site users
			No	Off-site users
		Inhalation of volatiles	No	Site users
			No	Off-site users
		Vertical and lateral migration in permeable strata	No	Principal Aquifers
			No	Rochdale Canal
Off site: Runoff from road network	Groundwater	Direct contact/ingestion	No	Site users
		Inhalation of volatiles	No	Site users
	Service conduits	Direct contact/ingestion	No	Site users
		Inhalation of volatiles	No	Site users
On and off-site: Potential hazardous ground gas and vapours from Made Ground.	Ground Gas	Inhalation of ground gas	No	Site users
			No	Off-site users
		Explosive risks	No	Site users
			No	Off-site users

The risk assessment is based upon the available information relating to the site and all recommended mitigation measures being implemented. Should ground conditions inconsistent with those outlined in this report be encountered CCL should be contacted to enable further assessment. The findings of the CSM should be confirmed upon finalisation of the proposed redevelopment plans.

8.0 Geotechnical Assessment

8.1 Introduction

It is proposed to develop the site with a nine-storey residential apartment block with a basement level, which will be used primarily for plant rooms, management facilities and bicycle storage.

No preliminary structural loads have been received for the proposed development. Therefore, the preliminary recommendations below will need to be reviewed at the detailed design stage once these are known.

8.2 Preliminary Geotechnical Risk Register

The table below summarises the potential geotechnical hazards associated with the development. The table provides an assessment of whether the site is likely to be affected by the hazard and the possible consequences and engineering considerations.

Table 3 – Geotechnical Risk Register

Hazard Description	Is hazard likely to be present / affect the site?	Comments/possible engineering requirements where hazard present
Sudden lateral/vertical changes in ground conditions	M/H	A variable thickness of Made Ground was recorded beneath the site, overlying Devensian Till. The main variation in ground conditions is likely to be associated with the thickness and composition of the Made Ground and compressibility of the underlying Devensian Till.
Highly compressible/low bearing capacity soils, (including soft clay)	M/H	Low SPT results were obtained in the Made Ground and is not considered suitable to support traditional foundations.
Ground dissolution features/natural cavities	L	Ground conditions beneath the site are not consistent with these features.
Shrinking and swelling clays	L	Samples tested from the Devensian Till had a low to medium volume change potential. However, it is considered that the adoption of piled foundations will adequately mitigate the potential risks posed by shrinking and swelling clays.
Slope stability/Retaining wall issues	L/M	Basement retaining walls are proposed as part of the development. Retaining walls created as part of the development should be subject to appropriate geotechnical design based on site-specific site investigation information.
High groundwater table (including waterlogged ground)	L/M	Groundwater was not recorded during the most recent investigation. It is considered that any perched groundwater encountered within the Made Ground or granular layers of the Devensian Till may be controlled via pumping from a localised sump.
Filled and Made Ground (including embankments)	M/H	Made Ground was recorded beneath the site, up to 3.58m in thickness.
Obstructions (including foundations, services, basements, tunnels and adjacent sub-structures)	M	Historical development of the site has been extensive. However, it is considered likely that any relic foundations and/or buried services encountered could be removed using standard construction plant.
Underground mining	L	The site is not located in an area affected by mining.
Concrete classification	L/M	Testing indicates that that a Design Sulphate Class of DS2 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC2 would be required for buried concrete structures in contact with the Made Ground and Devensian Till.
Seismic Activity	L	The Eurocode 8 seismic hazard zoning maps for the UK (Musson and Sargeant, 2007) indicate that horizontal Peak Ground Acceleration (PGA) values with 10% probability of being exceeded in 50 years (475 year return period) are between 0.00g and 0.02g, which is considered very low.

Hazard Description	Is hazard likely to be present / affect the site?	Comments/possible engineering requirements where hazard present
NOTES: H – High Risk M – Medium Risk L – Low risk		

8.3 Foundation Solutions

8.3.1 Piled Foundations

Given the likely high column loads from the proposed development thickness of Made Ground beneath the site, it is considered that piled foundations would be required to support the proposed development. Continuous flight auger (CFA) or bored piles, terminating in the deeper layers of the Devensian Till or Chester Formation are likely to be most suitable on the subject site from a geotechnical viewpoint.

Preliminary anticipated CFA or bored pile bearing capacities are detailed in the table, below:

Table 4 – Anticipated Preliminary Pile Capacities

Pile Length (m bgl)	Pile Diameter		
	450mm	600mm	750mm
10.00	375kN	545kN	735kN
12.00	510kN	725kN	970kN
14.00	660kN	935kN	1235kN
16.00	825kN	1160kN	1530kN
18.00	1005kN	1410kN	1845kN
20.00	1185kN	1655kN	2155kN

A piling contractor should be consulted with regard to detailed pile design, since the type of pile and method of installation adopted will affect capacity.

Partial safety factors have been applied to the calculated pile capacities above in accordance with Design Approach 1: Combination 2, as detailed within Tables A.6, A.7 and A.8 of Annex A in BS EN 1997-1. This was found to be the most conservative design approach.

It should be noted that no design loads have been received at this stage. It is recommended that when the final structural loads have known further detailed assessment of pile capacity will need to be undertaken in accordance with the recommendations provided in Eurocode 7.

Loads are based on single piles only and do not take into account the action of groups of piles. This should be considered at the detailed design stage.

The pile capacity estimates presented above are preliminary and based on a conservative soil profile derived from exploratory holes undertaken on site. The adopted pile profile is summarised as follows:

Table 5 – Adopted Soil Profile

Stratum	Depth (m bgl)	Bulk Density (kN/m ³)	Shear Strength (kN/m ²)	Nc	Soil/Pile Friction Angle (°)	Nq
Made Ground	GL to 4.00	18	Not taken into account			
Devensian Till	4.00 to 21.00	20	75 at 4.00m bgl, increasing linearly to 225 at 21.00m bgl	9		
Chester Formation	21.00 to 25.00	20	-	-	30	40

An appropriate piling platform should be designed and constructed in accordance with BRE Digest 470 (Working platforms for Tracked Plant).

8.4 Floor Slabs

Made Ground is anticipated to be present at floor slab formation level beneath the proposed development at an assumed depth of approximately 0.60m bgl. If the remaining thickness of Made Ground beneath proposed floor slab formation level is limited, this may be excavated and replaced in an engineered fashion to form a suitable bearing stratum for ground bearing floor slabs.

If this is not feasible, suspended floor slabs would be required to prevent excessive total and differential settlement, whereby settlement beneath the slab would be controlled by the foundations of the building. Additional loads from suspended floor slabs should be taken into account when designing foundations for the proposed development.

8.5 Temporary Works and Excavations

Historical development of the site has been extensive. However, it is considered likely that any relic foundations and/or buried services encountered could be removed using standard construction plant.

Groundwater was not recorded during the most recent investigation. It is considered that any perched groundwater encountered within the Made Ground or granular layers of the Devensian Till may be controlled via pumping from a localised sump.

If groundwater is encountered during excavation, degradation of the formation may occur. The formation should therefore be adequately protected from seepages and protected from adverse weather conditions. If the formation layer becomes wet resulting in loosening or softening of the surface materials, then excavation may have to be taken deeper in order to find a suitable bearing layer. Instability of excavations in granular material should be expected, especially during periods of adverse weather. Suitable shoring measures or battering back of slopes may be required for any excavations greater than 1.20m bgl. All temporary excavations should be undertaken in accordance with CIRIA Report 97 'Trenching Practice'.

8.6 Chemical Attack on Buried Concrete

Samples of the Made Ground, Devensian Till and Chester Sandstone Formation were tested for pH and for sulphate content. The results are presented below:

Table 6 – Results of pH and sulphate testing

Stratum	No. Samples	Range of pH	Characteristic pH	Range of Sulphate (mg/kg)	Characteristic Sulphate (mg/kg)	Design Sulphate Class	ACEC Class
Made Ground	3	8.3 to 11.2	8.30	190 to 730	730	DS2	AC2
Devensian Till	7	8.1 to 10.0	8.20	50 to 990	870	DS2	AC2
Chester Formation	1	8.6	8.60	50	50	DS1	AC1

The data was used to assess appropriate concrete classification for buried concrete in accordance with BRE Special Digest 1, based on the following assumptions:

- Brownfield ground conditions.
- Mobile groundwater conditions.
- For a dataset of less than five samples, the characteristic value for soluble sulphate has been taken as the highest result, while the characteristic value for pH is taken as the lowest pH result.
- For a dataset of between five and nine samples, the characteristic value for soluble sulphate has been taken as the average of the two highest results, while the characteristic value for pH is taken as the average of the two lowest pH results.

Based on the above, it is considered that a Design Sulphate Class of DS2 and an Aggressive Chemical Environment for Concrete (ACEC) Classification of AC2 would be required for buried concrete structures in contact with the Made Ground and Devensian Till.

9.0 Conclusions and Recommendations

Clancy Consulting Limited was instructed by Great Places Housing Group to carry out a Phase 2 Site Investigation at on a plot located off Laystall Street, Manchester. The site was previously occupied by a large brick building, which has recently been demolished. A hard surfaced car park is present in the western section of the site. It is proposed to develop the site with a nine-storey residential apartment building, including a basement.

A previous investigation was undertaken by E3P, including six window sample boreholes and two cable percussion boreholes, were undertaken on the western side of the site. No investigations were undertaken beneath the buildings.

Clancy Consulting Ltd undertook investigations beneath the footprint of the recently demolished building in the east of the site including, one cable percussion borehole to a depth of 25.00m bgl and five machine excavated trial pits to a maximum depth of 4.17m bgl.

Made Ground was present at each borehole location to depths of up to 3.58m bgl. Made Ground was underlain by Devensian Till to a depth of 21.20m bgl, followed by the Chester Formation.

Polycyclic aromatic hydrocarbon (PAH) compounds were recorded in samples of Made Ground collected from borehole TP01 and trial pit TP04 at concentrations in excess of adopted assessment criteria (AC), protective of residential site users. Amosite and chrysotile asbestos fibres were also recorded within the sample of Made Ground collected from trial pit TP04.

Previous investigations recorded elevated concentrations of PAH contaminants within Made Ground sampled from two locations and asbestos fibres in another location.

Following redevelopment, the areas of the site where contaminants were recorded in Made Ground at concentrations in excess of adopted AC will be excavated and disposed of appropriately off site as part of the basement construction. Therefore, these recorded contaminants will not pose a risk to future site users.

The site is underlain by a Principal Aquifer, relating to the Chester Sandstone formation. However, the site is not located within a groundwater SPZ and the nearest groundwater abstraction is indicated to be approximately 1km from the site. Furthermore, the site is underlain by approximately 18m of predominantly cohesive Devensian Till, which will prevent the downward migration of potential contaminants of concern.

The Rochdale Canal is present approximately 96m to the west of the site. Given its distance, this watercourse is not considered to be at significant risk from the generally low concentrations of contaminants of concern recorded beneath the site.

Based on monitoring undertaken at the site by E3P, the ground gas regime corresponds to CIRIA CS1. On this basis, ground gas protection measures would not be required. No further assessment of the risks posed by ground gases has been undertaken by Clancy Consulting Ltd.

Given the likely high column loads from the proposed development thickness of Made Ground beneath the site, it is considered that piled foundations would be required to support the proposed development. Continuous flight auger (CFA) or bored piles, terminating in the deeper layers of the Devensian Till or Chester Formation are likely to be most suitable on the subject site from a geotechnical viewpoint.

Testing indicates that that a Design Sulphate Class of DS2 and an ACEC Classification of AC2 would be required for buried concrete structures in contact with the Made Ground and Devensian Till.

On the basis of the findings no remediation is required at the site. Should visual or olfactory evidence of contamination be encountered during the groundworks phase of the development, works should be ceased immediately within the effected area and an environmental consultant contacted for a further assessment to be made and possible remedial options discussed with the Local Authority.

APPENDIX I
DRAWINGS

Client **Great Places Housing Group**

Project **Laystall Street Development**

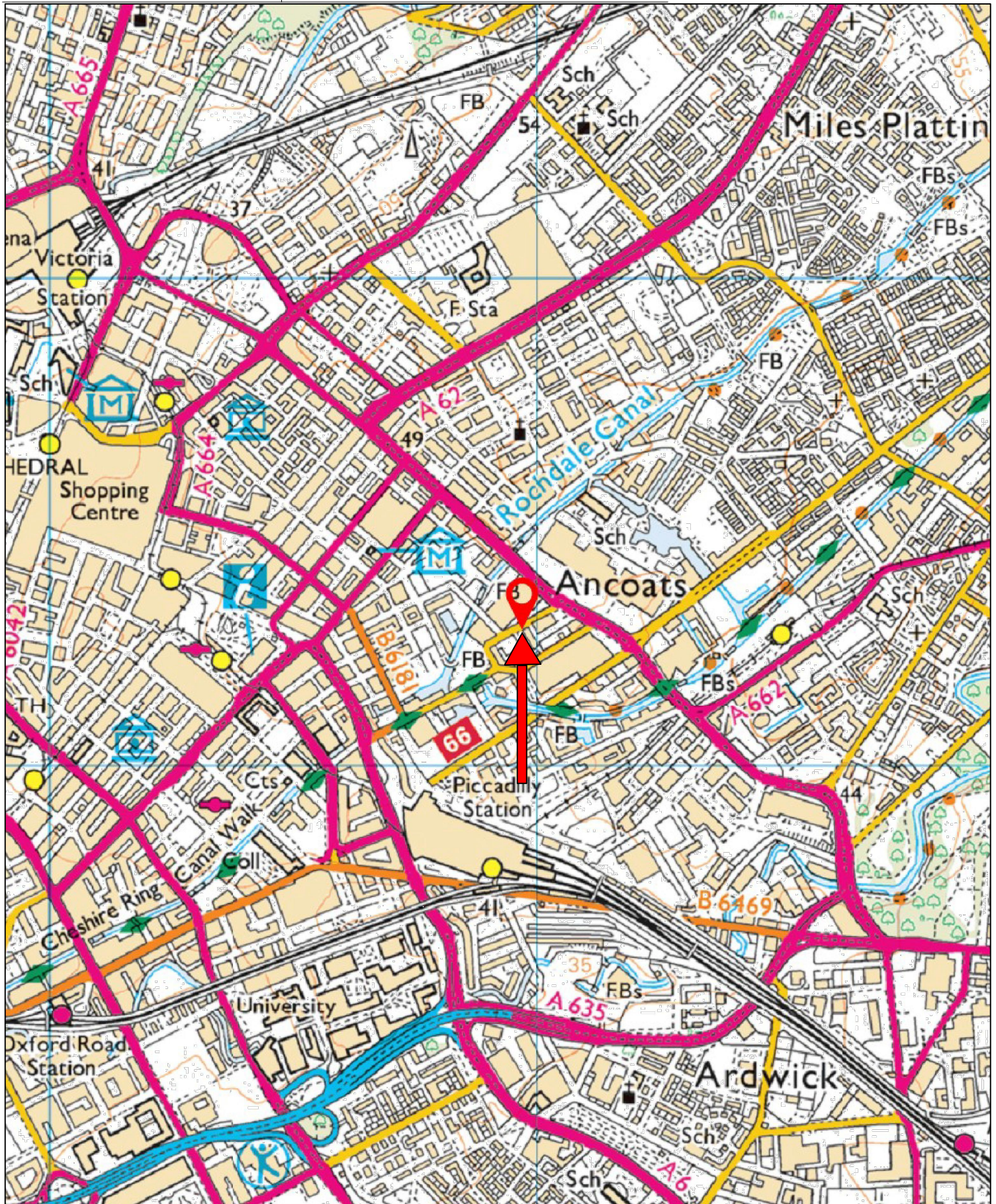
Title **Site Location Plan**

Office **Altrincham**

Discipline **Geo**

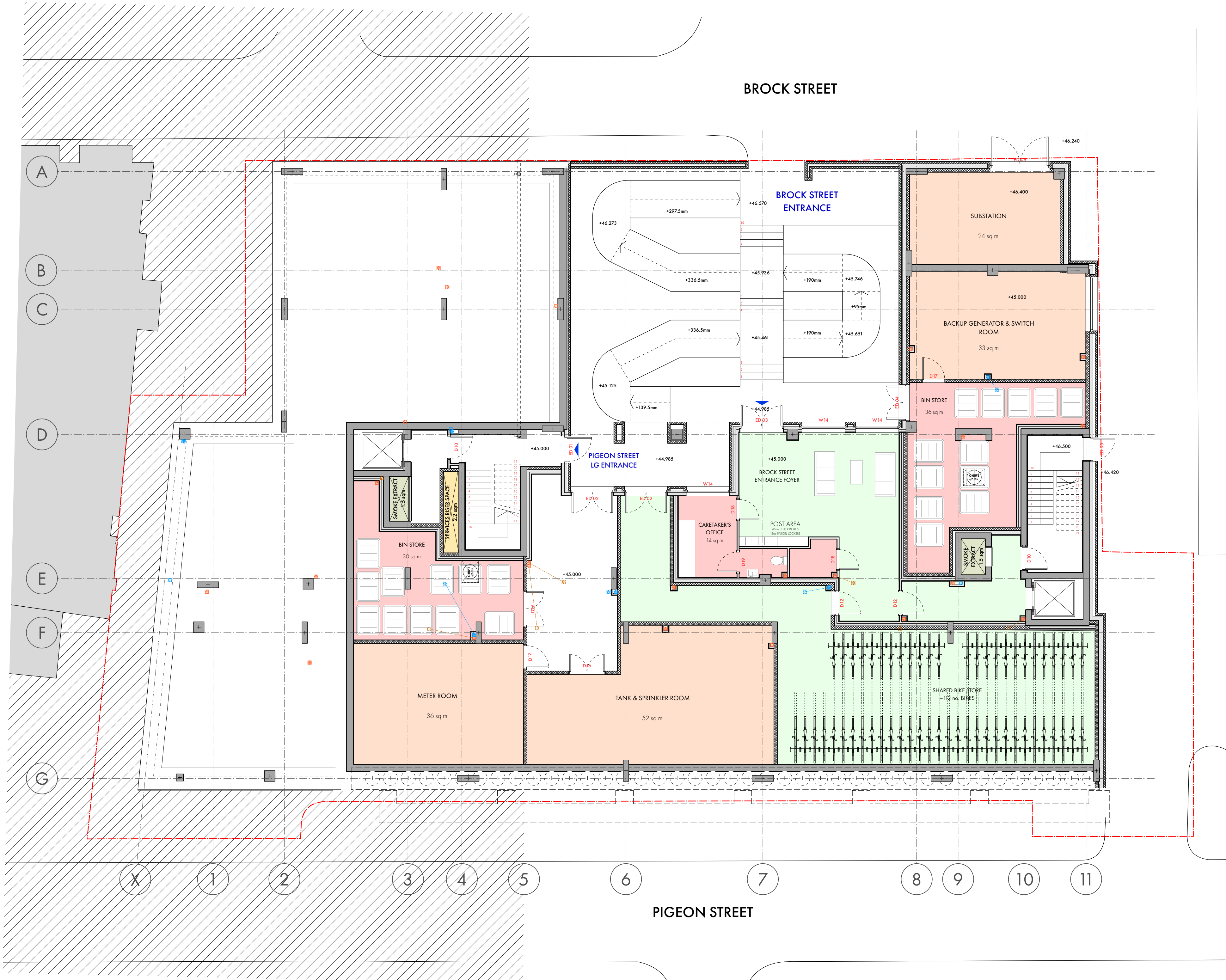


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XX XX.XX.XX XXX			XXX XX XXX			Drawn PJH	Date 07/10/22	COPYRIGHT: THE COPYRIGHT OF THIS DRAWING IS VESTED IN CLANCY CONSULTING LTD. IT SHALL NOT BE USED WITHOUT PERMISSION BY ANYONE FOR ANY PURPOSE. DO NOT SCALE THIS DRAWING ELECTRONICALLY OR MANUALLY. WORK TO FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE. DO NOT TURN ON LAYERS THAT HAVE BEEN TURNED OFF. DO NOT THAW LAYERS THAT HAVE BEEN FROZEN.	Job number	Drawing number	Revision
Rev	Date	Description	By	Check	App.	Checked RP	Scale @ A4 NTS		10/1448.1	001	0
						Approved NR	Status Live				

REVISION	DATE	DESCRIPTION
A	17/08/2021	PRELIMINARY ISSUE
B	01/04/2022	Draft for coordination
C	26/04/2022	FOR BUILDING REGS SUBMISSION
D	28/04/2022	CLIENT SIGN OFF ISSUE
E	03/05/2022	PARCEL LOCKERS ADDED
F	17/05/2022	Stage 3+ Tender Issue



LOWER GROUND LEVEL
1:100

GENERAL ARRANGEMENT KEY

- RESIDENT ANCILLARY
- MANAGEMENT
- PLANT
- 1 BEDROOM APARTMENT
- 2 BEDROOM APARTMENT

OMIArchitects

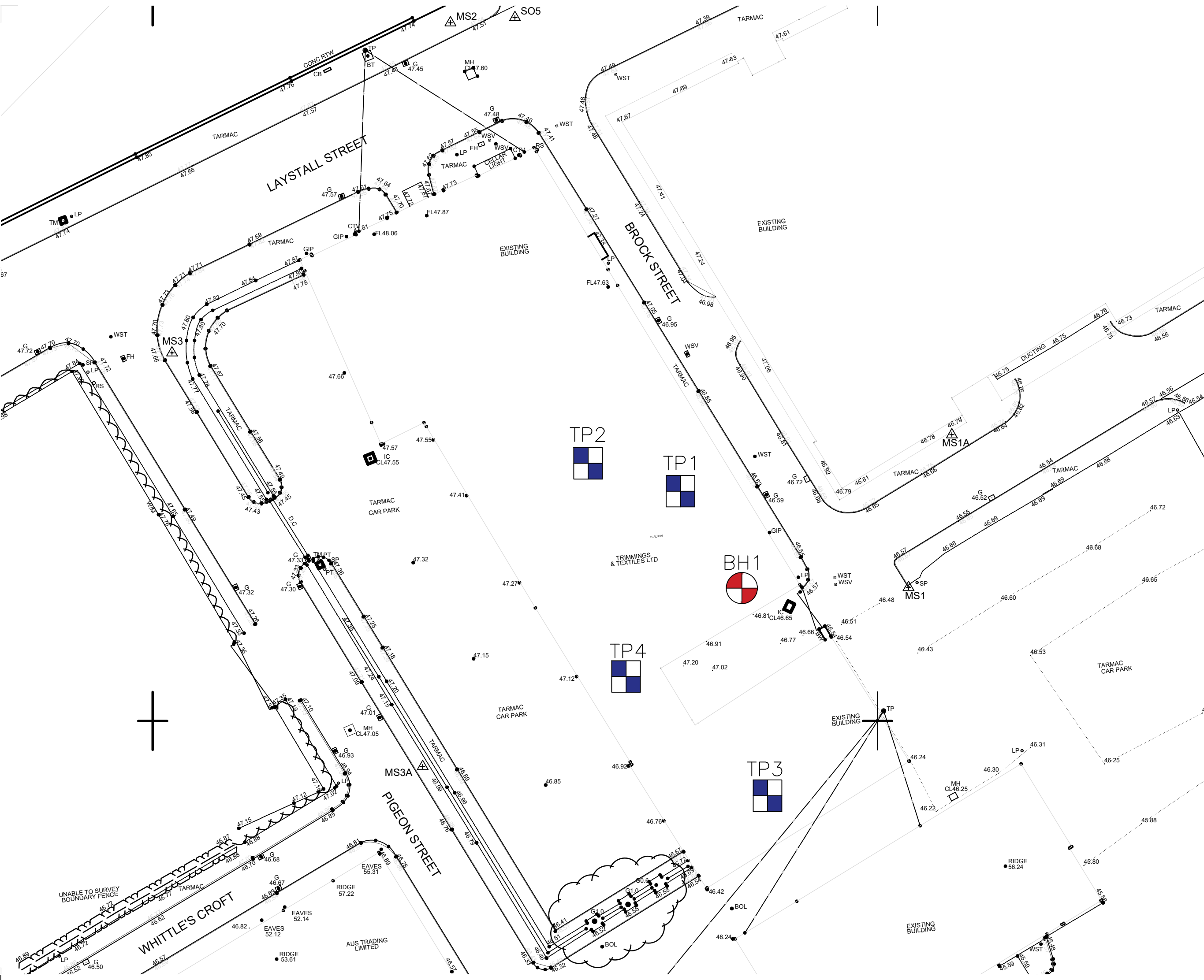
31 Blackfriars Road, Salford, Manchester, M3 7AQ
+44(0)161 832 3242 / info@omiarchitects.com / www.omiarchitects.com

PROJECT	LAYSTALL STREET - NEW BUILD APARTMENTS			
DRAWING	GENERAL ARRANGEMENT - LG			
DATE	AUG '21	DRAWN BY	LG	SCALE 1:100 @A1
JOB NO.	1383	DWG. NO.	1383-OMI-XX-LG-DR-A-L1110-F	

REVISION	DATE	DESCRIPTION
A	17/08/2021	PRELIMINARY ISSUE
B	01/04/2022	Draft for coordination
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D	28/04/2022	CLIENT SIGN OFF ISSUE
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F	17/05/2022	Stage 3+ Tender Issue



LEVEL 00
1:100



Key

Cable Percussive Borehole

Trial Pit

00	22/08/22	Exploratory Borehole Location Plan	TB	SHP	NR
Rev	Date	Description	By	Check	App.

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Client	Great Places Housing Group		
Project	Laystall Street Development Manchester		
Office	Altrincham		
Discipline	Geo-Enviromental		
Title	Exploratory Hole Location Plan		
Scale @ A3	NTS	Status	Live



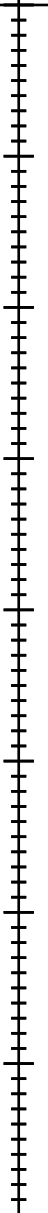
www.clancy.co.uk

Originator	Job Number	Discipline	Building/Zone
TB	10/1448.1	GEO	-
Type	Level	Drawing No.	Revision
GA	-	002	00

Birmingham 0121 230 7865 Glasgow 0141 221 1720 Liverpool 0151 2273300 Newcastle 0191 613 8000 Norwich 01603 350190 Penrith 01661 613 8000 Reading 0118 941 7868

APPENDIX II
EXPLORATORY HOLE LOGS

		Project Title: Laystall Street Development, Manchester				BH1	
		Project Number: 10/1448.1		Client: Great Places Housing Group			
		GL (mAOD):		N Coord: 53.480836		E Coord: -2.227636	
Date: 17/08/2022-19/08/2022		Method: Cable Percussion		Driller: PB Drilling		Logged By: TB	

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.40	ES					MADE GROUND: Brownish grey slightly clayey sand and gravel with many cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies including brick and concrete. Cobbles are brick and concrete with fragments of wood plastic and metal.		
1.20 - 1.65	SPT	N=4			1.00 1.20			
1.80	ES				1.65	MADE GROUND: Brownish grey becoming mottled yellowish brown slightly clayey slightly gravelly sand. Gravel is angular to sub-angular fine to coarse of mixed lithologies. Occasional fragments of brick wood plastic and glass.		
2.00 - 2.45	SPT	N=16			2.00 2.15	Firm becoming stiff yellowish brown slightly sandy CLAY.		
3.00 - 3.45	SPT	N=16			3.00	Stiff greyish brown slightly gravelly slightly sandy CLAY. Gravel is angular to sub-angular fine to medium of mixed lithologies. Rare cobble content.		
4.00 - 4.45	U				4.00			
4.60	ES				4.70			
5.00 - 5.45	SPT	N=19			5.00	Stiff brownish grey slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse of mixed lithologies. (Till, Devensian - Diamicton)		
6.00 - 6.45	SPT	N=20			6.00			
7.50 - 7.95	SPT	N=21			7.00 8.00			
						Borehole Continues		

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
 - Groundwater Strike
 - Groundwater Level

REMARKS
No Groundwater Encountered



Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Chiselling					
Date	Casing	Water	From	To	Hours

Scale: 1:50

		Project Title: Laystall Street Development, Manchester				BH1	
		Project Number: 10/1448.1		Client: Great Places Housing Group			
		GL (mAOD):		N Coord: 53.480836		E Coord: -2.227636	
Date: 17/08/2022-19/08/2022		Method: Cable Percussion		Driller: PB Drilling		Logged By: TB	

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
9.00 - 9.45	U	N=21			9.00	Stiff brownish grey slightly sandy slightly gravelly CLAY. Gravel is angular to sub-angular fine to coarse of mixed lithologies. (Till, Devensian - Diamicton)		
9.80	ES				10.00			
10.50 - 10.95	SPT				11.00			
11.20	D	N=23			12.00			
12.00 - 12.45	SPT				13.00			
13.50 - 13.95	SPT				13.28			
13.50 - 13.95	SPT	N=34			14.00	Stiff orangish grey slightly gravelly CLAY with occasional sand bands. Gravel is angular to sub-angular fine to coarse of mixed lithologies. Rare cobble content. (Till, Devensian - Diamicton)		
15.00 - 15.45	U			15.00				
15.75	ES			16.00				
						Borehole Continues		

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed
- W - Water Sample
- S - Standard Penetration Test
- C - Cone Penetration Test
- N - Penetration Test 'N' Value
- V - Hand Shear Vane kPa
- ▽ - Groundwater Strike
- ▼ - Groundwater Level



REMARKS

No Groundwater Encountered

Scale: 1:50

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths

Date	Casing	Water	From	To	Hours

		Project Title: Laystall Street Development, Manchester				BH1																																																		
		Project Number: 10/1448.1		Client: Great Places Housing Group																																																				
		GL (mAOD):		N Coord: 53.480836		E Coord: -2.227636																																																		
Date: 17/08/2022-19/08/2022		Method: Cable Percussion		Driller: PB Drilling		Logged By: TB																																																		
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe																																																
16.40 16.50 - 16.95	D SPT	N=37			16.20	Stiff orangish grey slightly gravelly CLAY with occasional sand bands. Gravel is angular to sub-angular fine to coarse of mixed lithologies. Rare cobble content. (Till, Devensian - Diamicton) Very stiff brownish grey becoming mottled orangish brown slightly sandy CLAY. (Till, Devensian - Diamicton)																																																		
17.50	D				17.00																																																			
18.00 - 18.45	SPT	N=50			18.00																																																			
18.50	ES				19.00																																																			
19.50 - 19.95	SPT	N=50			20.00																																																			
21.00 - 21.45	SPT	N=50			21.00 21.20																																																			
21.90	ES	N=50			22.00	Orangish brown SANDSTONE. (Chester Formation - Sandstone)																																																		
22.50 - 22.95	SPT				23.00																																																			
24.00 - 24.45	SPT				24.00																																																			
						Borehole Continues																																																		
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa ▽ - Groundwater Strike ▼ - Groundwater Level			REMARKS No Groundwater Encountered 			Water Strikes <table border="1"> <thead> <tr> <th>Date</th> <th>Strike</th> <th>Level</th> <th>Minutes</th> <th>Casing</th> <th>Sealed</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="3">Daily Log Of Depths</th> <th colspan="3">Chiselling</th> </tr> <tr> <th>Date</th> <th>Casing</th> <th>Water</th> <th>From</th> <th>To</th> <th>Hours</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>			Date	Strike	Level	Minutes	Casing	Sealed																			Daily Log Of Depths			Chiselling			Date	Casing	Water	From	To	Hours												
Date	Strike	Level	Minutes	Casing	Sealed																																																			
Daily Log Of Depths			Chiselling																																																					
Date	Casing	Water	From	To	Hours																																																			

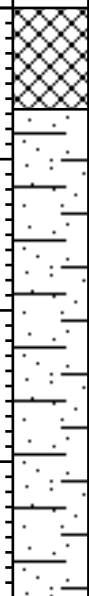
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			Project Number: 10/1448.1		Client: Great Places Housing Group																											
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Date: 17/08/2022-19/08/2022			Method: Cable Percussion		Driller: PB Drilling		Logged By: TB																									
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe																								
				* * * *	25.00	Orangish brown SANDSTONE. (Chester Formation - Sandstone)																										
						End Of Borehole At 25.00 m																										
					26.00																											
					27.00																											
					28.00																											
					29.00																											
					30.00																											
					31.00																											
					32.00																											
KEY D - Disturbed Sample B - Bulk Sample U - Undisturbed W - Water Sample S - Standard Penetration Test C - Cone Penetration Test N - Penetration Test 'N' Value V - Hand Shear Vane kPa  - Groundwater Strike  - Groundwater Level			REMARKS No Groundwater Encountered 			Water Strikes <table border="1"> <tr> <th>Date</th> <th>Strike</th> <th>Level</th> <th>Minutes</th> <th>Casing</th> <th>Sealed</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>			Date	Strike	Level	Minutes	Casing	Sealed																		
Date	Strike	Level	Minutes	Casing	Sealed																											
			Scale: 1:50			Daily Log Of Depths Chiselling <table border="1"> <tr> <th>Date</th> <th>Casing</th> <th>Water</th> <th>From</th> <th>To</th> <th>Hours</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>			Date	Casing	Water	From	To	Hours																		
Date	Casing	Water	From	To	Hours																											

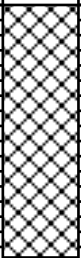
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			Project Number: 10/1448.1		Client: Great Places Housing Group			
			GL (mAOD):		N Coord: 53.4809		E Coord: -2.227765	
Date: 18/08/2022			Method: JCB		Logged By: TB		Scale: 1:50	
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	
0.80	ES				1.00	MADE GROUND: Brownish grey slightly clayey sand and gravel with many cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies including brick and concrete. Cobbles are brick and concrete with fragments of wood plastic and metal.		
					2.00			
					3.00			
					3.48			
3.70	ES				4.00	Yellowish brown slightly clayey SAND .		
					4.10			
						End Of Trial Pit At 4.10 m		
					5.00			
					6.00			
					7.00			
					8.00			
					9.00			
					10.00			
KEY						REMARKS		
D - Disturbed Sample						No Groundwater Encountered Trial pit backfilled with arisings.		
B - Bulk Sample								
W - Water Sample								
V - Hand Shear Vane kPa								
 - Groundwater Strike								
 - Groundwater Level								
								

			Project Title: Laystall Street Development, Manchester			TP02		
			Project Number: 10/1448.1		Client: Great Places Housing Group			
			GL (mAOD):		N Coord: 53.480903		E Coord: -2.227658	
Date: 18/08/2022			Method: JCB		Logged By: TB		Scale: 1:50	
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	
0.40	ES				1.00	MADE GROUND: Brownish grey slightly clayey sand and gravel with many cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies including brick and concrete. Cobbles are brick and concrete with fragments of wood plastic and metal.		
					2.00			
					3.00			
3.90	ES				3.58	Firm becoming stiff yellowish brown slightly sandy CLAY.		
					4.00			
					4.17			
					5.00	End Of Trial Pit At 4.17 m		
				6.00				
				7.00				
				8.00				
				9.00				
				10.00				
KEY D - Disturbed Sample B - Bulk Sample W - Water Sample V - Hand Shear Vane kPa						REMARKS No Groundwater Encountered Trial pit backfilled with arisings.		

 - Groundwater Strike
 - Groundwater Level



			Project Title: Laystall Street Development, Manchester			TP03		
			Project Number: 10/1448.1		Client: Great Places Housing Group			
			GL (mAOD):		N Coord: 53.480705		E Coord: -2.227566	
Date: 18/08/2022			Method: JCB		Logged By: TB		Scale: 1:50	
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	
1.70	ES				0.67	MADE GROUND: Brownish grey slightly clayey sand and gravel with many cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies including brick and concrete. Cobbles are brick and concrete with fragments of wood plastic and metal and glass. . Firm becoming stiff yellowish brown slightly sandy CLAY.		
					1.00			
	2.00							
	3.00							
3.70	ES							
				3.93				
	4.00	End Of Trial Pit At 3.93 m						
	5.00							
	6.00							
	7.00							
	8.00							
	9.00							
	10.00							
KEY					REMARKS			
D - Disturbed Sample					No Groundwater Encountered			
B - Bulk Sample					Trial pit backfilled with arisings.			
W - Water Sample								
V - Hand Shear Vane kPa								
 - Groundwater Strike  - Groundwater Level								

			Project Title: Laystall Street Development, Manchester			TP04		
			Project Number: 10/1448.1		Client: Great Places Housing Group			
			GL (mAOD):		N Coord: 53.480728		E Coord: -2.227679	
Date: 18/08/2022			Method: JCB		Logged By: TB		Scale: 1:50	
Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	
1.03	ES				1.00	MADE GROUND: Brownish grey slightly clayey sand and gravel with many cobbles. Gravel is angular to sub-angular fine to coarse of mixed lithologies including brick and concrete. Cobbles are brick and concrete with fragments of wood plastic and metal.		
					1.67	End Of Trial Pit At 1.67 m		
					2.00			
					3.00			
					4.00			
					5.00			
					6.00			
					7.00			
					8.00			
					9.00			
					10.00			
KEY D - Disturbed Sample B - Bulk Sample W - Water Sample V - Hand Shear Vane kPa						REMARKS No Groundwater Encountered Trial pit backfilled with arisings.		



APPENDIX III
CHEMICAL LABORATORY TEST RESULTS

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 22/08386
Issue Number: 1

Date: 08 September, 2022

Client: Clancy Consulting
Dunham Court
2 Dunham Road
Altrincham
Cheshire
UK
WA14 4NX

Project Manager: Sophie Harper-Pryce
Project Name: Laystall Street, Manchester
Project Ref: 10/1448.1
Order No: 31413
Date Samples Received: 26/08/22
Date Instructions Received: 26/08/22
Date Analysis Completed: 08/09/22

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 22/08386

Client Project Name: Laystall Street, Manchester

Client Project Ref: 10/1448.1

Lab Sample ID	22/08386/1	22/08386/2	22/08386/3	22/08386/4	22/08386/5	22/08386/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	TP1	TP1	TP2	TP3	TP4				
Depth to Top	0.40	0.80	3.70	3.90	1.70	1.03				
Depth To Bottom										
Date Sampled	17-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	5A	4AB	4AB	4ABE	5AB	4AB				
% Stones >10mm _A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		% w/w	0.1	A-T-044
pH _D ^{M#}	11.23	10.91	10.04	10.03	8.16	8.27		pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.19	0.67	0.99	0.75	0.68	0.73		g/l	0.01	A-T-026s
Total Organic Carbon _D ^{M#}	2.45	-	3.37	-	3.72	-		% w/w	0.03	A-T-032s
Arsenic _D ^{M#}	9	10	11	14	11	12		mg/kg	1	A-T-024s
Beryllium _D	1.0	0.7	0.8	1.4	1.1	0.8		mg/kg	0.5	A-T-024s
Boron (water soluble) _D	1.1	1.8	1.8	2.2	1.6	2.7		mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5	0.6	10.7	0.7	<0.5	0.9		mg/kg	0.5	A-T-024s
Copper _D ^{M#}	48	31	37	50	59	35		mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	<1		mg/kg	1	A-T-040s
Lead _D ^{M#}	135	114	180	142	86	221		mg/kg	1	A-T-024s
Mercury _D	0.74	0.18	0.26	<0.17	<0.17	0.25		mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	26	17	18	28	25	16		mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	<1		mg/kg	1	A-T-024s
Vanadium _D ^{M#}	32	25	28	40	30	24		mg/kg	1	A-T-024s
Zinc _D ^{M#}	70	162	765	143	63	239		mg/kg	5	A-T-024s

Envirolab Job Number: 22/08386

Client Project Name: Laystall Street, Manchester

Client Project Ref: 10/1448.1

Lab Sample ID	22/08386/1	22/08386/2	22/08386/3	22/08386/4	22/08386/5	22/08386/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	TP1	TP1	TP2	TP3	TP4				
Depth to Top	0.40	0.80	3.70	3.90	1.70	1.03				
Depth To Bottom										
Date Sampled	17-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	5A	4AB	4AB	4ABE	5AB	4AB				
Asbestos in Soil (inc. matrix)										
Asbestos in soil _D [#]	NAD	NAD	NAD	NAD	NAD	Amosite & Chrysotile				A-T-045
Asbestos Matrix (visual) _D	-	-	-	-	-	-				A-T-045
Asbestos Matrix (microscope) _D	-	-	-	-	-	Loose Fibres				A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A	N/A	N/A				A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _D	-	-	-	-	-	<0.001		% w/w	0.001	A-T-054

Envirolab Job Number: 22/08386

Client Project Name: Laystall Street, Manchester

Client Project Ref: 10/1448.1

Lab Sample ID	22/08386/1	22/08386/2	22/08386/3	22/08386/4	22/08386/5	22/08386/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	TP1	TP1	TP2	TP3	TP4				
Depth to Top	0.40	0.80	3.70	3.90	1.70	1.03				
Depth To Bottom										
Date Sampled	17-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	5A	4AB	4AB	4ABE	5AB	4AB				
PAH-16MS										
Acenaphthene _A ^{M#}	0.14	5.47	-	-	0.11	4.67		mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.02	0.03	-	-	<0.01	0.24		mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.17	3.63	-	-	0.15	5.58		mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.35	6.53	-	-	0.32	18.2		mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.28	4.97	-	-	0.25	11.8		mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.33	5.19	-	-	0.29	12.5		mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.15	2.09	-	-	0.14	5.67		mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.12	1.96	-	-	0.10	4.17		mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.43	7.30	-	-	0.37	17.5		mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.47	-	-	<0.04	1.64		mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.78	14.8	-	-	0.64	33.1		mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	0.09	3.41	-	-	0.09	3.22		mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.15	2.13	-	-	0.14	6.69		mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.12	17.4	-	-	0.16	9.86		mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.87	21.6	-	-	0.72	26.3		mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.81	15.3	-	-	0.66	32.5		mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	4.81	112	-	-	4.14	194		mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/08386

Client Project Name: Laystall Street, Manchester

Client Project Ref: 10/1448.1

Lab Sample ID	22/08386/1	22/08386/2	22/08386/3	22/08386/4	22/08386/5	22/08386/6		Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH1	TP1	TP1	TP2	TP3	TP4				
Depth to Top	0.40	0.80	3.70	3.90	1.70	1.03				
Depth To Bottom										
Date Sampled	17-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	5A	4AB	4AB	4ABE	5AB	4AB				
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1	<1	<1	<5		mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	1	2	3	<1	<1	<5		mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	2	9	6	4	<1	8		mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	2	15	10	7	1	14		mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	12	194	118	45	7	180		mg/kg	1	A-T-055s
Total Aliphatics _A	16	200	108	51	7	183		mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1	2	<1	<1	<1	<5		mg/kg	1	A-T-055s
Aro >C10-C12 _A	2	59	30	21	<1	54		mg/kg	1	A-T-055s
Aro >C12-C16 _A	10	138	95	65	4	133		mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	23	217	187	130	9	292		mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	50	410	388	274	30	656		mg/kg	1	A-T-055s
Total Aromatics _A	75	750	551	451	34	1030		mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	91	950	659	502	41	1210		mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<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 "A" 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:	Clancy Consulting, Dunham Court, 2 Dunham Road, Altrincham, Cheshire, UK, WA14 4NX	Project No:	22/08386
Project:	Laystall Street, Manchester	Date Received:	26/08/2022 (am)
Clients Project No:	10/1448.1	Cool Box Temperatures (°C):	13.5

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.

Envirolab Analysis Dates

Lab Sample ID	22/08386/1	22/08386/2	22/08386/3	22/08386/4	22/08386/5	22/08386/6
Client Sample No						
Client Sample ID/Depth	BH1 0.40m	TP1 0.80m	TP1 3.70m	TP2 3.90m	TP3 1.70m	TP4 1.03m
Date Sampled	17/08/22	18/08/22	18/08/22	18/08/22	18/08/22	18/08/22
A-T-019s	05/09/2022	05/09/2022			05/09/2022	05/09/2022
A-T-022s	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022
A-T-024s	05/09/2022	05/09/2022	05/09/2022	05/09/2022	05/09/2022	05/09/2022
A-T-026s	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022
A-T-027s	03/09/2022	03/09/2022	03/09/2022	03/09/2022	03/09/2022	03/09/2022
A-T-031s	05/09/2022	05/09/2022	05/09/2022	05/09/2022	05/09/2022	06/09/2022
A-T-032s	01/09/2022		01/09/2022		01/09/2022	
A-T-040s	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022
A-T-044	01/09/2022	01/09/2022	01/09/2022	01/09/2022	01/09/2022	01/09/2022
A-T-045	31/08/2022	31/08/2022	31/08/2022	31/08/2022	31/08/2022	31/08/2022
A-T-054						08/09/2022
A-T-055s	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022
Calc-As Recd	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022	02/09/2022

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

APPENDIX IV
GEOTECHNICAL LABORATORY TEST RESULTS



LABORATORY REPORT



4043

Contract Number: PSL22/5661

Report Date: 16 September 2022

Client's Reference: 10/1448.1

Client Name: Clancy Consulting
Dunham Court
2 Dunham Road
Altrincham
Cheshire
WA144NX

For the attention of: Sophie Harper-Price

Contract Title: Laystall Street, Manchester

Date Received: 31/8/2022

Date Commenced: 31/8/2022

Date Completed: 16/9/2022

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)

S Eyre
(Senior Technician)

T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Laystall Street, Manchester

Contract No:

PSL22/5661

Client Ref:

10/1448.1

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



4043

PSL
Professional Soils Laboratory

Laystall Street, Manchester

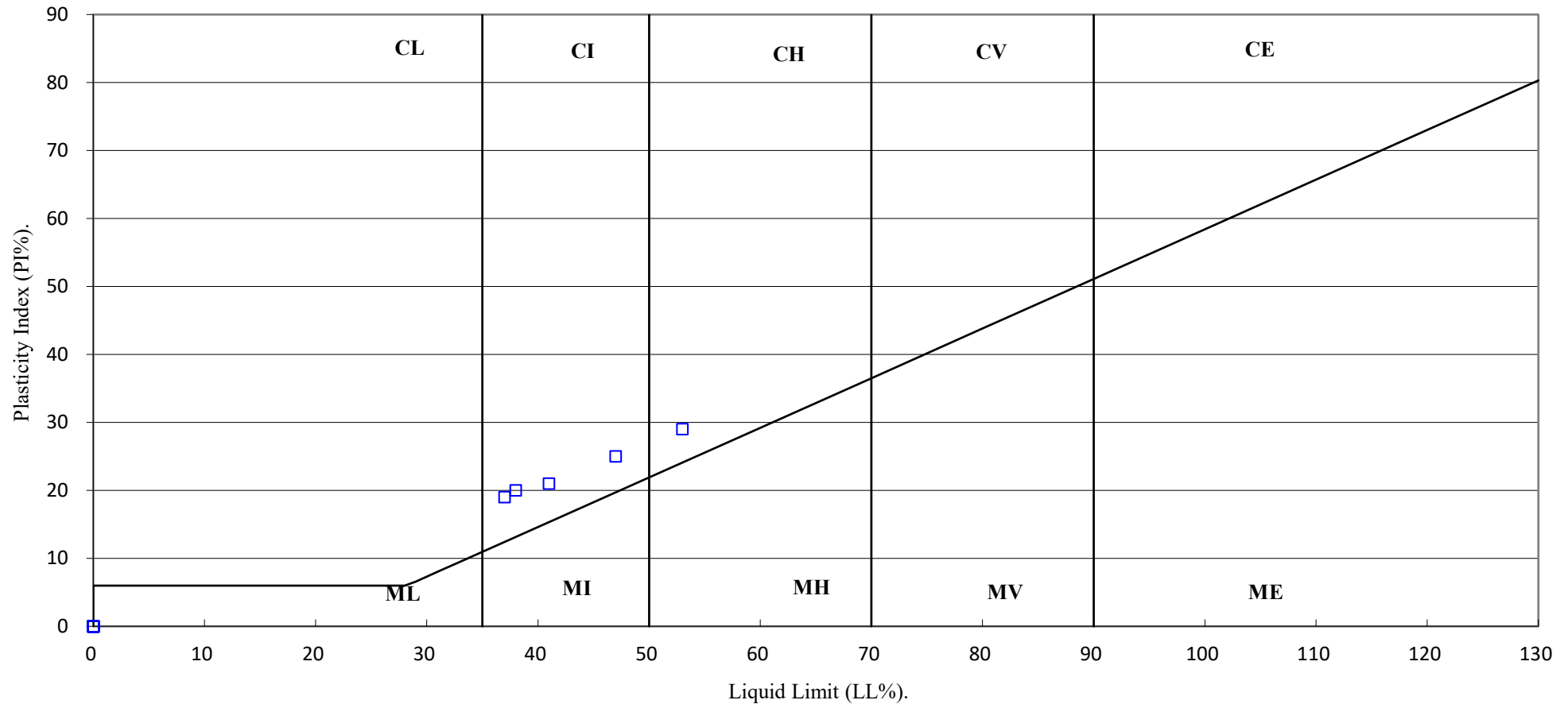
Contract No:

PSL22/5661

Client Ref:

10/1448.1

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Laystall Street, Manchester

Contract No:

PSL22/5661

Client Ref:

10/1448.1

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

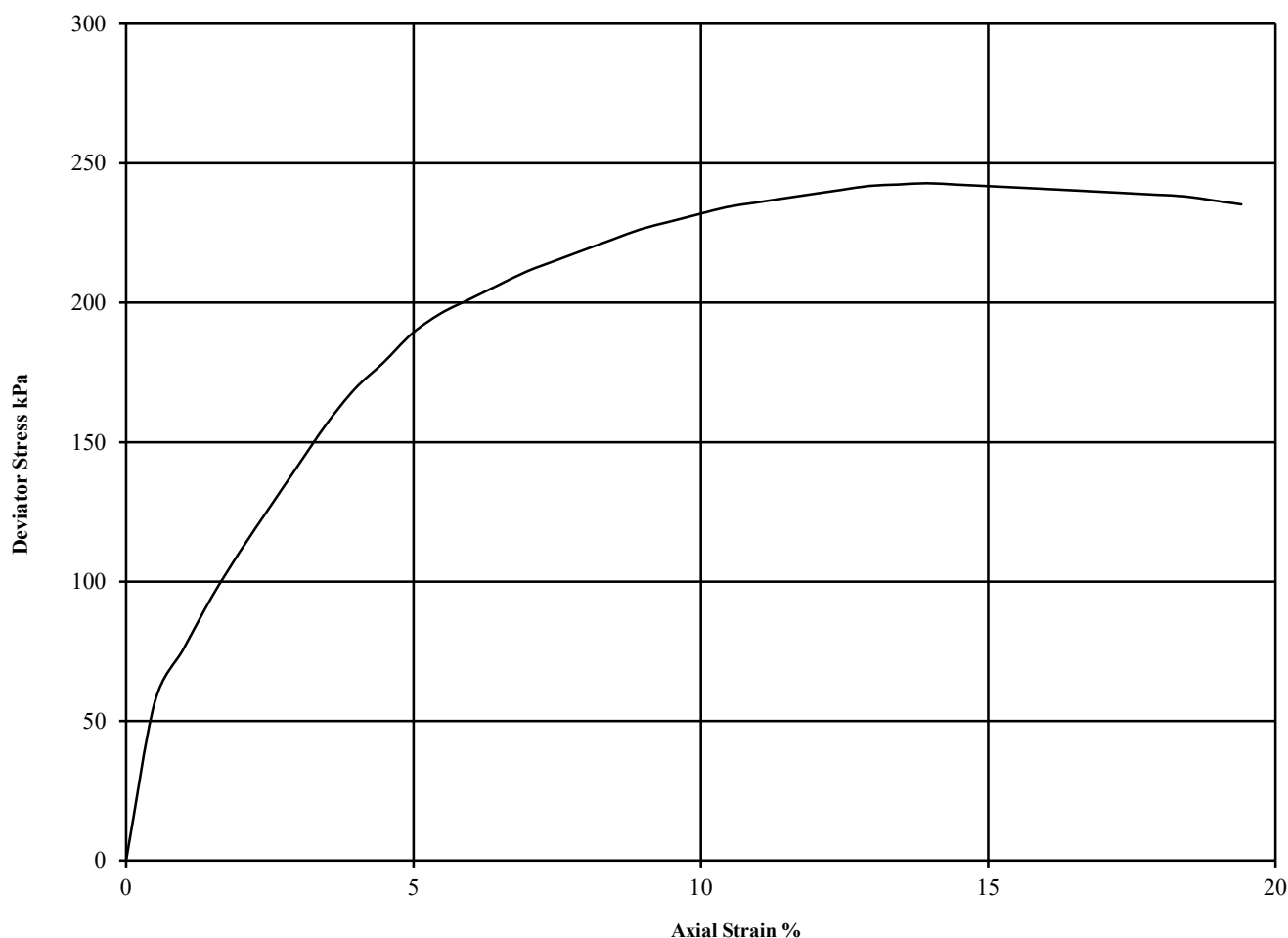
Hole Number: BH1

Top Depth (m): 4.40

Sample Number:

Base Depth (m): 4.45

Sample Type -



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	22	2.12	1.74	88	243	121	13.9	Plastic	



4043

PSL

Professional Soils Laboratory

Laystall Street, Manchester

Contract No:

PSL22/5661

Client Ref:

10/1448.1

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

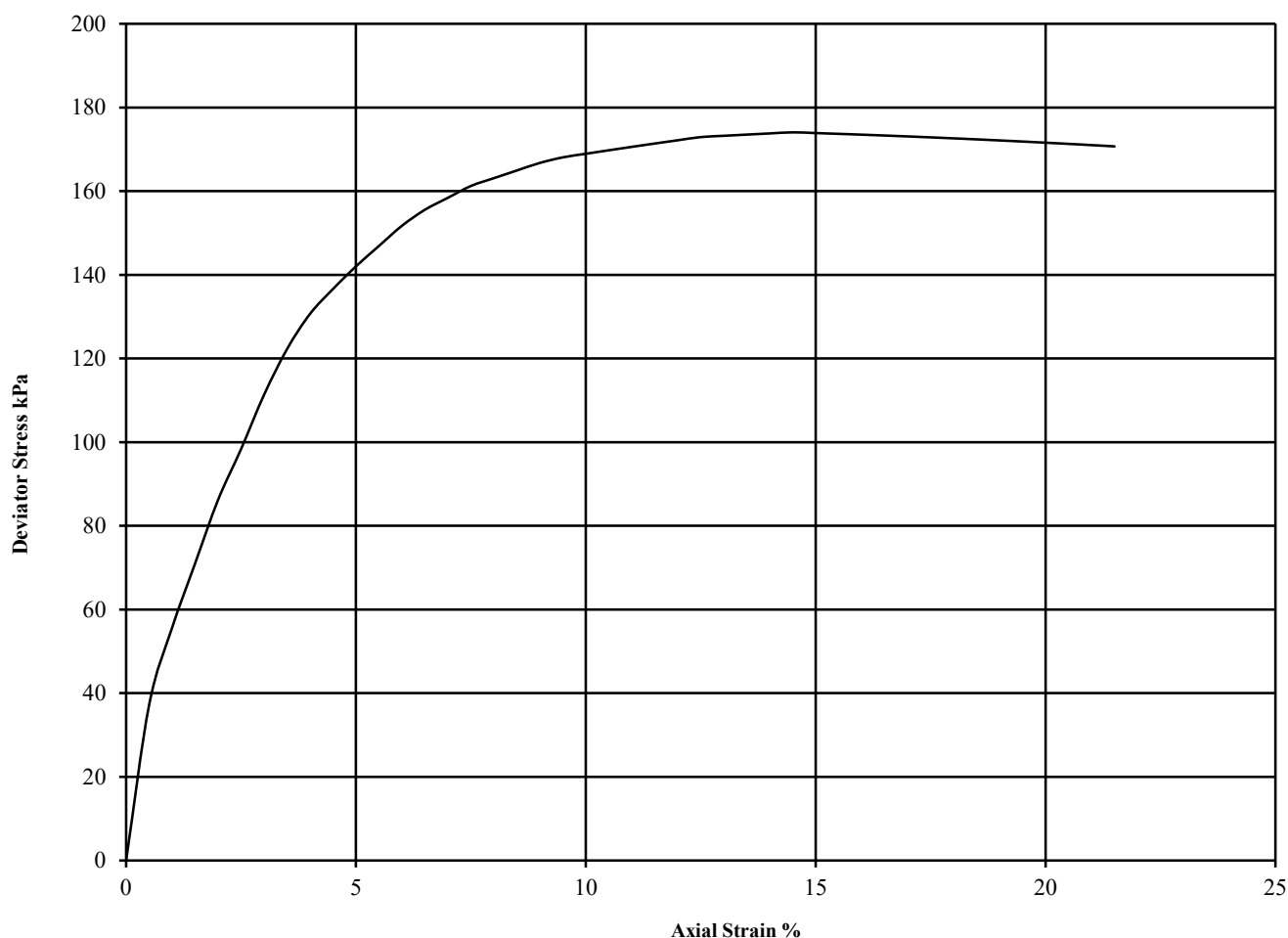
Hole Number: BH1

Top Depth (m): 9.00

Sample Number:

Base Depth (m): 9.45

Sample Type -



Diameter (mm):		102	Height (mm):		204	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.35 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	18	2.23	1.89	180	174	87	14.5	Plastic	



4043

PSL

Professional Soils Laboratory

Laystall Street, Manchester

Contract No:

PSL22/5661

Client Ref:

10/1448.1

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

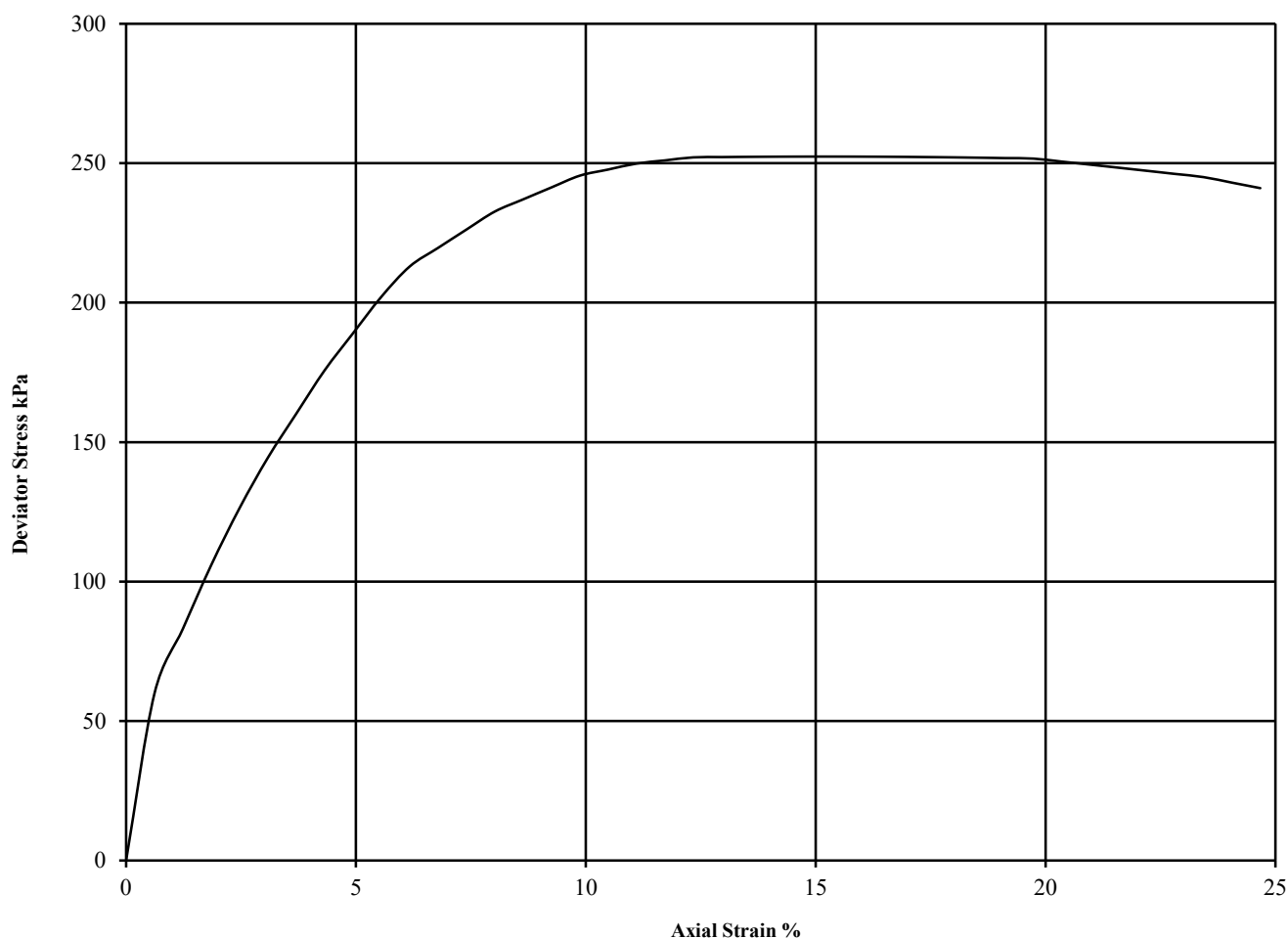
Hole Number: BH1

Top Depth (m): 15.00

Sample Number:

Base Depth (m): 15.45

Sample Type -



Diameter (mm):		103	Height (mm):		167	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	11	2.22	2.00	300	252	126	15.4	Intermediate	



4043

PSL

Professional Soils Laboratory

Laystall Street, Manchester

Contract No:

PSL22/5661

Client Ref:

10/1448.1



DETS

Certificate of Analysis

Certificate Number 22-17858

Issued: 13-Sep-22

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

Our Reference 22-17858

Client Reference PSL22/5661

Order No (not supplied)

Contract Title Laystall Street, Manchester

Description 5 Soil samples.

Date Received 09-Sep-22

Date Started 09-Sep-22

Date Completed 13-Sep-22

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

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

Approved By



Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 22-17858

Client Ref PSL22/5661

Contract Title Laystall Street, Manchester

Lab No	2056134	2056135	2056136	2056137	2056138
Sample ID	TP3	BH1	BH1	BH1	BH1
Depth	3.70	4.60	7.50	15.50	19.50
Other ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Inorganics								
pH	DETSC 2008#		pH	8.1	8.3	8.4	8.3	8.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	120	46	66	62	50

Information in Support of the Analytical Results

Our Ref 22-17858
 Client Ref PSL22/5661
 Contract Laystall Street, Manchester

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2056134	TP3 3.70 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2056135	BH1 4.60 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2056136	BH1 7.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2056137	BH1 15.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	
2056138	BH1 19.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (30 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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

End of Report