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Geotechnical Ground Investigation – Concrete Floor Slab

Storage World Ambrose Street, Manchester

Jan 2023

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Geotechnical Investigation

1. Introduction

This report is an account of a ground investigation carried out by GeoAssist Limited at the request of Thomasons on behalf of Storage World Self Storage & Workspace LLP their Client and undertaken at the existing Storage World Ambrose Street, Manchester.

The object of this investigation was to obtain information into the ground conditions inside and around the existing unit which is to be demolished and where the proposed new unit is to be constructed.

The work was commissioned following the instructions to proceed issued on 3rd November 2022 by Thomasons on behalf of their Client Storage World Self Storage & Workspace LLP.

The location of the area under investigation is indicated on the site plan in Appendix A1 along with the exploratory hole locations.

2. Description of the Site

2.1 Present

The site is located to the northern side of Ambrose Street at the junction of Pottery Lane and is presently occupied by a large warehouse structure with associated exterior hardstanding areas. The building is subdivided into smaller commercial/light industrial and retail lettings. The site is roughly rectangular in shape and the general topography of the site is relatively level.

A railway line forms the northern boundary to the site. Commercial/industrial property is located along the eastern boundary of the site. The southern boundary to the site abuts Ambrose Street over which more commercial/industrial property is located. To the west the site abuts Pottery Lane across which more commercial /warehousing/light industrial units are located.

Where observed the condition of the concrete floor was not uniform or consistent.

2.2 Proposed Development

The proposed development comprises a new storage facility occupying a similar foot print to the existing unit with new concrete floor slabs and external hardstanding.

The proposed plan for the Site forms appendix A2 to this report.

3. Geology

The 1 in 10,560 scale geological map of the area SJ 89 NE published in 1976, shows the site to be located on Boulder Clay (Glacial Till) Drift deposits. The depth of the drift is not readily discernible from the plans. The underlying solid geology is shown as being Westphalian C Undifferentiated red strata, mainly Mudstone of the Carboniferous Period.

No faults in the solid geology pass directly beneath the site, however, a fault is shown as roughly 150m east of the site in a roughly north-south direction.

4. Intrusive Investigation

The ground investigation was carried out in accordance with BS 5930:1999/2015 where relevant.

All fieldwork was supervised by suitably qualified GeoAssist Limited Geotechnical Engineers.

Geotechnical in situ testing, sampling and laboratory testing was carried out within the GeoAssist Laboratory.

The exploratory holes were located at positions that were accessible for the equipment used and as indicated by Thomasons Engineer.

4.1 Exploratory Hole Programme

Exploratory holes BH1 to BH6 were undertaken using windowless sampling and dynamic probing techniques.

The internal concrete floor was pre-cored to allow the in-situ testing beneath.

Two trial pits referenced TP1 and TP2 were excavated immediately adjacent to the existing retaining wall running along the north side of the site in order to establish, if possible, the nature and depth of the existing foundations of the retaining wall.

The locations of all the exploratory holes are shown on the site plan attached to this report in Appendix A.

The exploratory holes were completed between the 14th and 16th November 2022.

4.2 Field Sampling and Testing

Representative samples were taken of all the strata encountered in the exploratory holes.

In Situ Dynamic Penetration tests using the Standard SPT drop weight and drop height were carried out in the exploratory holes. All samples were stored in airtight containers and returned to the laboratory for subsequent examination and testing.

In situ TRL DCP tests were undertaken at shallow depth in selected exploratory holes in order that CBR values for the subsoils could be assessed.

Observations of groundwater conditions were made throughout the fieldwork operations.

Exploratory holes BH1, BH3 and BH6 were converted to gas/groundwater monitoring standpipes.

On completion to depth the remaining exploratory holes were backfilled and reinstated.

4.3 Field Results

Full details of the subsoil conditions in the exploratory holes are given in the exploratory hole log sheets, which form Appendix C1 to this report.

The details of the strata in the exploratory holes were recorded by a suitably qualified Professional Engineer. The results of interpreted CBR values are recorded on the exploratory hole logs.

5. Laboratory Investigation

5.1 Geotechnical Testing

The following geotechnical tests were performed in GeoAssist's laboratory on samples recovered from the exploratory holes.

Table 5.1 Geotechnical Testing

TEST	PURPOSE
Shear Strength from Hand Vane/Hand Penetrometer test	Assessment of in-situ shear strength of cohesive deposits
Natural Moisture Content and Classification test	Assessment of in-situ subsoil conditions and compressibility/shrinkage of cohesive deposits
Sulphate and pH test	Assessment of potential aggressive ground conditions with respect to subsurface concrete

5.2 Test Results

The geotechnical test results are given in the laboratory test results summary sheets, which form Appendices D1 to D3 to this report.

6. Subsurface Stratigraphy

The subsoil profile obtained from the exploratory holes consists of made ground to depths between 0.40m and 2.70m over gravelly sandy silty Clay with sand inclusions. The upper made ground consists of concrete/hard standing over sandy gravels with brick fragments. A lower silty clay with cinders and ash was encountered in BH2, BH3 and BH6.

Further details of the subsurface stratigraphy can be found in the exploratory hole log sheets which form Appendix C1 to this report.

Table 6.0 Subsoil Profile Summary

Strata	Depth of Strata (m) below ground level	
	Top	Base
Made Ground – MG1 Concrete/Hard standing over variable mixed granular	Ground Level	0.30 to 1.40
Made Ground – MG2 Silty Clay with ash and cinders in parts	0.20 to 1.90 BH2, BH3 and BH6	2.00 to 2.70 BH2, BH3 and BH6
Glacial Till – GT Gravelly sandy silty Clay	0.40 to 2.70	>6.00

7. Groundwater

Groundwater was encountered at depths of 1.90m and 1.00m in BH1 and BH6 respectively during the course of the fieldwork. The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to

the record being taken.

Groundwater levels associated with the groundwater monitoring in BH1 and BH6 standpipes installed on this site indicate that over the monitoring period 09/12/2022 to 16/01/2023, ground water has been recorded as being present at highest depths of 1.90m and 0.80m respectively with a corresponding highest level around 51.0 mAOD. Water ingress was noted at a higher level of 52.3mAOD in the Trial Pits.

Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.

8. Geotechnical Properties

The following sections summarise the geotechnical properties for the main strata encountered on this site and are based on physical description, measured and empirical values.

8.1 Upper Made Ground – MG1

Made ground has been identified on the entire site as being mainly granular consisting of sandy gravel with brick fragments and cinders in varying proportions.

Table 8.1 Summary of Geotechnical Properties – Upper Made Ground

Property	Number of Tests	Range of Results	Derived Value Weighted Mean
Sulphate 2:1 Water:Soil Extract	1	520 mg/l	520 mg/l
Sulphate Total from contamination tests	4	0.018 to 2.14%	2.14 % See note on concrete attack

8.2 Lower Made Ground – MG2

Made ground has been identified in BH2, Bh3 and BH6 as being mainly cohesive consisting of silty clay with cinders in varying proportions.

Table 8.2 Summary of Geotechnical Properties – Lower Made Ground

Property	Number of Tests	Range of Results	Derived Value Weighted Mean
Sulphate 2:1 Water:Soil Extract	3	400 to 510 mg/l	520 mg/l see above
Sulphate Total from contamination tests	4	0.019 to 1.2%	1.2%

8.3 Glacial Till – GT

Gravelly sandy silty Clay, medium to very high strength increasing with depth and intermediate to high in plasticity

Table 8.3 Summary of Geotechnical Properties – Glacial Till

Property	Number of Tests	Range of Results	Derived Value Weighted Mean
Sulphate 2:1 Water:Soil Extract	2	400 to 470 mg/l	520 mg/l see above
Plasticity Index	2	25% to 34%	31%
Shear Strength From Hand Vane tests within influencing depth	6	109 to 170 kN/m ²	100 kN/m ² Reduced to alleviate adverse settlements
Assessed CBR value for TRLDGP probe tests	3	5% to 13%	5% Drained with water 0.60m lower than formation

9. Geotechnical Assessment

9.1 Design Criteria

The following typical design criteria have been assumed for the proposed development.

1. Structural loads of up to 20kN/m² on slab foundations at shallow depth.
2. Structural loads of up to 120kN/m² on pad foundations up to 2.00m square at depth of around 1.00m.

9.2 Foundation Design Considerations

Made ground is present across the site. Deeper pad/strip foundations located in the natural clay present at depths between 1.00m and 2.70m may be considered.

9.3 Shallow to Moderate Depth Footings

Reinforced concrete foundations located on the stiff natural gravelly sandy silty clay can be designed to the bearing capacities given below with the likely associated settlements as indicated.

Depth m	Material	Foundation Type	Maximum Foundation Size m	Allowable bearing capacity kN/m ²	Long term Settlement mm
1.00 to 2.70	Stiff gravelly sandy silty Clay	Pad	Up to 2.00 square	200	<25

Concreting of foundations should take place as soon as formation level is exposed in order to prevent weakening of the subsoil due to the ingress of surface/seepage groundwater.

9.4 Excavations

Ancillary shallow depth excavations (<1.20m) in the made ground will require nominal support with at least pumping from sumps to control surface water ingress. There is a high perched groundwater on site apparently fed by seepage water emanating from beneath the adjacent retaining wall and railway embankment. Suitable interception of this seepage water should be installed as part of the enabling works during demolition of the existing buildings.

10. Vehicle Pavement Foundations

The results of classification tests indicate a CBR value of 5% could be anticipated in the very silty clays present across the site.

The pavement design and construction will be dependent on the service requirements of the intended vehicular paved area and consequently is outside the scope of this report.

The very silty clay in this area is susceptible to softening in the presence of surface/ground water when exposed and it is recommended that the Engineer takes a conservative approach to the design in respect of CBR value likely to be obtained during construction. In situ CBR tests should be undertaken to confirm that the design for the external outside paved areas has been achieved during/after the enabling works after demolition has been completed.

Adequate drainage should be installed to ensure that the groundwater is at least 600mm below the sub-base of the pavement foundations.

11. Subsurface Concrete Attack

The results of the soluble sulphate and pH tests carried out on samples of subsoil obtained from this site in general indicate that according to Building Research Establishments Special Digest 1 (2005) no particular precautions for concrete foundations will be required.

Generally, the use of concrete mix design sulphate class DS-2 and according to ACEC Class AC-2 of Table C1 conditions can be used for subsurface concrete mix design in contact with the natural clay.

It should be noted a high total sulphate content was encountered within the fill materials in BH2 and BH5 and the Design Engineer should ensure suitable precautions should be undertaken to remove the made ground deposits off site or to segregate concrete foundations from the potentially aggressive made ground materials.



Matthew Benson BSc
Geotechnical/Environmental Engineer



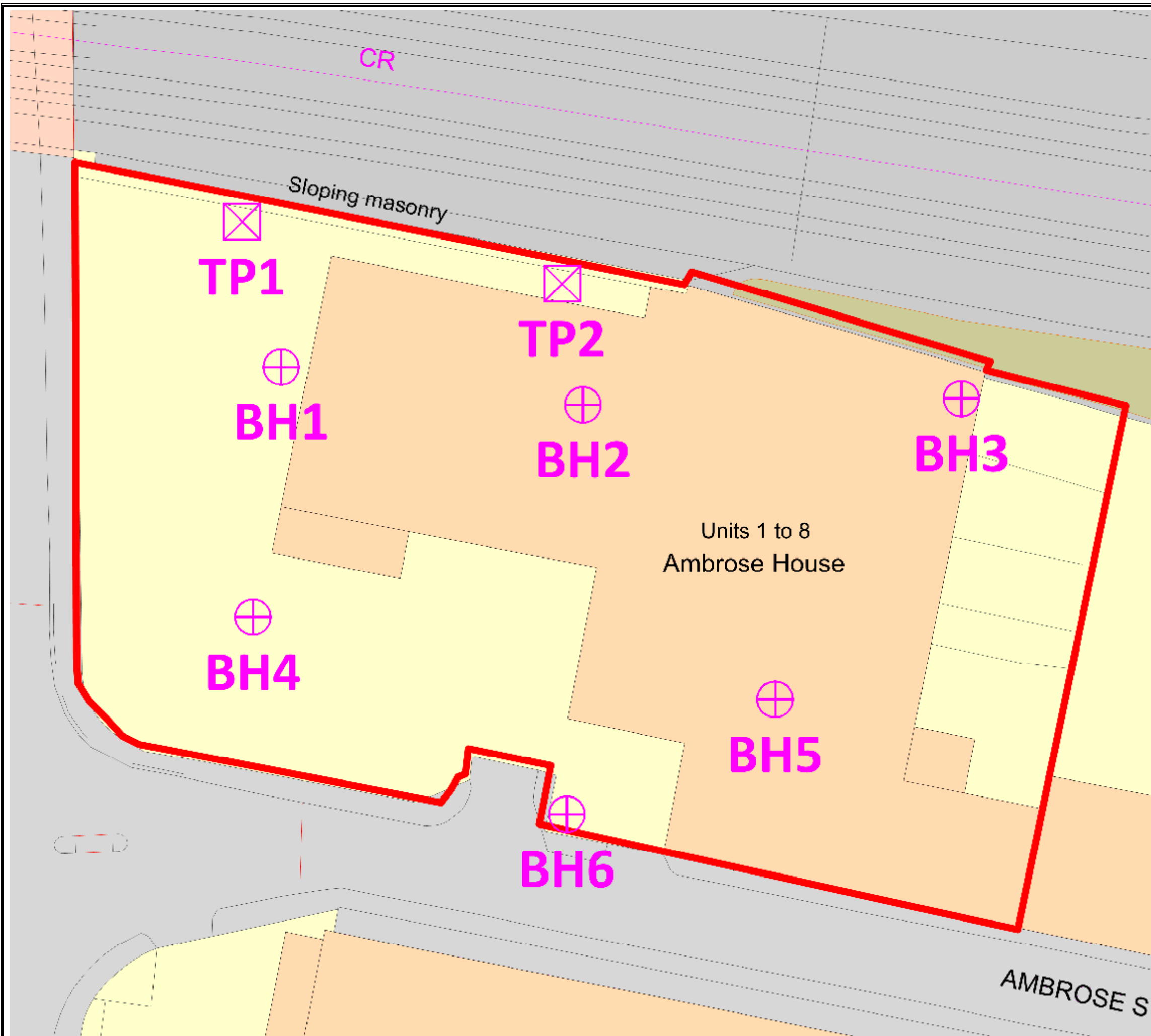
Mark Richardson MSc CEng MICE
Technical Director

Field investigations have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions are, and can be, variable and have only been tested at isolated locations across the site. Therefore, the potential exists for ground conditions to be encountered which are different to those considered in this report.

This report has been prepared by GeoAssist Limited with all reasonable professional skill, care and diligence within the terms of the contract with Storage World Self Storage & Workspace LLP. The report is confidential to Thomasons and Storage World Self Storage & Workspace LLP and GeoAssist Limited accepts no responsibility of whatever nature to third parties to whom this report may be divulged. GeoAssist Limited owns the copyright in this report. All rights are reserved, and unauthorised use is prohibited. Thomasons and Storage World Self Storage & Workspace LLP may use the report for their/her/his own purposes.

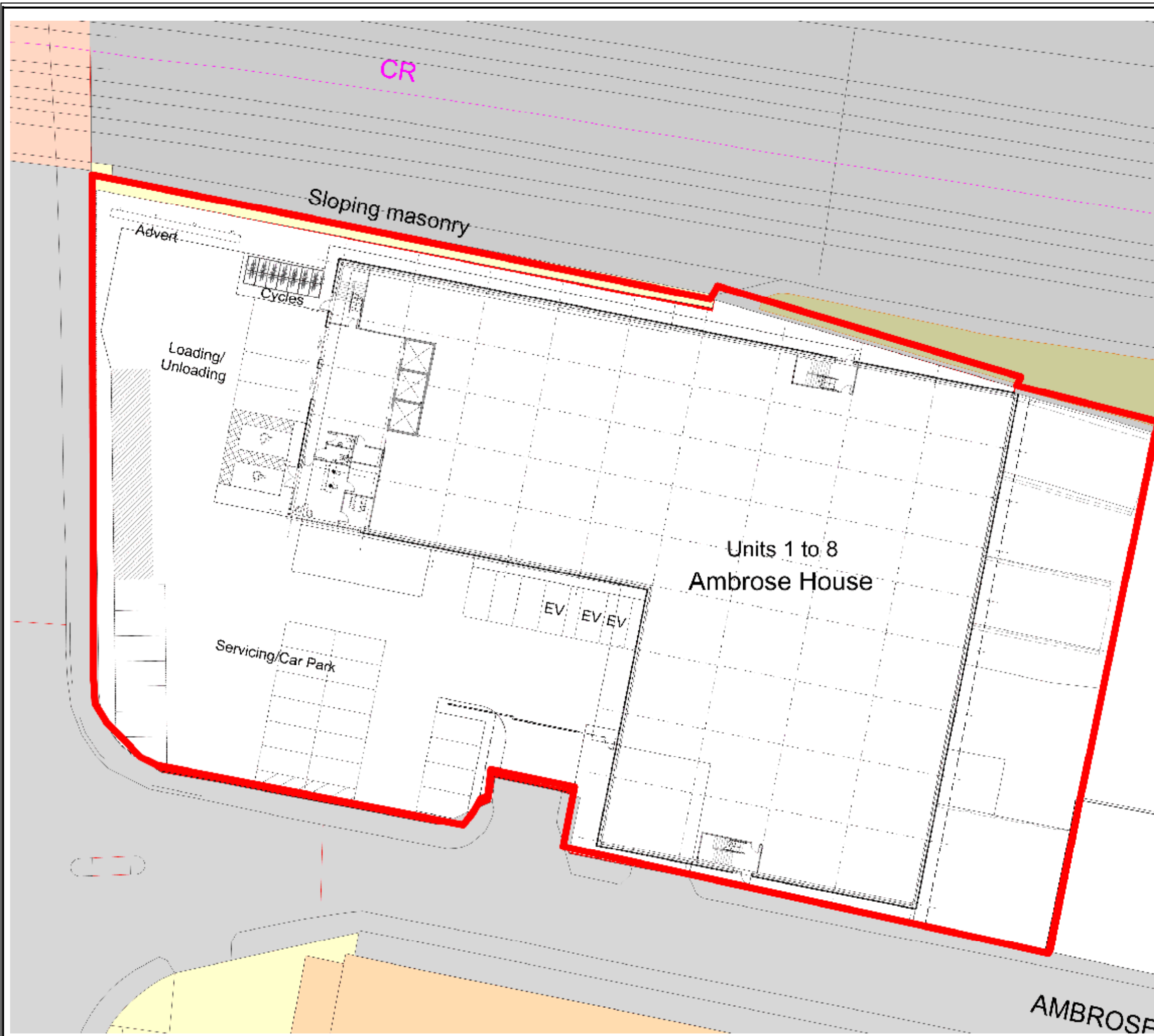
Appendix A

- A1 Site Plan with Exploratory Hole Locations
- A2 Proposed Site Plan



A1. Site Plan

Site Name	Seaton House Stockport
Location	
GeoAssist Ref	6101/VAJ
Client	Storage World Self Storage & Workspace LLP
Planning Consultant	Thomasons
NGR (centre of site)	387260, 397200
Production Date	Jan 2023
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36



A2. Proposed Plan

Site Name	Seaton House Stockport
Location	
GeoAssist Ref	6101/VAJ
Client	Storage World Self Storage & Workspace LLP
Planning Consultant	Thomasons
NGR (centre of site)	387260, 397200
Production Date	Jan 2023
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

Appendix B

- B1 Terminology used in Soil Descriptions
- B2 List of Abbreviations
- B3 Concrete in Aggressive Ground

Terminology used in Soil Descriptions

The procedure and principles given in BS EN ISO 14688-1:2002 Part 1: 'Identification and description' have been adopted in producing the soil descriptions contained within this report.

The general identification and description of soils is based on a flexible system for immediate (field) use by experienced persons, covering both material and mass characteristics by visual and manual techniques.

Details are given of the individual characteristics for identifying soils and the descriptive terms in regular use, including those related to the results of tests from the field.

This part of ISO 14688 is applicable to natural soils *in situ*, similar man-made materials *in situ* and soils redeposited by man.

Particular sections of BS EN ISO 14688-1:2002 Part 1 are reproduced here in order to clarify the production of the soil descriptions contained within this report.

Identification of soil

General

Soil characteristics that generally permit soil to be identified with adequate accuracy for general (or preliminary) characterization are outlined below. A more accurate identification and classification based on grading, plasticity or organic content can be achieved by laboratory tests. In addition to identifying soils, the condition in which a soil is encountered, any particular secondary constituents, other features of a soil, such as carbonate content, particle shape, surface roughness of particles, odour, any common names and the geological classification are indicated.

The identification and description of soils generally follows the flow chart in Figure B1.1 attached.

Particle size

Particle size is the fundamental basis for designating mineral soils using particle fractions to distinguish the soil mechanical behaviour.

Table B1 shows the terms to be used for each soil fraction and its sub-fractions, together with the corresponding chosen range of particle sizes.

Basic soils are soils with uniform grading (i.e. they consist of particles of only one size range as specified in Table B1.1

Table B1.1 Particle Size Fractions

Soil fractions	Sub-fractions	Symbols	Particle sizes mm
Very coarse soil	Large boulder	LBo	> 630
	Boulder	Bo	> 200 to 630
	Cobble	Co	> 63 to 200
Coarse soil	Gravel	Gr	> 2,0 to 63
	Coarse gravel	CGr	> 20 to 63
	Medium gravel	MGr	> 6,3 to 20
	Fine gravel	FGr	> 2,0 to 6,3
	Sand	Sa	> 0,063 to 2,0
	Coarse sand	CSa	> 0,63 to 2,0
	Medium sand	MSa	> 0,2 to 0,63
	Fine sand	FSa	> 0,063 to 0,2
Fine soil	Silt	Si	> 0,002 to 0,063
	Coarse silt	CSi	> 0,02 to 0,063
	Medium silt	MSi	> 0,006 3 to 0,02
	Fine silt	FSi	> 0,002 to 0,006 3
	Clay	Cl	≤ 0,002

APPENDIX B1

Form No.: QF029AEN

Composite soils

General

Most soils are composite and consist of principal and secondary fractions. They are designated by a noun (main term) describing the principal fraction and by one or more adjectives (qualifying terms) describing the secondary fractions (e.g. sandy gravel saGr, gravelly clay grCl).

Principal fraction

The principal fraction in terms of mass determines the engineering properties of the soil and is given in capital letters for clarity.

In the case of very coarse soils, the principal fraction is the relevant very coarse soil fraction predominating in terms of mass. The very coarse fraction should be separated from the sample before identifying the fine and coarse fractions.

In the case of coarse soils, the principal fraction is the relevant coarse soil fraction predominating in terms of mass.

Composite coarse soils include a fines fraction (silt and/or clay) that does not determine the engineering properties of the soil.

In the case of fine soils, the principal fraction is the relevant fine soil type determining the engineering properties of the soil.

In the case of composite fine soils, the fines fraction determines the engineering properties of the soil. The fines fraction is regarded as determining the characteristics of a composite soil if this is of at least medium dry strength or exhibits a certain degree of plasticity.

In both cases, the soil is termed either "clay" or "silt", depending on the plasticity of the fines fraction and not on the grading.

Secondary fractions

Secondary and further fractions do not determine but will affect the engineering properties of the soil. The secondary fractions as adjectives are placed with the term describing the principal fraction in the order of their relevance.

If coarse secondary fractions are present in a particularly small or particularly large proportion, the term "slightly" or "very" shall precede the qualifying term.

If it is a fine soil, the properties of which are determined by fines fractions, a soil can be identified as "silt" or "clay" by checking for the presence of fine secondary constituents on the basis of its plasticity properties.

If, in the case of coarse soils, two soil fractions are present in approximately equal proportions, an oblique shall be placed between the relevant terms, e.g. gravel/sand (Gr/Sa) or fine/medium sand (FSa/MSa).

Plasticity

Assessment of the plasticity and identification of a soil as either silt or clay permits the soil to be qualified as being of low plasticity or high plasticity.

An exact determination can only be made by establishing the liquid limit and the plastic limit in laboratory tests.

Organic content

Small quantities of dispersed organic matter in a soil can produce a distinctive odour and colour. The intensity of odour and colour indicates the proportion of organic matter and should be described.

Determination of consistency

The consistency of a cohesive soil shall be determined in a manual test, permitting the following identification and description:

- a) a soil is to be identified as **very soft** if it exudes between the fingers when squeezed in the hand;
- b) a soil is to be identified as **soft** if it can be moulded by light finger pressure;
- c) a soil is to be identified as **firm** if it cannot be moulded by the fingers, but rolled in the hand to thick threads without breaking or crumbling;
- d) a soil is to be identified as **stiff** if it crumbles and breaks when rolled to thick threads but is still sufficiently moist to be moulded to a lump again;
- e) a soil is to be identified as **very stiff** if it has dried out and is mostly light coloured. It can no longer be moulded but crumbles under pressure. It can be indented by the thumbnail.

Preliminary descriptions are based on visual and manual identification only.

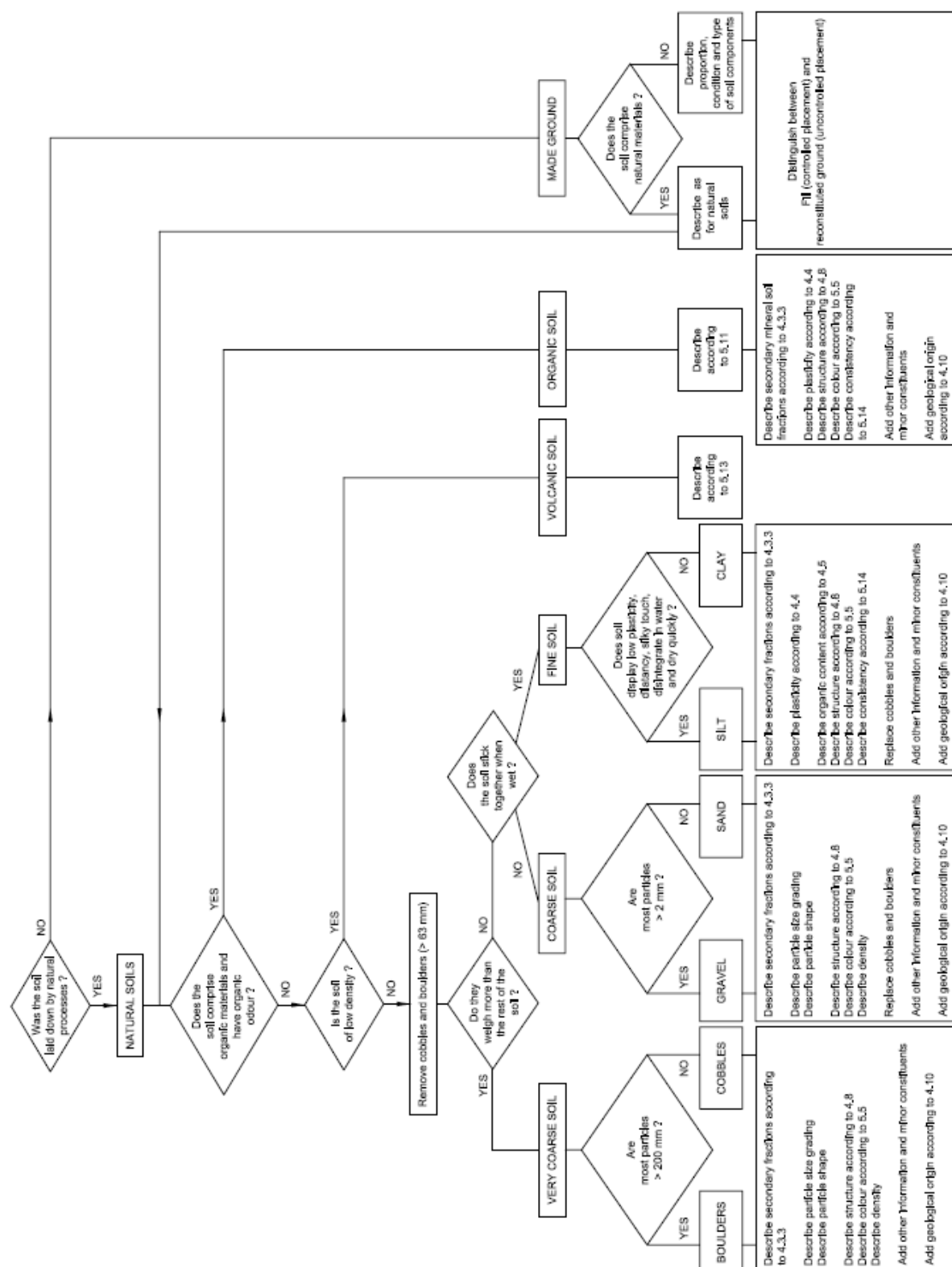


Figure B1.1 Flow chart for the identification and description of soils

APPENDIX B1

Form No.: QF029AEN

Terminology used in Soil Classification

The procedure and principles given in BS EN ISO 14688-2:2004 Part 2: 'Principles for a classification' have been adopted in producing the soil descriptions contained within this report where laboratory or in situ field tests have been carried out.

The classification principles established in this part of ISO 14688 permit soils to be grouped into classes of similar composition and geotechnical properties and, with respect to their suitability for geotechnical engineering purposes.

This part of ISO 14688 is applicable to natural soil and similar man-made material *in situ* and redeposited, but it is not a classification of soil by itself.

Particular sections of BS EN ISO 14688-1:2002 Part 2 are reproduced here in order to clarify the production of the soil descriptions contained within this report.

Principles of soil classifications

General

Soils shall be classified into soil groups on the basis of their nature, which is the composition only, irrespective of their water content or compactness, taking into account the particle size distribution (grading), plasticity, organic content, genesis as appropriate.

The most common approach to classification is to divide the soils on the basis of particle size grading and plasticity. The division is made on the relative size fractions present for the coarser soil fractions, determined on the whole sample, and on the plasticity of the finer fractions (Table B1.2).

Table B1.2 Principles of a classification of soils

Criterion	Soil group	Quantification	Denomination into groups of similiar properties			Further subdivision as appropriate by
Wet soil does not stick together	very coarse	most particles > 200 mm	Bo	xBo		Requires special consideration
			boCo	coBo		
	most particles > 63 mm	Co	saCo, grCo	sagrCo		
	coarse	most particles > 2 mm	Gr	coGr	cosaGr	Particle size (grading) Shape of grading curve Relative density Permeability
most particles > 0,063 mm		Sa	siGr, clGr orSa	sasiGr, grsiSa siSa, clSa, saclGr	(Mineralogy) (Particle shape)	
Wet soils sticks together	fine	low plasticity dilatant	Si	saSi	sagrSi saclSi	Plasticity Water content Strength, sensitivity Compressibility, stiffness (Clay mineralogy)
			clSi, siCl			
		plastic non-dilatant	Cl	orSi, orCl	sagrCl	
Dark colour, low density	organic		Or	saOr, siOr	clOr	Requires special consideration
Not naturally	Made ground	deposited	Mg	xMg	Man-made material	Requires special consideration
					Relaid natural materials	As for natural soils
Key to symbols						Cases requiring special consideration should be classified according to national or project requirements
Soil	Principal	Secondary or tertiary component				
Boulders	Bo	bo	Gr(gr) and Sa(sa) can be subdivided into fine F(f), medium M(m) or coarse C(c)			
Cobbles	Co	co				
Gravel	Gr	gr				
Sand	Sa	sa				
Silt	Si	si				
Clay	Cl	cl	any combination of components			
Organic	Or	or				
Made ground	Mg	—				
		x				

Appendix B1

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GeoAssist Limited

APPENDIX B1

Form No.: QF029AEN

Fractions

Soil is a mixture of materials of different particle size, which are grouped into fractions as specified in BS EN ISO 14688-1.

Classification of coarse and very coarse soils is to be based on the particle size distribution alone (see Table B1.3)

Table B1.3 Classification of very coarse soils

Fraction	Percent by mass	Term
Boulders	< 5	low boulder content
	5 to 20	medium boulder content
	> 20	high boulder content
Cobbles	< 10	low cobble content
	10 to 20	medium cobble content
	> 20	high cobble content

In the case of soils composed of both fine and coarse material, classification is to be based on both plasticity and particle size distribution.

Particle size distribution (grading)

The particle sizes and their distribution in a soil are determined by mechanical analysis carried out by the separation of the coarser fractions by sieving on a series of standard sieves and the determination of the finer fractions by sedimentation.

The results of the sieving and sedimentation process are plotted as a grading curve.

Plasticity

The fine fractions of soil, represented by clay and silt and containing clay minerals (see also BS EN ISO 14688-1), both alone or in mixtures with coarser material, are usually classified according to their plasticity characteristics. This is carried out on the basis of laboratory tests to determine the liquid limit w_L and plastic limit w_P .

Organic content

When soils with organic constituents are classified according to their organic content (Table B1.4), a distinction is to be made between organic soils and mineral soils with an organic content.

Table B1.4 Classification of soils with organic constituents

Soil	Organic content (≤ 2 mm) % of dry mass
Low-organic	2 to 6
Medium-organic	6 to 20
High-organic	> 20

Classification of coarse and composite organic soils accumulated *in situ* is based on the type of organic matter and that of organic soils, on the genetic origin and the degree of decomposition of the organic constituents.

APPENDIX B1

Form No.: QF029AEN

Undrained shear strength of fine soils

The terms to be used for the designation of the undrained shear strength according to the results of laboratory and field tests are given in Table B1.5.

Table B1.5 Undrained shear strength of fine soils

Undrained shear strength of clays	Undrained shear strength c_u kPa
Extremely low	< 10
Very low	10 to 20
Low	20 to 40
Medium	40 to 75
High	75 to 150
Very high	150 to 300
Extremely high ^a	> 300
^a Materials with shear strength greater than 300 kPa may behave as weak rocks and should be described as rocks according to ISO 14689-1.	

Table B1.6 Guiding values for the division of mineral soils on a basis of the contents of various fractions

Fraction	Content of fraction in wt % of material ≤ 63 mm	Content of fraction in wt % of material ≤ 0,063 mm	Name of soil	
			Modifying term	Main term
Gravel	20 to 40 > 40		gravelly	gravel
Sand	20 to 40 > 40		sandy	sand
Silt + clay (fine soil)	5 to 15	< 20	slightly silty	silt silt clay clay
		≥ 20	slightly clayey	
	15 to 40	< 20	silty	
		≥ 20	clayey	
	> 40	< 10		
		10 to 20	clayey	
		20 to 40	silty	
		> 40		

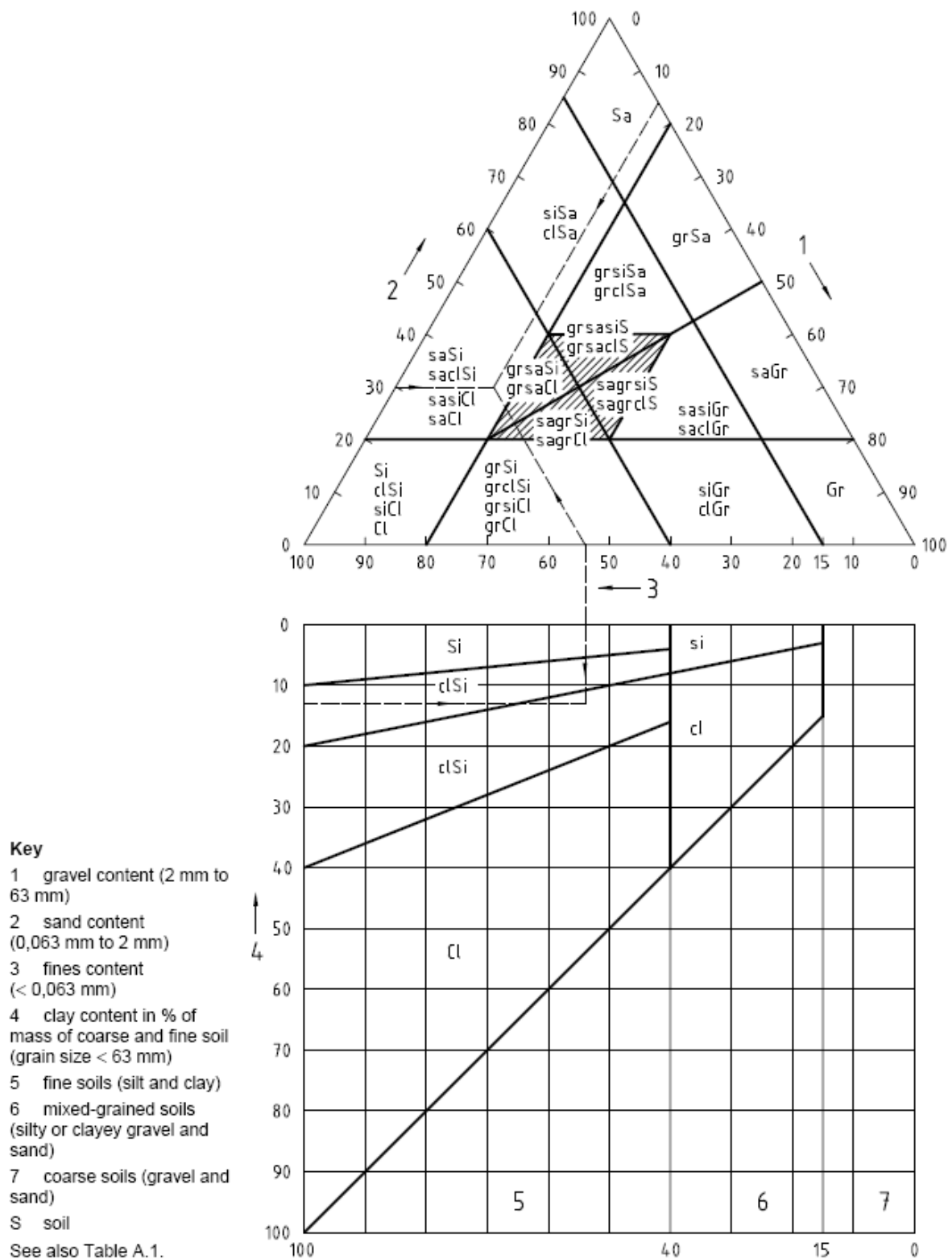


Figure B1.2 Classification of soils, based on grading alone

References

BS EN ISO 14688-1: 2002

Geotechnical investigation and testing — Identification and classification of soil — Part 1: Identification and description

BS EN ISO 14688-2: 2004

Geotechnical investigation and testing — Identification and classification of soil — Part 2: Principles for a classification

Abbreviations

Exploratory Hole log

Sample Type

AGS Code	Sample Type	AGS Code	Sample Type
B	Bulk Disturbed sample	SPT	Penetration Test – split spoon
CBR	CBR sample	U	Undisturbed sample – open drive
CPT	Penetration Test – cone	UF	Undisturbed sample failed recovery
D	Small disturbed sample	W	Water sample
PU	Piston sample	C - ES	Environmental sample

SPT and CPT – Standard Penetration Test

Blow Count (N) – If full penetration of 450mm then the total number of blows for the last 300mm is given.

If limited penetration following 150mm seating blows then the number of blows for the stated penetration is given.

If limited penetration then the total number of blows for the stated penetration is given.

The N values are actual blows recorded and uncorrected.

U - Undisturbed Sample

Blow Count – total number of blows for recovered length

Legend – As per British Standard – if blank then CAVITY/OPEN HOLE

Core Rec.:

T - Total Core Recovery as a percentage of the cored run

S – Solid Core Recovery as a percentage of the cored run

RQD – Rock Quality Designation as a percentage of the cored run

FI – Fracture index as number of fractures per metre

l_f – Fracture spacing as the average length of solid core pieces between natural fractures over core length of reasonable uniform characteristics

APPENDIX B2

Form No.: QF033AEN

Laboratory Test Summary Sheet

Tests on Soils

AGS Code	Test Name	AGS Code	Test Name
ASB	Asbestos	IDEN	In Situ Density
BDEN	Bulk Density	IGNIS	Loss on Ignition
CBR	California Bearing Ratio	IVAN	In Situ Vane
CD	Consolidated drained (single stage)	LS	Linear shrinkage
CDM	Consolidated drained (multi stage)	MCVG	Moisture Condition Value
CLSS	Atterberg Limits	NMC	Natural Moisture content
CMPG	Compaction	OMS	Organic Matter
CNMT	Contaminant and Chemical	PD	Particle density
CONG	Consolidation	PHS	pH
CU	Consolidated undrained with pwp measurement (single stage)	PTST	Laboratory permeability
CUM	Consolidated undrained with pwp measurement (multi stage)	RELD	Relative Density
DDEN	Dry Density	SHBG	Shear box
FRST	Frost Susceptibility	SLIM	Shrinkage Limit
GRAD HY	Particle Size (Hydrometer)	SULWS	Sulphate on 2:1 Water:Soil Extract
GRAD WS	Particle size (wet Sieve)	TNPC	Ten Per Cent Fines
HVP	Hand vane – peak	UU	Unconsolidated quick undrained (single stage)
ICBR	In situ CBR	UUM	Unconsolidated quick undrained (multi stage)

Tests on rocks and Aggregates

AGS Code	Test Name	AGS Code	Test Name
ACV	Aggregate crushing value	SHOR	Shore hardness
BRAZ	Tensile Strength by Brazilian method	SOUN	Aggregate Soundness Test
LOSA	Aggregate Los Angeles Abrasion	UCS	Uniaxial Compressive Strength
PLSI	Point Load Index – size corrected	WTAB	Aggregate Water Absorption

4. Reference AGS Format Edition 3

Concrete in Aggressive Ground

1. Assessing the Aggressive Chemical Environment

In order to assess the levels of sulphate in the ground or groundwater, which may have a deleterious effect on concrete, the sulphate content of soil and groundwater may be determined in accordance with BS 1377 (2001) Test 3:5. The sulphate contents determined are grouped into Aggressive Chemical Environment for Concrete (ACEC) site classifications in Building Research Establishment Special Digest 1 – Part 1 (2005) Tables C1 and C2 as reproduced below.

Based on this classification BRE Special Digest 1 gives recommendations for the design of suitable concrete mixes to resist chemical attack for each ACEC classification. Care should be taken in the interpretation of results over the site area, if classification is based solely on groundwater analysis, it should be based on the highest sulphate concentration recorded. Where a large number of results from soil analysis are available it should be based on the average of the highest 20 per cent of the results. If a varied set of results are recorded from a limited sampling programme it is important to carry out further analyses before a detailed classification is given.

2. References

BS 1377: 2001: 'Methods of Test for Soils for Civil Engineering Purposes': British Standards Institution.

BRE Special Digest 1: 2005: 'Concrete in Aggressive Ground': Building Research Establishment.

Table C1 Aggressive Chemical Environment for Concrete (ACEC) classification for natural ground locations ^a						
Sulfate Design Sulfate Class for location	2:1 water/soil extract ^b	Groundwater	Total potential sulfate ^c	Groundwater Static water	Mobile water	ACEC Class for location
1	2 (SO ₄ mg/l)	3 (SO ₄ mg/l)	4 (SO ₄ %)	5 (pH)	6 (pH)	7
DS-1	< 500	< 400	< 0.24	≥ 2.5	> 5.5 ^d 2.5–5.5	AC-1s AC-1 ^e AC-2z
DS-2	500–1500	400–1400	0.24–0.6	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-1s AC-2 AC-2s AC-3z
DS-3	1600–3000	1500–3000	0.7–1.2	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-2s AC-3 AC-3s AC-4
DS-4	3100–6000	3100–6000	1.3–2.4	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-3s AC-4 AC-4s AC-5
DS-5	> 6000	> 6000	> 2.4	> 3.5 2.5–3.5	≥ 2.5	AC-4s AC-5

Notes

- Applies to locations on sites that comprise either undisturbed ground that is in its natural state (ie is not brownfield – Table C2) or clean fill derived from such ground.
- The limits of Design Sulfate Classes based on 2:1 water/soil extracts have been lowered relative to previous Digests (Box C7).
- Applies only to locations where concrete will be exposed to sulfate ions (SO₄) which may result from the oxidation of sulfides (eg pyrite) following ground disturbance (Appendix A1 and Box C8).
- For flowing water that is potentially aggressive to concrete owing to high purity or an aggressive carbon dioxide level greater than 15 mg/l (Section C2.2.3), increase the ACEC Class to AC-2z.

Table C2 Aggressive Chemical Environment for Concrete (ACEC) classification for brownfield locations ^a								
Sulfate and magnesium						Groundwater		ACEC
Design Sulfate Class for location	2:1 water/soil extract ^b		Groundwater		Total potential sulfate ^c	Static water	Mobile water	Class for location
1	2	3	4	5	6	7	8	9
	(SO ₄ mg/l)	(Mg mg/l)	(SO ₄ mg/l)	(Mg mg/l)	(SO ₄ %)	(pH) ^d	(pH) ^d	
DS-1	< 500		< 400		< 0.24	≥ 2.5	> 6.5 ^e 5.5–6.5 4.5–5.5 2.5–4.5	AC-1s AC-1 AC-2z AC-3z AC-4z
DS-2	500–1500		400–1400		0.24–0.6	> 5.5 2.5–5.5	> 6.5 5.5–6.5 4.5–5.5 2.5–5.5	AC-1s AC-2 AC-2s AC-3z AC-4z AC-5z
DS-3	1600–3000		1500–3000		0.7–1.2	> 5.5 2.5–5.5	> 6.5 5.5–6.5 2.5–5.5	AC-2s AC-3 AC-3s AC-4 AC-5
DS-4	3100–6000	≤ 1200	3100–6000	≤ 1000	1.3–2.4	> 5.5 2.5–5.5	> 6.5 2.5–6.5	AC-3s AC-4 AC-4s AC-5
DS-4m	3100–6000	> 1200 ^e	3100–6000	> 1000 ^e	1.3–2.4	> 5.5 2.5–5.5	> 6.5 2.5–6.5	AC-3s AC-4m AC-4ms AC-5m
DS-5	> 6000	≤ 1200	> 6000	≤ 1000	> 2.4	> 5.5 2.5–5.5	≥ 2.5	AC-4s AC-5
DS-5m	> 6000	> 1200 ^e	> 6000	> 1000 ^e	> 2.4	> 5.5 2.5–5.5	≥ 2.5	AC-4ms AC-5m

Notes

- a Brownfield locations are those sites, or parts of sites, that might contain chemical residues produced by or associated with industrial production (Section C5.1.3).
- b The limits of Design Sulfate Classes based on 2:1 water/soil extracts have been lowered from previous Digests (Box C7).
- c Applies only to locations where concrete will be exposed to sulfate ions (SO₄²⁻), which may result from the oxidation of sulfides such as pyrite, following ground disturbance (Appendix A1 and Box C8).
- d An additional account is taken of hydrochloric and nitric acids by adjustment to sulfate content (Section C5.1.3).
- e The limit on water-soluble magnesium does not apply to brackish groundwater (chloride content between 12 000 mg/l and 17 000 mg/l). This allows 'm' to be omitted from the relevant ACEC classification. Seawater (chloride content about 18 000 mg/l) and stronger brines are not covered by this table.

Appendix C

- C1 Exploratory Hole Logs BH1 to BH6
- C2 Exploratory Hole Logs TP1 and TP2 including photograph

GeoAssist Limited Consultant: Thomasons Client: Storage World Self Storage & Workspace LLP	Exploratory Hole Record Sheet Project: Storage World Ambrose Street Location: Manchester		Ref: BH1 Sheet: 1					
	Equipment: Archway Dart Rig		Ground Level: 52.75 m.AOD Co-ordinates: Easting: 387241.3(m) Northing: 397217.2(m) Dates: 16/11/2022 to 16/11/2022					
Drilling Foreman: M Walton STRATUM DESCRIPTION Engineer/Geologist: M Benson		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests Depth (m) from to	Sample Type/No	Blow Count N/(U)	Field Records

0	Grey/brown sandy gravel, brick and concrete fragments - MADE GROUND	(0.40) 0.40	52.35		0.30	C1		
	Stiff to very stiff brown with light grey gravelly sandy silty CLAY	(0.60) 1.00	51.75		0.80 1.00 1.20	D1 CP1 D2	9	TRLDGP Test CBR at 0.40m- 13%
1	Stiff to very stiff brown high to very high strength gravelly slightly sandy silty CLAY							Hand penetrometer at 1.20m - 164kPa
2					2.00	CP2	13	Hand penetrometer at 1.80m - >250kPa
3		(3.60)			3.00	CP3	13	Hand penetrometer at 2.50m - 220kPa
4		4.60	48.15		4.00	CP4	7	Hand penetrometer at 3.50m - 182kPa
5	Very stiff brown/grey very high strength gravelly sandy silty CLAY with occasional sand inclusions	(0.40) 5.00	47.75		4.90	CP5	9	Hand penetrometer at 4.50m - 144kPa Hand penetrometer at 4.80m - 219kPa
6	Exploratory Hole complete at 5.00m							16/11/2022: On completion of exploratory hole at 5.00m. Casing at 2.00m. Standing water level Nil with casing. On withdrawal of casing groundwater/gas monitoring standpipe installed to 4.00m with response zone from 1.00m to 4.00m.
7								
8								
9								
10								

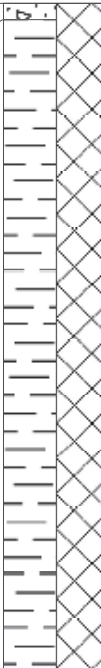
Remarks: 16/11/2022: Inspection pit excavated to 1.00m depth to avoid services The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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GeoAssist Limited		Exploratory Hole Record Sheet				Ref: BH2	
Consultant: Thomasons		Project: Storage World Ambrose Street				Sheet: 1	
Client: Storage World Self Storage & Workspace LLP		Location: Manchester				Ground Level: NR m.AOD	
		Equipment: Archway Dart Rig				Co-ordinates: Easting: NR(m) Northing: NR(m)	
						Dates: 14/11/2022 to 14/11/2022	
Drilling Foreman: M Walton		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests		Field Records
STRATUM DESCRIPTION Engineer/Geologist: M Benson					Depth (m) from to	Sample Type/No	
0 CONCRETE		0.10					
Brown sandy gravel with brick and sandstone fragments - MADE GROUND		0.20			0.40	C1	
Very soft to firm grey with black very low to medium strength inclusions very silty clay - MADE GROUND					0.50	CP1	9
1		(1.80)			0.90	D1	
					1.00	CP2	1
					1.50	CP3	4
2		2.00			2.00	CP4	10
Firm to stiff brown medium to high strength gravelly sandy silty CLAY with cobbles from 3.00 to 4.00m depth					2.20	D2	Hand penetrometer at 2.20m - 209kPa
3		(3.00)			3.00	CP5	15
							Hand penetrometer at 3.50m - >250kPa
4					4.00	CP6	13
							Hand penetrometer at 4.50m - 170kPa
5		5.00			4.90	CP7	26
Exploratory Hole complete at 5.00m							14/11/2022: On completion of exploratory hole at 5.00m. Casing at 2.00m. Standing water level Nil with casing. On withdrawal of casing exploratory hole backfilled and reinstated.
6							
7							
8							
9							
10							
Remarks: 14/11/2022: Concrete slab precored						Logged: M Benson	
The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken.						Date: 21/11/2022	
Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.						Checked: M Richardson	
						Date: 25/11/2022	
						Site Ref: 6101/VAJ	
						Scale 1:50	

GeoAssist Limited		Exploratory Hole Record Sheet					Ref: BH3	
Consultant: Thomasons		Project: Storage World Ambrose Street					Sheet: 1	
		Location: Manchester						
Client: Storage World Self Storage & Workspace LLP		Equipment: Archway Dart Rig				Ground Level: NR m.AOD		
						Co-ordinates: Easting: NR(m) Northing: NR(m)		
						Dates: 14/11/2022 to 14/11/2022		
Drilling Foreman: M Walton		Depth (Thick) {m}	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests			Field Records
STRATUM DESCRIPTION					Depth (m) from to	Sample Type/No	Blow Count N/(U)	
Engineer/Geologist: M Benson								

Depth (m)	Description	Soil Type / Material	Penetration Test Results (kPa)	Notes
0.00 - 0.10	CONCRETE	Light grey concrete fragments - MADE GROUND		
0.10 - 0.30	Orange/brown brick fragments - MADE GROUND			
0.30 - 0.50	Very soft to soft grey with black silty clay, ash and cinders - MADE GROUND			
0.50 - 2.70	(2.20)			
2.70 - 6.00	(3.30)			
6.00 - 6.00	Exploratory Hole complete at 6.00m			

Remarks: 14/11/2022: Concrete slab precored The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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GeoAssist Limited	Exploratory Hole Record Sheet		Ref: BH4
	Project: Storage World Ambrose Street Location: Manchester		Sheet: 1
Consultant: Thomasons	Equipment: Archway Dart Rig		Ground Level: 52.46 m.AOD Co-ordinates: Easting: 387238.5(m) Northing: 397193(m) Dates: 16/11/2022 to 16/11/2022
Client: Storage World Self Storage & Workspace LLP			
Drilling Foreman: M Walton STRATUM DESCRIPTION Engineer/Geologist: M Benson	Depth (Thick) (m) (4.88)	Reduced Level (mAOD) 52.34	Strata Legend/ Standpipe Backfill 
		Samples/Tests Depth (m) from to Sample Type/No Blow Count N/(U)	Field Records

0 CONCRETE	0.12	52.34						
Stiff to very stiff brown with light grey high to very high strength gravelly sandy silty CLAY with occasional sand inclusions								
1								
2								
3								
4								
5								
Exploratory Hole complete at 5.00m								
6								
7								
8								
9								
10								

Remarks: 16/11/2022: Inspection pit excavated to 1.00m depth to avoid services The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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GeoAssist Limited		Exploratory Hole Record Sheet						Ref: BH5	
Consultant: Thomasons		Project: Storage World Ambrose Street						Sheet: 1	
		Location: Manchester							
Client: Storage World Self Storage & Workspace LLP		Equipment: Archway Dart Rig				Ground Level: NR m.AOD			
						Co-ordinates: Easting: NR(m) Northing: NR(m)			
						Dates: 14/11/2022 to 14/11/2022			
Drilling Foreman: M Walton		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests			Field Records	
STRATUM DESCRIPTION					Depth (m) from to	Sample Type/No	Blow Count N/(U)		
Engineer/Geologist: M Benson									

Remarks: 14/11/2022: Concrete slab precored The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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GeoAssist Limited	Exploratory Hole Record Sheet						Ref:	BH6		
	Project:		Storage World Ambrose Street				Sheet:	1		
Consultant:	Thomasons		Location:			Manchester				
Client:	Storage World Self Storage & Workspace LLP		Equipment:			Ground Level:			51.86 m.AOD	
						Co-ordinates:			Easting: 387268.8(m)	
						Northing: 397174(m)				
					Dates:			15/11/2022 to 15/11/2022		
Drilling Foreman:	M Walton	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests			Field Records	
Engineer/Geologist:	M Benson					Depth (m) from to	Sample Type/No	Blow Count N/(U)		

0	CONCRETE	0.10	51.76						
	Brown sand, gravel and brick fragments - MADE GROUND	0.30	51.56		0.30	C1			
	Soft to firm brown/grey gravelly sandy silty clay - MADE GROUND	(0.70)			0.80	D1			
		1.00	50.86		1.00	CP1	1		Wet at 1.00m depth
1	Very soft brown with grey gravelly sandy silty clay - MADE GROUND	(0.90)			1.40	D2			
		1.90	49.96		2.00	CP2	6		Hand penetrometer at 1.90m - 122kPa Hand penetrometer at 2.20m - 109kPa
2	Stiff brown high strength gravelly sandy silty CLAY	(1.10)			3.00	CP3	11		Hand penetrometer at 2.80m - 164kPa
3	Brown silty fine to medium SAND	3.20	48.66		3.00				Wet from 3.20m depth
	Stiff brown high strength gravelly sandy silty CLAY	(0.80)			4.00	CP4	12		Hand penetrometer at 3.50m - 134kPa
4	Medium dense brown with occasional black silty fine to medium SAND	4.00	47.86		4.00				
		(0.80)							
		4.80	47.06						
	Brown/grey gravelly sandy silty CLAY	5.00	46.86		4.90	CP5	21		15/11/2022: On completion of exploratory hole at 5.00m. Casing at 2.00m. Standing water level at 3.80m with casing. On withdrawal of casing groundwater/gas monitoring standpipe installed to 4.50m with response zone from 1.00m to 4.50m.
5	Exploratory Hole complete at 5.00m								
6									
7									
8									
9									
10									

Remarks: 15/11/2022: Inspection pit excavated to 1.00m depth to avoid services	Logged: M Benson
	Date: 21/11/2022
The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken.	Checked: M Richardson
Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Date: 25/11/2022
	Site Ref: 6101/VAJ
	Scale 1:50

GeoAssist Limited		Exploratory Hole Record Sheet				Ref: TP1	
Consultant: Thomasons		Project: Storage World Ambrose Street Location: Manchester				Sheet: 1	
Client: Storage World Self Storage & Workspace LLP		Equipment: Hand Excavation Methods				Ground Level: 53.04 m.AOD Co-ordinates: Easting: 387237.5(m) Northing: 397231.2(m) Dates: 16/11/2022 to 16/11/2022	
Drilling Foreman: M Walton		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests		Field Records
Engineer/Geologist: M Benson					Depth (m) from to	Sample Type/No	

0 Dark brown sandy gravel, brick fragments and sandstone cobbles - MADE GROUND	(0.50)				0.30	C1	
Brown with light grey gravelly sandy silty CLAY	0.50	52.54					
Base of Masonry Wall at 0.70m depth	0.80	52.24					Water ingress from 0.70m depth 16/11/2022: On completion of trial pit at 0.80m. Hole backfilled and reinstated
Exploratory Hole complete at 0.80m							



Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:25
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GeoAssist Limited Consultant: Thomasons Client: Storage World Self Storage & Workspace LLP	Exploratory Hole Record Sheet Project: Storage World Ambrose Street Location: Manchester		Ref: TP2 Sheet: 1
	Equipment: Hand Excavation Methods		Ground Level: 53.04 m.AOD Co-ordinates: Easting: 387268.4(m) Northing: 397225.2(m) Dates: 16/11/2022 to 16/11/2022

Drilling Foreman: M Walton	STRATUM DESCRIPTION Depth (Thick) (m) Reduced Level (mAOD) Strata Legend/ Standpipe Backfill	Samples/Tests Depth (m) from to Sample Type/No Blow Count N/(U)			Field Records
Engineer/Geologist: M Benson					

0 CONCRETE	0.30	52.74		0.60	C1	Water ingress from 0.70m depth 16/11/2022: On completion of trial pit at 0.90m. Hole backfilled and reinstated
Brown with light grey gravelly sandy silty CLAY	(0.60)					
Base of Masonry Wall at 0.80m depth	0.90	52.14				
1 Exploratory Hole complete at 0.90m Note that datum level is where concrete meets wall						



Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:25
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Appendix D

- D1 Laboratory Test Summary Sheet
- D2 Classification Test Summary Sheet
- D3 Sulphate and pH Test Summary Sheet

GeoAssist Limited SOIL LABORATORY SUMMARY SHEET	Project: Storage World Ambrose Street Location: Manchester Client: Storage World Self Storage & Workspace LLP Consultant : Thomasons	Site Ref: 6101/VAJ Project Code :
		Hole Ref BH1 to BH6

Sample Ref.	Depth m	Sample Description	Classification					Triaxial Compression					Chemical		Test Code
			LL %	PL %	PI %	% passing 425 m	Moist Cont. %	Bulk Density Mg/m ³	Sample Diameter mm	Lateral Pressure kN/m ²	Deviator Stress kN/m ²	Shear Cohesion kN/m ²	So ₄ 2:1 extract Soil:Water mg/l	pH	
BH1 D1	0.80	Brown with light grey gravelly sandy silty CLAY					-						470	7.9	SULWS PHS
BH1 D2	1.20	Brown gravelly slightly sandy silty CLAY	46	21	25	100	19								NMC CLSS
BH2 D1	0.90	Grey with black very silty clay - MADE GROUND					-						400	7.1	SULWS PHS
BH2 D2	2.20	Brown gravelly sandy silty CLAY	53	22	31	99	20								NMC CLSS
BH3 D1	0.90	Grey with black silty clay, ash and cinders - MADE GROUND					-						410	7.5	SULWS PHS
BH3 D2	3.20	Brown/grey gravelly sandy silty CLAY	54	23	31	100	20								NMC CLSS
BH4 D1	0.80	Brown with light grey gravelly sandy silty CLAY with occasional sand inclusions					-						400	7.8	SULWS PHS
BH4 D2	1.20	Brown with light grey gravelly sandy silty CLAY with occasional sand inclusions	45	20	25	99	17								NMC CLSS
BH5 D1	1.00	Dark grey/brown sandy gravel with cinders, brick and timber fragments - MADE GROUND					-						520	7.6	SULWS PHS
BH5 D2	1.60	Brown gravelly sandy silty CLAY	56	22	34	98	22								NMC CLSS
BH6 D1	0.80	Brown/grey gravelly sandy silty clay - MADE GROUND					-						510	7.7	SULWS PHS
BH6 D2	1.40	Brown with grey gravelly sandy silty clay - MADE GROUND	51	21	30	97	24								NMC CLSS

Site Reference:			6101 VAJ					
Project Site:			Storage World Ambrose Street					
Project Location:			Manchester					
Client:			Storage World Self Storage & Workspace LLP					
Consultant:			Thomasons					
	CLASSIFICATION TEST							
Borehole Reference	Sample	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% passing 425 micro	Natural Moisture Content	Material Code
BH1	D2	1.20	46	21	25	100	19	CI
BH2	D2	2.20	53	22	31	99	20	CH
BH3	D2	3.20	54	23	31	100	20	CH
BH4	D2	1.20	45	20	25	99	17	CI
BH5	D2	1.60	56	22	34	98	22	CH
BH6	D2	1.40	51	21	30	97	24	CH
		Mean	51	22	29	99	20	
		Maximum	56	23	34	100	24	
CLAY		Minimum	45	20	25	97	17	
	Standard Deviation		4	1	4	1	2	
	Count		6	6	6	6	6	

Site Reference:			6101	VAJ		
Project Site:			Storage World Ambrose Street			
Project Location:			Manchester			
Client:			Storage World Self Storage & Workspace LLP			
Consultant:			Thomasons			
	GEOTECHNICAL SULPHATE AND PH TEST					
Borehole Reference	Sample	Depth	SO4 2:1 Water:Soil extract mg/l	pH	SO4 Water mg/l	
BH1	D1	0.80	470	7.9		
BH2	D1	0.90	400	7.1		
BH3	D1	0.90	410	7.5		
BH4	D1	0.80	400	7.8		
BH5	D1	1.00	520	7.6		
BH6	D1	0.80	510	7.7		