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Basement Impact Assessment – Stage 2 Ground Investigation Report

Project Name: 17 Courthope Road

Location: London, NW3 2LE

Client: Mr J Markham

Project ID: J15878

Report Ref: J15878-S3

Report Date: 18 February 2025

Report Issue: 1

SUMMARY

The site currently comprises a three-storey terraced residential property with an additional small single-storey cellar beneath the north-eastern part of the property. It is proposed to construct a basement level extending beneath the entire building footprint. It is understood that the proposed basement excavation will extend to approximately 3.4mbgl.

Geological records indicate the site to be underlain by London Clay Formation. No superficial deposits are mapped across the site or in the near vicinity.

A Stage 1 Screening & Stage 2 Scoping Report, including a desk study, was undertaken in December 2024 (report ref. STL J15878-S1&S2).

A single phase of intrusive investigation was carried out. The presence of the existing building and underground limited borehole locations. It should not be assumed that the same ground conditions would apply to these inaccessible areas.

The soils encountered comprised a covering of Made Ground to around 0.7/0.8mbgl, underlain by Superficial Head Deposits (clay/gravelly clay) to 2.0/2.3m, underlain by London Clay (silty clay).

During the site investigation works no groundwater was encountered in BH1 and water was encountered at the base of BH2 on completion. Groundwater monitoring wells and digital groundwater dataloggers were installed within both boreholes to record water levels at intervals of three hours. The dataloggers were installed on 19th December 2024 and were removed on 11th February 2025. The highest recorded groundwater level in borehole BH1 was 5.75 mbgl and in borehole BH2 was 1.26 mbgl over the monitoring period.

Soil parameters for retaining structures are discussed in the report. It is considered that the proposed basement retaining walls could be utilised to support structural loads. Underpinning or bored pile retaining walls, would be suitable for use on this site. The presence of groundwater should be considered in the design of any temporary and permanent retaining systems. If an impermeable cut-off is required, a secant bored pile wall is recommended.

All loadings should be transferred beneath any fill or made ground, topsoil, soft or disturbed soils and be placed within the underlying natural clay soils. Based on the results of this investigation an allowable bearing capacity of 100kN/m^2 could be adopted for foundations set on the London Clay soils at 3mbgl.

The sulphate content of the fill and natural soil was found to fall within Class DS-5. The ACEC classification for the site is AC-5.

Inflows of groundwater into excavations should be anticipated. Due to the predominately cohesive nature of this strata, groundwater flow through these soils in anticipated to be slow. The overlying made ground will have higher and variable permeability values. These seepages should be managed with simple pumping methods.

Detailed information on the proposed development, such as detailed final layout, loadings and serviceability limits was not provided. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Mr J Markham and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd. accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

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For and on behalf of Southern Testing Laboratories Limited

DOCUMENT HISTORY AND STATUS

Issue No.	Date	Purpose or Status	Author	Check / Review
1	18/02/2025	First Issue	VF	JNR

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a signed STL Project Order Form from Mr D Snaith of STAAC Architecture, on behalf of Mr J Markham (the Client). This is in relation to our quotation, Q241436, dated 30th October 2024.

2 Location

The site is located on Courthope Road in the London Borough of Camden, approximately 340km west of Gospel Oak Overground Station.

The approximate National Grid Reference of the site is TQ 27936 85569. The site location is indicated on Figure 1 within Appendix A.

3 Proposed Construction

It is proposed to construct a basement level extending beneath the entire building footprint. Proposed development plans are provided in Appendix A. It is understood that the proposed basement excavation will extend to approximately 3.4mbgl.

Ground loadings have not been given at this stage.

4 Object

The object of this study was to produce a Basement Impact Assessment (BIA) as part of the Client's planning application in accordance with the requirements of the London Borough of Camden, and to consider the effects of a proposed basement development at 17 Courthope Road.

The purpose of the BIA is to enable the London Borough of Camden to consider a scheme's potential impact on local drainage and flooding and on the structural stability of neighbouring properties through its effect on groundwater conditions and ground movement in accordance with their planning policies.

This is a geotechnical investigation to assess foundation bearing conditions and other soil parameters relevant to the proposed development and to carry out groundwater monitoring at the subject site.

5 Scope

This report presents exploratory hole logs, test results and our interpretation of these data.

A UXO risk assessment was carried out as part of the Stage 1 Screening and Stage 2 Scoping report in advance of the investigation works being undertaken. The assessment was made with specific regard to the proposed investigation works and its conclusions may not be appropriate to other activities.

As with any site there may be differences in soil conditions between exploratory hole positions.

This report is not an engineering design and the figures and calculations contained in the report should be used by the Engineer, taking note that variations will apply, according to variations in design loading, in techniques used, and in site conditions. Our figures therefore should not supersede the Engineer's design.

The ground investigation has been completed with reference to BS 5930 Ref [1] and BS 10175 Ref [2].

Contamination issues are not considered in this report. Waste Classification of soils has not been included within the brief for the investigation.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Mr J Markham and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

Detailed information on the proposed development, such as detailed final layout, loadings and serviceability limits was not provided. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules.

B BACKGROUND INFORMATION

6 Geology

The British Geological Survey Map No. 256 (North London) indicates that the site geology consists of London Clay Formation. No superficial deposits are mapped across the site or in the near vicinity.

6.1.1 London Clay

The London Clay mainly comprises blue-grey or grey-brown fissured clay and silty clay, which weathers to brown near the surface. It commonly contains thin courses of carbonate concretions ('cementstone nodules'), selenite crystals and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation.

Although slopes will stand in the clay at steep angles in the short term, the long-term stable slope angle is about 7˚ for grassed, or cleared slopes, and a few degrees more for wooded slopes.

This formation is known to contain pyrite.

7 Site Description

The site currently comprises a three-storey terraced residential property with an additional small single-storey cellar beneath the north-eastern part of the property.

To the front (north-east) of the property is a small paved area with an approximately 70mm high brick wall and hedge (around 1.9m high) around the perimeter. To the rear (south-west) is a rear garden which is also paved and the boundaries are defined by brick walls (approximately 1.5m high) with foliage.

A full site description and photographs are provided in the Stage 1 Screening and Stage 2 Scoping Report (STL J15878-S1&S2).

C GROUND INVESTIGATION

8 Strategy and Method

The strategy adopted for the intrusive investigation comprised the following:

Activity / Method	Purpose	Max Depth Range (mbgl)	Installations / Notes
BH1 Dynamic Windowless Sampling BH2 Hand Auger Borehole	Boreholes to investigate the shallow ground conditions within external areas. To allow SPT's/in-situ testing and collection of samples for geotechnical testing. Installation of shallow land gas and groundwater monitoring wells.	BH1 7.45m BH2 3.6m	50mm gas / groundwater monitoring wells installed within both boreholes.

Exploratory hole locations are shown in Figure 2 in Appendix A.

In-situ test and sampling methods descriptions employed are given in Appendix B together with the test results.

SPT Energy Ratio certificates and a Summary Table of SPT N Values is provided within Appendix B.

The presence of the existing building and underground services limited borehole locations.

9 Weather Conditions

The fieldwork was carried out on 19th December 2024, at which time the weather was generally overcast but dry.

From Met Office data, the rainfall in the south of England was approximately 102% the normal average for October, 94% the normal average for November and 58% the normal average for December.

10 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (Appendix A), but in general comprised a covering of Made Ground over Superficial Head Deposits over London Clay. A summary is given below.

Depth (m)	Thickness (m)	Soil Type	Description
GL to 0.06/0.10m	0.06m to 0.10m	Made Ground	Paving slab underlain by a fine to coarse sand in BH1. Tiled surfacing underlain by concrete in BH2.
0.06/0.10m to 0.7/0.8m	0.60m to 0.63m		Dark brown, silty variably sandy variably gravelly CLAY. Sand is fine to coarse grained. Gravel consist of fine to coarse brick, clinker, chalk, and ceramic.
0.7/0.8m to 1.5/1.75m	0.7m to 1.05m	Head Deposits	Soft to firm, silty CLAY.
1.5/1.75m to 2.0/2.3m	0.5m to 0.55m		Firm to stiff, silty gravelly to very gravelly CLAY. Gravel consist of fine to coarse angular to rounded flint.
2.0/2.3m to 3.6/7.45m+	1.6m+ to 5.15m+	London Clay Formation	Stiff becoming very stiff, extremely closely fissured, silty CLAY with occasional selenite crystals. Occasional pockets of fine sand noted.

10.1 Visual and Olfactory Evidence of Contamination

Apart from some shallow made ground, no visual or olfactory evidence of possible contamination was recorded at either borehole location.

11 Groundwater Observations

During the site investigation works, groundwater was observed in the exploratory holes as follows:

Hole ID	Comment
BH1	No groundwater encountered.
BH2	Groundwater at base of borehole on completion.

12 Ground Model

From the ground investigation undertaken to date, the following ground model has been established:

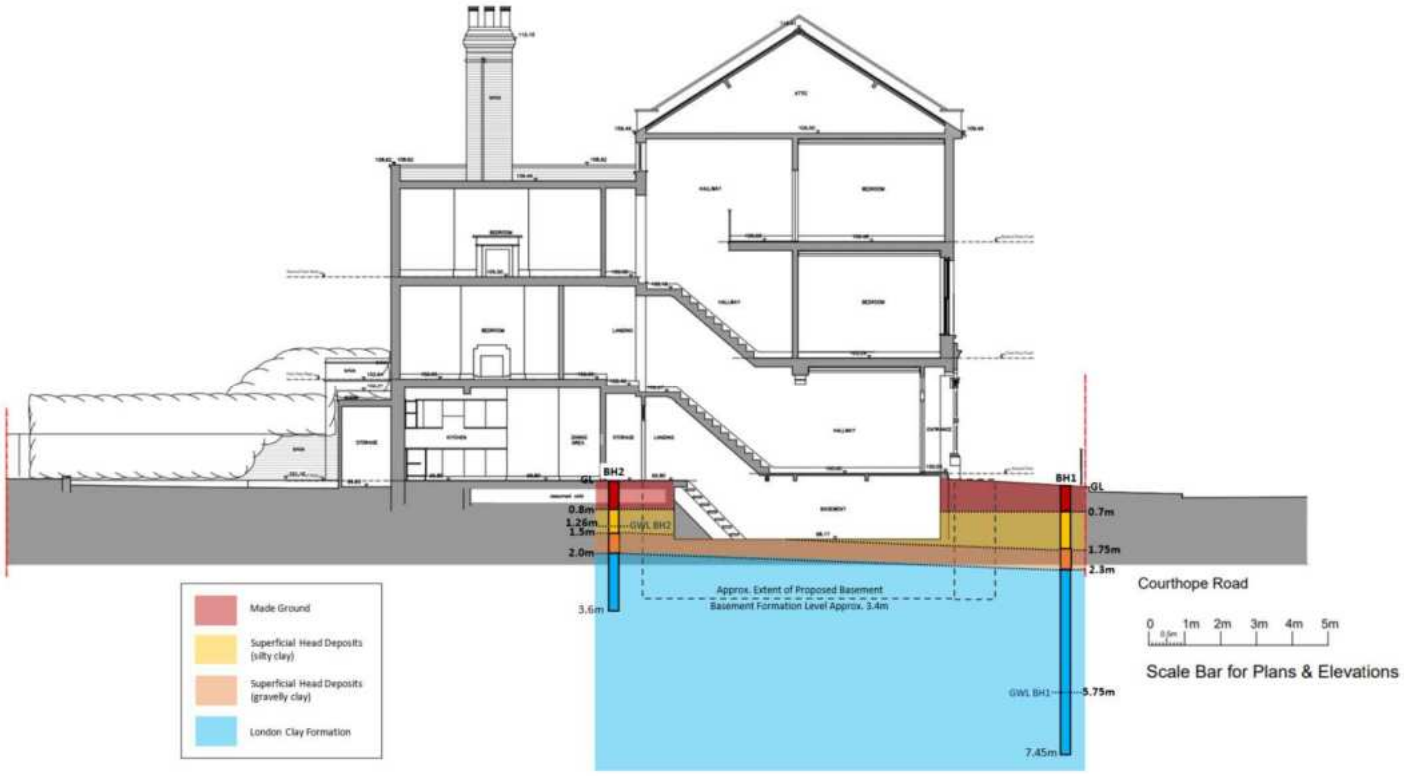

Figure 3: Ground Model (existing section from STAC Architecture Limited 'General Arrangement Elevations & Section A-A & B-B as Existing).

D DISCUSSION OF GEOTECHNICAL TEST RESULTS AND RECOMMENDATIONS

13 Geotechnical Laboratory Tests

The following geotechnical laboratory testing was carried out on selected samples in order to aid material classification and characterise soil properties. The test method references and results are given in Appendix C.

Laboratory Test	Number of Samples Tested	Stratum
Moisture Content	7	1 No. Head Deposits 5 No. London Clay
Atterberg Limit	7	1 No. Head Deposits 5 No. London Clay
Particle Size Distribution (Wet Sieve/Pipette)	1	Head Deposits
BRE SD1 Suite B/D	8	2 No. Made Ground 3 No. Head Deposits 3 No. London Clay

14 Soil Classification and Properties

14.1 Made Ground

Shallow surface hard standing in the form of paving slabs or tiles was encountered at each exploratory hole location. The made ground materials beneath was found to be generally composed of silty sandy gravelly clays. These contained various anthropogenic materials, including brick, clinker, chalk and slate.

No geotechnical laboratory testing was undertaken on the made ground soils.

The made ground should be anticipated to be very variable in both composition and thickness across the site and potentially having a high compressibility.

14.2 Superficial Head Deposits

The superficial head deposits at this site were generally a silty clay underlain by a layer of silty gravelly to very gravelly clay.

The silty clay soils were found to be soft to firm in nature with one SPT N value of 3 recorded and unconfined compressive strength values, measured using a hand penetrometer on disturbed samples of clay varied from 90 to 200 kPa, which is the equivalent to undrained shear strength values of approximately 45 to 100 kPa.

One Atterberg limit results for this material indicates clays of high plasticity. Liquid Limit was 64%, Plastic Limit results was 18% and Plasticity Indices between 46%, indicating a High Volume Change Potential.

The silty gravelly to very gravelly clay recorded one SPT N value of 7 which indicates the soils to be firm in nature.

The silty gravelly to very gravelly clay materials had the following range of particle size distribution results.

Hole ID / Depth (m)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Cobbles (%)
BH1 at 2.0m	11	5	13	71	0

14.3 London Clay Formation

The London Clay soils at this site were encountered from 2.0/2.3m and were generally seen as fissured silty clay. Pockets of fine sand were commonly noted, along with selenite crystals.

These clay soils were found to be stiff becoming very stiff in nature with SPT N values between 12 and 16, generally increasing with depth. Unconfined compressive strength values, measured using a hand penetrometer on disturbed samples of clay varied from 260 to 550 kPa, which is the equivalent to undrained shear strength values of approximately 130 to 275 kPa. The UCS values generally increased with depth.

Five Atterberg limit results for this material indicates clays of very high plasticity. Liquid Limit results were seen within the range 73 to 82%, Plastic Limit results between 25 to 28% and Plasticity Indices between 48 to 57%, indicating a High Volume Change Potential.

A plot of cohesion against depth within the London Clay has been included within Appendix D as Figure C01, based upon the limited SPT N values (using a factor f_1 of 4.5 as suggested by Stroud).

14.4 Summary of Geotechnical Parameters

Soil Type: Superficial Head Deposits

Parameters			Range	Suggested Design Value
SPT-N value			3 & 7	3
Plasticity Index (%)			46	46
Effective long term cohesion (kN/m^2)			Not tested(3)	0
Undrained Shear Strength (kN/m^2)(1)			15-80	See Figure C01, Appendix D
Bulk Density (Mg/m^3)			Not tested(3)	1.9
Coefficient of Compressibility, M_v (m^2/MN)			Not tested(3)	0.2
Long term effective internal friction angle ϕ' (degrees)			Not tested(3)	26
Young's Modulus (E) (MN/m^2)	Undrained	Top	Not tested(3)	6.4(2)
		Base	Not tested(3)	34 (2)
	Drained	Top	Not tested(3)	5.1(2)
		Base	Not tested(3)	27.2(2)
Poisson's Ratio (v)	Undrained		Not tested(3)	0.5
	Drained		Not tested(3)	0.2

1. From SPTs and Hand penetrometer testing
2. For the superficial clay materials, the stiffness parameters were derived based on Burland and Kalra (Ref [3]) as follows:
    a. Undrained Young's Modulus (E_u) = 425 x C_u
    b. Drained Young's Modulus (E_d) = 0.8 x E_u.
3. Where no testing has been undertaken, the suggested design values are based on our experience of similar soils on nearby projects unless otherwise specified.

Soil Type: London Clay

Parameters	Range	Suggested Design Value
SPT-N value	12-16	14
Plasticity Index (%)	48-57	52
Effective long term cohesion (kN/m^2)	Not tested(3)	0
Undrained Shear Strength (kN/m^2)(1)	60-220	See Figure C01, Appendix D
Bulk Density (Mg/m^3)	Not tested(3)	2.0

Parameters			Range	Suggested Design Value
Coefficient of Compressibility, M_v (m^2/MN)			Not tested(3)	0.2
Long term effective internal friction angle ϕ' (degrees)			Not tested(3)	26
Young's Modulus (E) (MN/m^2)	Undrained	Top	Not tested(3)	10(2)
		Base	Not tested(3)	154 (2)
	Drained	Top	Not tested(3)	7.5(2)
		Base	Not tested(3)	115.5 (2)
Poisson's Ratio (v)	Undrained		Not tested(3)	0.5
	Drained		Not tested(3)	0.2

1. From SPTs and Hand penetrometer testing
2. For the London Clay Formation, the stiffness parameters were derived based on Burland and Kalra (Ref [3]) as follows:
   a. Undrained Young's Modulus (E_u) = 10 + 5.2z (MN/m^2)
   b. Drained Young's Modulus (E_d) = 7.5 + 3.9z (MN/m^2)

   Where z is taken as the depth below the surface of the London Clay Formation, in metres. An arbitrary rigid boundary has been assumed at 30m below the existing site level.
3. Where no testing has been undertaken, the suggested design values are based on our experience of similar soils on nearby projects unless otherwise specified.

15 Groundwater Levels

Groundwater monitoring wells were installed within both boreholes BH1 & BH2.

Construction details for the wells are provided on the logs (Appendix A). The slotted pipe extended from the bottom of the hole to approximately 1.0m below ground level with plain pipe to the surface. Pea shingle was then poured around all the slotted sections and Bentonite around the plain sections to seal and prevent any migration of surface water into the borehole. The flush protective cover was cemented in securely to allow access.

Digital groundwater dataloggers were installed within both monitoring wells to record water levels at intervals of three hours. A barologger was also installed within BH2 to record the ambient atmospheric pressure and temperature at the same time intervals.

The dataloggers were installed on 19th December 2024 and were removed on 11th February 2025. The highest recorded groundwater level in borehole BH1 was 5.75 mbgl and in borehole BH2 was 1.26 mbgl over the monitoring period. Full results can be found in appendix E.

Based on the monitoring carried out to date, groundwater appears to be present at depths between about 1.26m and 5.75m bgl. It is understood the proposed basement will extend to around 3.4m bgl and would therefore intersect the groundwater recorded at this site.

Groundwater levels vary considerably from season to season and year to year, often rising close to the ground surface in wet or winter weather, and falling in periods of drought. Long-term monitoring from boreholes or standpipes is required to assess the ground water regime and this was not possible during the course of this site investigation.

Allowance should be made for seepages within the made ground, superficial deposits and London Clay. Where seepages are encountered the soils will soften rapidly. Due to the cohesive nature of the London Clay soils it is anticipated that groundwater should be controllable with simple pumping methods. Groundwater seepages from the overlying made ground and superficial clay deposits may be more variable.

Basement construction methods and design should allow for the ingress of water.

Groundwater flow within the London Clay is likely to be dominated by fissure flow and in general, due to the predominately cohesive nature of this strata, groundwater flow through these soils in anticipated to be slow. Data for the London Clay Formation indicates that the horizontal permeability generally ranges between about 1 x 10^{-9} m/s

and 1 x 10^{-14} m/s, with an even lower vertical permeability. The overlying Made Ground will have higher and variable permeability values.

It is assumed any groundwater flows that occur would generally follow the local topography, which in this instance slopes down towards the south-east by approximately 1 degrees (estimated). Given the relatively gentle slope (and therefore likely low hydraulic gradient), and the likely very low permeability of the London Clay Formation, there is considered to be a very low risk of the proposed basement walls causing a 'damming' effect or mounding of water on the upstream faces.

The design of the basement should allow for hydrostatic uplift and suitable waterproofing given the shallow groundwater levels recorded above.

16 Swelling and Shrinkage

Shrinkable soils are subject to changes in volume as their moisture content is altered. Soil moisture contents vary from season to season and can be influenced by a number of factors including the action of roots. The resulting shrinkage or swelling of the soil can cause subsidence or heave damage to foundations, the structures they support and services.

The designer should be aware that precautions regarding swelling and shrinkage are applicable, and in this respect NHBC precautions provide a helpful guide with respect to minimum foundation depths and deepening particularly within the zone of influence of vegetation.

Assessment of foundation depths should take into account trees, hedgerow and shrubs which are to be removed, are to remain or are proposed in any planting scheme; and which may be allowed to reach maturity.

We would recommend that on balance a NHBC HIGH Volume Change Potential site classification be adopted for design purposes covering the superficial Head Deposits and London Clay materials.

Full details of protective measures are given in NHBC Standards Ref [4], Chapter 4.2 to which the reader is referred.

17 Soakaways

No soakage testing has been carried out during the investigation works. However, due to the clay nature of the soils and the high groundwater levels measured on site it is considered unsuitable for soakaway drainage and a positive drainage system should be considered for surface water disposal.

18 Sulphates and Acidity

Chemical analysis of the underlying soils has been undertaken to establish the aggressive chemical environment for concrete in accordance with the BRE Special Digest 1, Ref [5]. The site category determined is that of a brownfield location that contain pyrites (or potential pyrites), as the underlying soils form part of the London Clay Formation.

The recorded pH values are in the range 7.6-8.2. Water soluble sulphate values are in the range of 45.1 to 3320 mg/l.

Given the sample numbers tested (eight) the characteristic value for sulphate concentration has been determined from the mean of highest two measured concentrations (3210 mg/l).

The Design Sulphate Class is DS-4. Groundwater should be assumed to be mobile. The ACEC site classification is AC-4.

Potential sulphates were also assessed for the eight samples tested in accordance with the guidance within BRE SD1. The highest mean of two values calculated for total potential sulphates (2.7%) increases the above classification to DS-5, AC-5.

19 Foundations and Bearing Capacity

All loadings should be transferred beneath any fill or made ground, topsoil, soft or disturbed soils and be placed within the underlying natural clay soils. Based on the results of this investigation an allowable bearing capacity of 100kN/m^2 could be adopted for foundations at basement level set on the underlying London Clay at around 3mbgl.

It is recommended that foundation inspections be undertaken during construction by a suitably qualified engineer to confirm that the recommendations within this report are appropriate to the foundations.

20 Basement Construction

Soil parameters for retaining structures are discussed in the previous sections. It is considered that the proposed basement retaining walls could be utilised to support structural loads. Underpinning or bored pile retaining walls, would be suitable for use on this site. The presence of groundwater should be considered in the design of any temporary and permanent retaining systems. If an impermeable cut-off is required, a secant bored pile wall is recommended.

Consideration should be given to potential ground movements arising from the installation of new retaining walls. It is recommended that robust structural propping should be installed at both the top and base of the excavation at an early stage to help reduce potential movements due to deflection of the retaining walls during excavation of the soils to form the basement. Propping would be required in both the temporary and permanent conditions. Consideration should be given to a top-down construction system.

The shallow soils are moisture sensitive and will lose their strength rapidly when wet. Groundwater seepages will need to be controlled. It is anticipated that groundwater can be managed with simple pumping methods.

The effects of hydrostatic uplift should be considered in the design of the basement. The basement will need to be fully tanked.

21 Heave

Due to the stress relief following the removal of the soils to form the basement, both immediate (undrained) and long term (undrained) heave displacement can be expected to occur in the underlying soils. These will be partially mitigated by the new concrete slab and basement structural loads.

The immediate (undrained) heave displacement will occur during excavation of the basement, and before the construction of basement elements (e.g. slabs). Only the long-term (drained) heave displacements will need to be catered for in design to overcome the problem of uplift pressures. This is generally overcome by installing appropriate void forming materials beneath the basement elements.

Uplift pressures are anticipated to be in the order of about 60-70 kN/m^2, assuming around a 3.4m deep excavation and the soil parameters discussed in this report.

Given the adjacent buildings, calculations for the magnitude of any movements should be undertaken once the proposed loading conditions have been finalised, to design any mitigating measures.

22 Piling

In the case of a piled foundation solution allowance should be made for a deeper borehole investigation to provide information for pile design. It is recommended that exploratory boreholes should penetrate to at least a depth of 33% to 50% more than final pile base depth.

As with any piling scheme, discussions should be held with selected piling contractors to discuss the technical and financial merits of their various systems. With respect to overall resources, the equipment available should be appropriate for the soils described and anticipated and be able to achieve the depths and diameters considered with an appropriate safety margin.

Based on the shallow boreholes, piles on this site will derive the majority of their capacity from the skin friction within the London Clay, base resistance will provide a much smaller contribution.

From the viewpoint of pile type and given the close proximity of adjacent structures, a bored pile solution is considered to be a more appropriate pile type. In terms of bored piles and, noting the presence of groundwater, a continuous flight auger grout injected pile (CFA) may be best suited to the ground conditions encountered. Careful monitoring during construction of these pile types is however required.

Noting that and standing water levels were measured, the specialist contractor should take appropriate measures to ensure that his system caters for the ingress of groundwater.

It should be noted that subsurface obstructions could be encountered in the form of old foundations, drain runs etc. accordingly allowances for their removal/breaking out should be made when carrying out piling works and excavations.

23 Excavations and Dewatering

Statutory support will be required in all excavations where personnel must work.

An allowance should be made for breaking out sub-surface obstructions associated with existing and past developments.

The Made Ground and London Clay materials will be prone to instability in open excavations during wet weather or where seepages are encountered and will soften rapidly if exposed to moisture or the elements.

Where excavation is proposed in close proximity to existing structure care will need to be taken to avoid undermining existing foundations.

To mitigate against vertical and horizontal movements caused by deflection of the retaining walls it is essential that structural propping is installed at both the top and base of the excavation at an early stage, for both the temporary and permanent conditions. Consideration should be given to a top-down construction method.

Inflows of groundwater into excavations should be anticipated. Due to the predominately cohesive nature of this strata, groundwater flow through these soils in anticipated to be slow. The overlying made ground will have higher and variable permeability values. These seepages should be managed with simple pumping methods.

Given the shallow groundwater recorded within the monitoring, the basement will need to be designed to cater for hydrostatic uplift.

REFERENCES

[1] BSI Standards, “BS 5930 Code of practice for ground investigations,” 2015.

[2] BSI Standards, “BS10175 Investigation of potentially contaminated sites – Code of practice,” 2013.

[3] Burland J. B. and Kalra J. L., “Queen Elizabeth II Conference Centre; Geotechnical Aspects,” *Proceedings of Institution of Civil Engineers,* vol. 80, pp. 1479 - 1503, 1986.

[4] NHBC, “NHBC Standards Plus,” [Online]. Available: http://www.nhbc.co.uk/Builders/ProductsandServices/TechZone/nhbcstandards/.

[5] Building Research Establishment (BRE), “SD1 Concrete in aggressive ground,” 2005.

[6] BSI Standards, “BS 3882:2015 Specification for Topsoil,” 2015.

[7] BSI Standards, “BS EN ISO 22476-3:2005+A1:2011 Geotechnical investigation and testing. Field testing. Standard penetration test,” 2011.

[8] BSI Standards, “BS EN ISO 22475-1:2006 Geotechnical investigation and testing. Sampling methods and groundwater measurements. Technical principles for execution.,” 2006.

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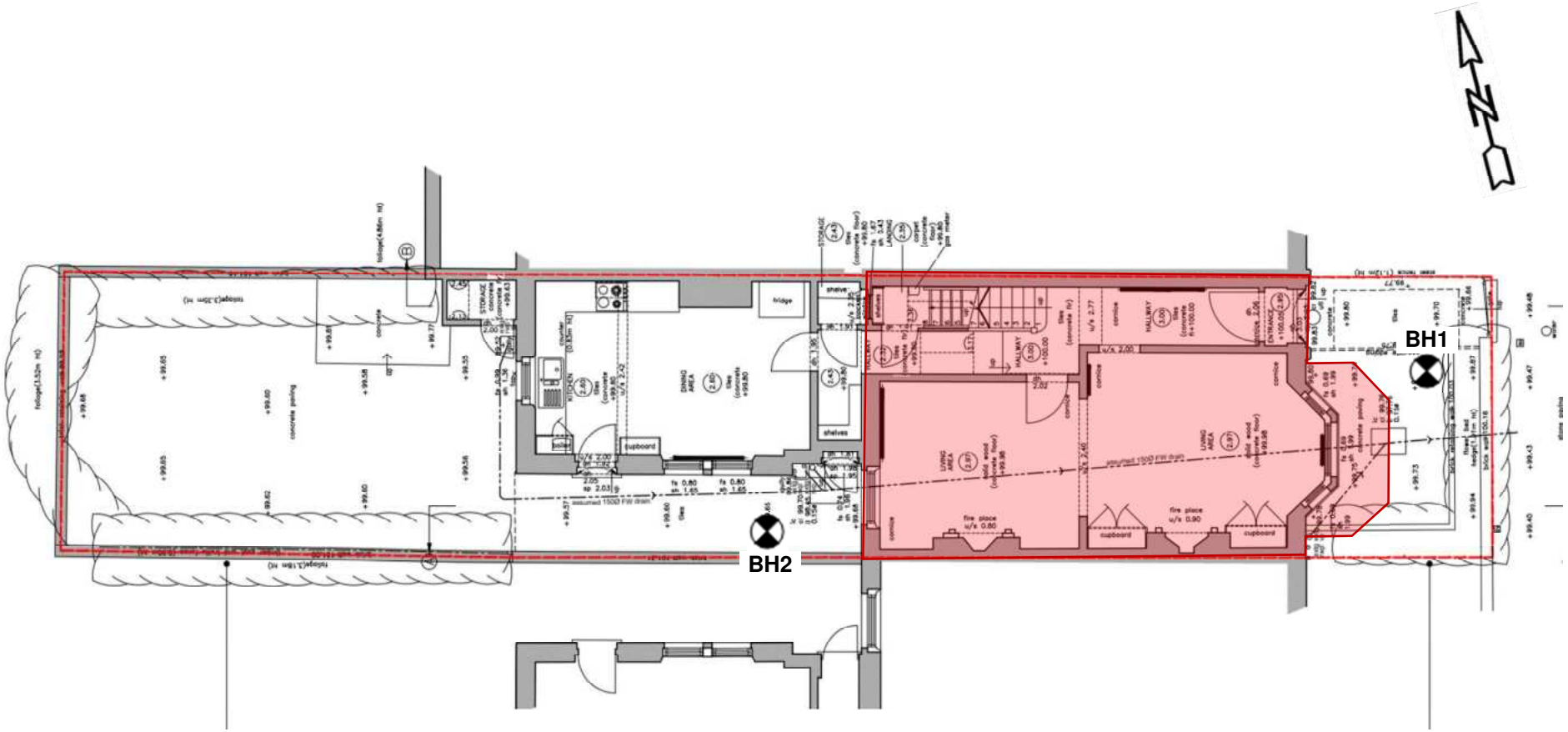
APPENDIX A

Site Plans and Exploratory Hole Logs

A

Site:	17 Courthope Road, London	Project ID	J15878
Figure 1	Site Location Plan	Date:	18/02/2025



Approximate extent of proposed basement.

NB: Positions of exploratory holes / test positions are only indicative unless dimensioned.

Site:	17 Courthope Road, London	Project ID	J15878
Figure 2	Site Investigation Layout Plan	Date:	18/02/2025

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	BH1
	19/12/2024	J15878	WLS	Sheet 1 of 2

Client:	Mr J Markham	Co-ordinates:	Level (m AOD)	Logger:
				VF
Project Name:	17 Courthope Road	**Location:**	London, NW3 2LE	

Well	Water Strikes	Samples and Insitu Testing: Depth (m)	Type/FI	Results	Progress: Runs	Depth (m)	Level (m AOD)	Legend	Stratum Description
						0.05	(0.05)		Paving Slab
						0.10	(0.05)		Orange fine to coarse SAND. MADE GROUND
		0.50	ES				(0.60)		Dark brown, silty sandy gravelly CLAY. Sand is fine to coarse grained. Gravel consists of fine to coarse angular brick, clinker, chalk and rare slate. MADE GROUND
		0.75	HP	UCS(kPa)=110		0.70			Soft to firm, greyish brown mottled orangish brown, silty CLAY. HEAD
		0.90	HP	UCS(kPa)=140					
		1.00	D						
			HP	UCS(kPa)=150					
		1.20	HP	UCS(kPa)=140			(1.05)		
			SPT	N=3 (1,0/1,0,1,1)	1.20 - 2.00 100% rec				
		1.40	HP	UCS(kPa)=160					
		1.50	ES						
		1.60	HP	UCS(kPa)=200		1.75			Firm, brown mottled dark grey, silty slightly sandy gravelly to very gravelly CLAY. Sand is fine to medium grained. Gravel consists of fine to coarse angular to rounded flint. HEAD
		2.00	D				(0.55)		
			SPT	N=7 (3,4/2,2,1,2)					
		2.40	HP	UCS(kPa)=310		2.30			Stiff becoming very stiff, extremely closely fissured, orangish brown mottled bluish grey, silty CLAY with occasional selenite crystals. LONDON CLAY FORMATION
		2.50	D		2.00 - 3.00 100% rec				
			ES						
		2.60	HP	UCS(kPa)=330					
		2.80	HP	UCS(kPa)=310					
		3.00	HP	UCS(kPa)=290					
			SPT	N=12 (1,2/3,3,3,3)					
		3.20	HP	UCS(kPa)=260					
		3.40	HP	UCS(kPa)=280					
		3.50	D		3.00 - 4.00 100% rec				
			ES						
		3.60	HP	UCS(kPa)=330					
		3.80	HP	UCS(kPa)=300					
		4.00	D						
			HP	UCS(kPa)=360					*From 4.0m, less bluish grey mottling.*
			SPT	N=13 (3,3/2,4,4,3)			(5.15)		
		4.20	HP	UCS(kPa)=370					
		4.40	HP	UCS(kPa)=410					
		4.50	D		4.00 - 5.00 100% rec				*At 4.45m, pocket of orange fine SAND.*
			ES						
		4.60	HP	UCS(kPa)=400					
		4.80	HP	UCS(kPa)=400					*At 4.8-4.9m, pockets of orange fine SAND.*
		5.00	D						*From 5.0m, brown.*
			HP	UCS(kPa)=410					
			SPT	N=14 (1,2/3,3,4,4)					
		5.20	HP	UCS(kPa)=360					
		5.40	HP	UCS(kPa)=380					
		5.50	D		5.00 - 6.00 100% rec				
			ES						
		5.60	HP	UCS(kPa)=480					*At 5.7m, pocket of orange fine SAND.*
		5.80	HP	UCS(kPa)=550					
		6.00	D						

Remarks:

Hand dug to 1.2m. Windowless sampler to 7.0m.
No groundwater encountered.
Installed with 50mm diameter groundwater monitoring well with response zone between 1m and 7mbgl.

Status:	FINAL	Log Print Date and Time:	13/02/2025 09:15	Log Approved By:	JNR

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	BH1
	19/12/2024	J15878	WLS	Sheet 2 of 2

Client:	Mr J Markham	Co-ordinates:	Level (m AOD)	Logger:
				VF
Project Name:	17 Courthope Road	**Location:**	London, NW3 2LE	

Well	Water Strikes	Samples and Insitu Testing			Progress	Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type/FI	Results	Runs				
			HP	UCS(kPa)=470					Stiff becoming very stiff, extremely closely fissured, orangish brown mottled bluish grey, silty CLAY with occasional selenite crystals. LONDON CLAY FORMATION
			SPT	N=16 (1,2/3,4,5,4)					
		6.20	HP	UCS(kPa)=380					
		6.40	HP	UCS(kPa)=400					
		6.50	D		6.00 - 7.00 100% rec				
		6.60	HP	UCS(kPa)=430					
		6.80	HP	UCS(kPa)=480					
		7.00	D						
			HP	UCS(kPa)=370					
			SPT	N=16 (2,2/4,4,4,4)					
						7.45			End of Borehole at 7.45m

7
8
9
10
11
12

Remarks:

Hand dug to 1.2m. Windowless sampler to 7.0m.
No groundwater encountered.
Installed with 50mm diameter groundwater monitoring well with response zone between 1m and 7mbgl.

Status:	FINAL	Log Print Date and Time:	13/02/2025 09:15	Log Approved By:	JNR

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	BH1
	19/12/2024	J15878	WLS	Sheet 1 of 1

Depth Related Hole Information

Top Depth (m)	Base Depth (m)	Hole Type	Start Date	End Date	Crew	Plant Used	Contractor	Logged By	Remarks
0.00	1.20	IP	19/12/2024	19/12/2024	OS/DT	Hand Dug	STL	VF	
1.20	7.45	WLS	19/12/2024	19/12/2024	OS/DT	Premier Rig	STL	VF	

Hole Diameter

Hole Diameter (mm)	Depth to Base (m)	Remarks

Casing Diameter

Casing Diameter (mm)	Depth to Base (m)	Remarks

Dynamic Sample Drill Run Information

Run No.	Top Depth (m)	Base Depth (m)	Duration	Hole Diameter (mm)	Sample Recovery (%)	Remarks
WLS1	1.20	2.00			100	
WLS2	2.00	3.00			100	
WLS3	3.00	4.00			100	
WLS4	4.00	5.00			100	
WLS5	5.00	6.00			100	
WLS6	6.00	7.00			100	

Project Specific Time Related Remarks

Date Time Start	Date Time End	Duration	Remarks

Drilling Progress by Time

Date Time	Depth (m)	Casing Depth (m)	Water Depth (m)	Remarks
19/12/2024 13:00:00				Start of borehole.
19/12/2024 15:30:00	7.45		Dry	End of borehole.

SPT

Top Depth (m)	Test Type	Casing Depth (m)	Water Depth (m)	Self Weight Penetration (mm)	Reported Result (N Value)	Hammer Serial No.	Energy Ratio %	Remarks
1.20	S			0	N=3 (1,0/1,0,1,1)	110.139	76	Dry
2.00	S			0	N=7 (3,4/2,2,1,2)	110.139	76	Dry
3.00	S			0	N=12 (1,2/3,3,3,3)	110.139	76	Dry
4.00	S			0	N=13 (3,3/2,4,4,3)	110.139	76	Dry
5.00	S			0	N=14 (1,2/3,3,4,4)	110.139	76	Dry
6.00	S			0	N=16 (1,2/3,4,5,4)	110.139	76	Dry
7.00	S			0	N=16 (2,2/4,4,4,4)	110.139	76	Dry

Water Strikes and Details

Depth Strike (m)	Date Time	Depth Casing (m)	Depth Sealed (m)	Remarks	Time Elapsed (mins)	Water Depth (m)	Remarks

Installation Details

Distance	Point Ref.	Type	Top of Response Zone (m)	Base of Response Zone (m)	Pipe Ref.
7.00	BH1	SP	1.00	7.00	BH1

Pipe Construction

Pipe Reference	Depth Top (m)	Depth Base (m)	Diameter (mm)	Pipe Type
BH1	0.05	1.00	50	PLAIN
BH1	1.00	7.00	50	SLOTTED

Backfill Details

Depth Top	Depth Base	Material	Remarks
0.00	0.05	Concrete	
0.05	1.00	Bentonite	
1.00	7.45	Gravel Backfill	

Status:	FINAL	Log Print Date and Time:	13/02/2025 09:15	Log Approved By:	JNR

01 BH1 GL to 1.2m

02 BH1 1.2m to 2.0m

Southern Testing ST Consult	Project ID:	Project Name:	Location:	BH1
	J15878	17 Courthope Road	London, NW3 2LE	

03 BH1 2.0m to 3.0m

04 BH1 3.0m to 4.0m

Southern Testing ST Consult	Project ID:	Project Name:	Location:	BH1
	J15878	17 Courthope Road	London, NW3 2LE	

05 BH1 4.0m to 5.0m

06 BH1 5.0m to 6.0m

Southern Testing ST Consult	Project ID:	Project Name:	Location:	BH1
	J15878	17 Courthope Road	London, NW3 2LE	

07 BH1 6.0m to 7.0m

Southern Testing ST Consult	Project ID:	Project Name:	Location:	BH1
	J15878	17 Courthope Road	London, NW3 2LE	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	BH2
	19/12/2024	J15878	WS	Sheet 1 of 1

Client:	Mr J Markham	Co-ordinates:	Level (m AOD)	Logger:
				VF
Project Name:	17 Courthope Road	**Location:**	London, NW3 2LE	

Well	Water Strikes	Samples and Insitu Testing: Depth (m)	Type/FI	Results	Progress: Window Run	Depth (m)	Level (m AOD)	Legend	Stratum Description
						0.03	(0.03)		Tiled surfacing.
						0.06	(0.11)		Concrete.
		0.30	ES			0.17	(0.33)		Brown and red, silty sandy gravelly CLAY. Sand is fine to coarse grained. Gravel consists of fine to coarse angular brick. MADE GROUND
		0.60	D			0.50	(0.30)		Dark brown/black, silty very sandy gravelly to very gravelly CLAY. Sand is fine to coarse grained. Gravel consists of abundant fine to medium clinker with occasional brick and ceramic. MADE GROUND
			ES						
		0.70	HP	UCS(kPa)=90		0.80			
		0.85	HP	UCS(kPa)=120					
		1.00	D						Soft, greyish brown, silty slightly gravelly CLAY with rare roots. Gravel consists of fine to coarse angular brick. MADE GROUND
			ES				(0.70)		
			HP	UCS(kPa)=120					
		1.20	HP	UCS(kPa)=140					Firm, orangish brown mottled bluish grey, silty CLAY. HEAD
		1.25	D						
		1.40	HP	UCS(kPa)=180		1.50			
		1.75	D				(0.50)		Firm to stiff, dark bluish grey mottled orangish brown, silty gravelly to very gravelly CLAY. Gravel consists of fine to coarse subangular to rounded flint. HEAD
			ES						*From 1.8m, orange brown.*
		2.00	HP	UCS(kPa)=270		2.00			Stiff, extremely closely fissured, brown mottled bluish grey, silty CLAY with occasional selenite crystals. LONDON CLAY FORMATION
		2.20	HP	UCS(kPa)=350	1.80 - 2.80 100% rec				
		2.25	D						*At 2.25m, occasional gravel of fine to medium subangular claystone.*
		2.40	HP	UCS(kPa)=300					
		2.50	ES						
		2.60	HP	UCS(kPa)=300					
		2.80	HP	UCS(kPa)=340			(1.60)		
		3.00	D						
			ES						
			HP	UCS(kPa)=310	2.80 - 3.60 100% rec				
		3.20	HP	UCS(kPa)=370					*At 3.2m, pocket of orange fine SAND.*
		3.40	HP	UCS(kPa)=340					
		3.50	D						
		3.60	HP	UCS(kPa)=380		3.60			*Water at base on completion of borehole. Window sampler unable to progress further through stiff clay from 3.6m.*
									End of Borehole at 3.60m

Remarks:

Hand dug to 1.8m. Hand held window sampler to 3.6m.
Water at base of borehole on completion.
Installed with 50mm diameter groundwater monitoring well with response zone between 1m and 4mbgl.

Status:	FINAL	Log Print Date and Time:	13/02/2025 09:16	Log Approved By:	JNR

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	BH2
	19/12/2024	J15878	WS	Sheet 1 of 1

Depth Related Hole Information

Top Depth (m)	Base Depth (m)	Hole Type	Start Date	End Date	Crew	Plant Used	Contractor	Logged By	Remarks
0.00	1.80	HA	19/12/2024	19/12/2024	OS/DT	Hand Dug	STL	VF	
1.80	3.60	WS	19/12/2024	19/12/2024	OS/DT	Window Sampler	STL	VF	

Window Sample Drill Run Information

Run No.	Top Depth (m)	Base Depth (m)	Duration	Hole Diameter (mm)	Sample Recovery (%)	Remarks
WS1	1.80	2.80			100	
WS2	2.80	3.60			100	

Project Specific Time Related Remarks

Date Time Start	Date Time End	Duration	Remarks

Drilling Progress by Time

Date Time	Depth (m)	Casing Depth (m)	Water Depth (m)	Remarks
19/12/2024 09:00:00				Start of borehole.
19/12/2024 13:00:00	3.60		3.6	End of borehole.

Water Strikes and Details

Depth Strike	Date Time	Depth Casing (m)	Depth Sealed (m)	Remarks	Time Elapsed (mins)	Water Depth (m)	Remarks

Installation Details

Distance	Point Ref.	Type	Top of Response Zone (m)	Base of Response Zone (m)	Pipe Ref.
3.60	BH2	SP	1.00	3.60	BH2

Pipe Construction

Pipe Reference	Depth Top (m)	Depth Base (m)	Diameter (mm)	Pipe Type
BH2	0.05	1.00	50	PLAIN
BH2	1.00	3.60	50	SLOTTED

Backfill Details

Depth Top (m)	Depth Base (m)	Material	Remarks
0.00	0.05	Concrete	
0.05	1.00	Bentonite	
1.00	3.60	Gravel Backfill	

Status:	FINAL	Log Print Date and Time:	13/02/2025 09:17	Log Approved By:	JNR

01 BH2 GL to 1.0m

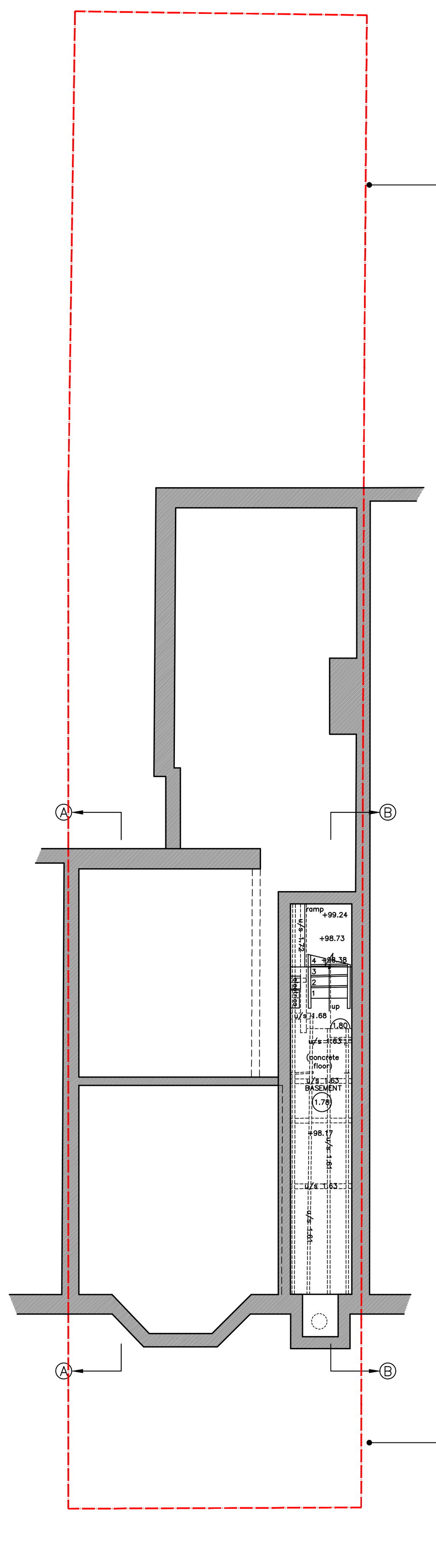
02 BH2 1.0m to 1.8m

Southern Testing ST Consult	Project ID:	Project Name:	Location:	BH2
	J15878	17 Courthope Road	London, NW3 2LE	

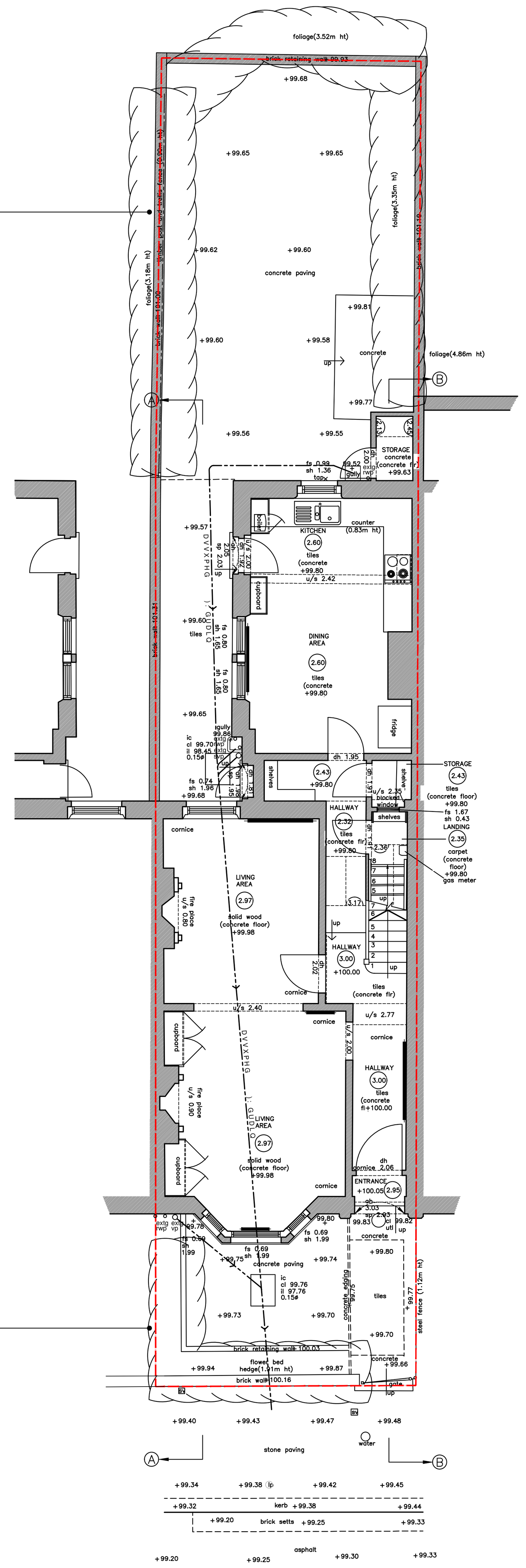
03 BH2 1.8m to 2.8m

04 BH2 2.8m to 3.6m

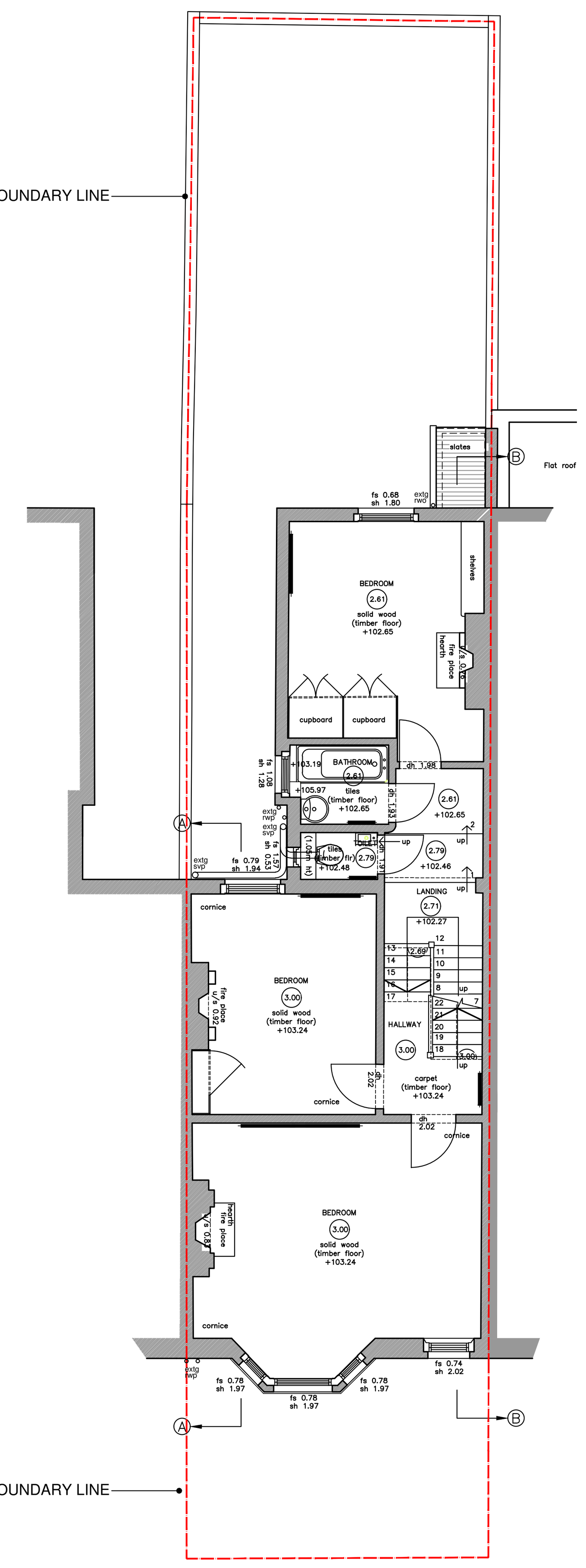
Southern Testing ST Consult	Project ID:	Project Name:	Location:	BH2
	J15878	17 Courthope Road	London, NW3 2LE	



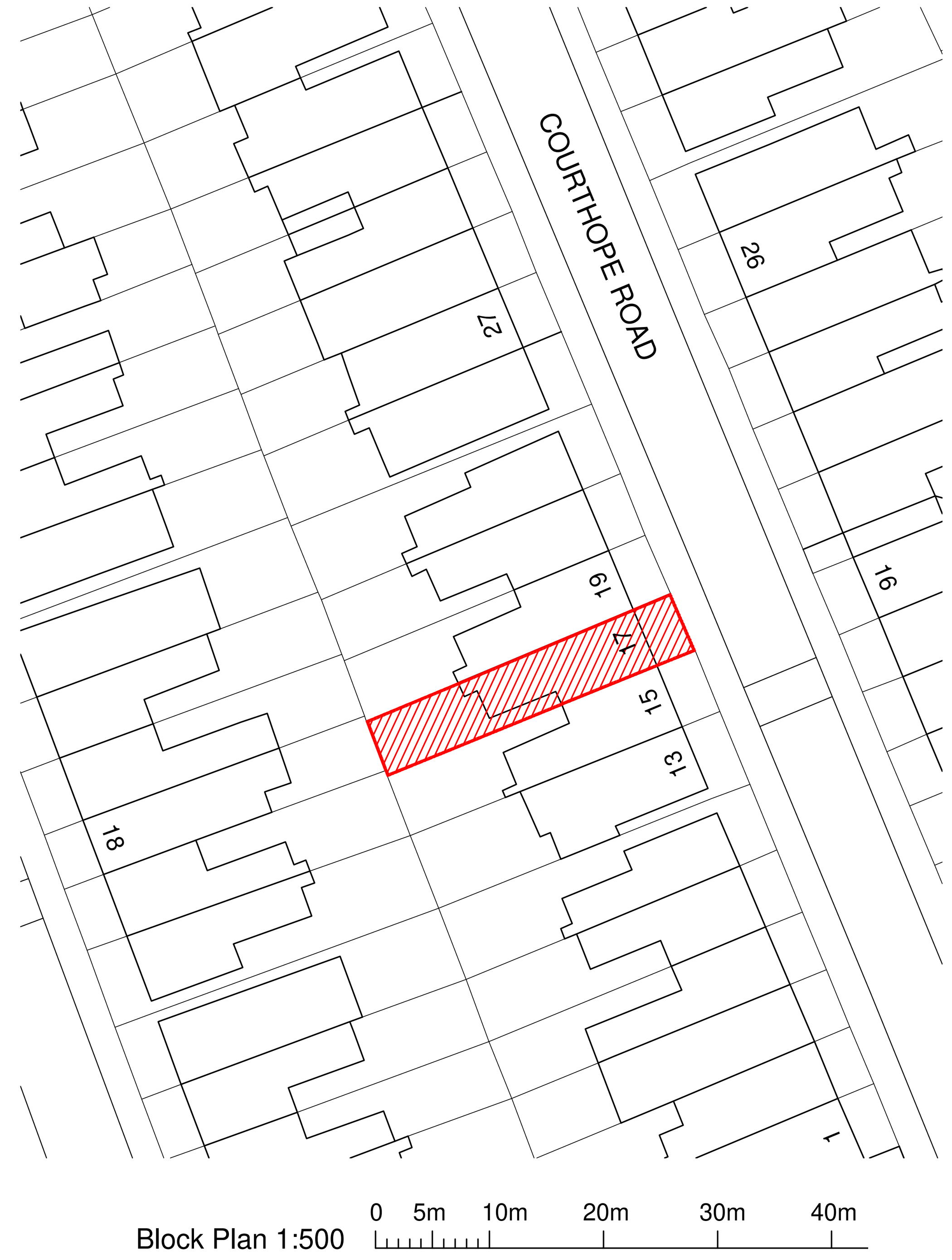
Cellar Floor Plan



Ground Floor Plan

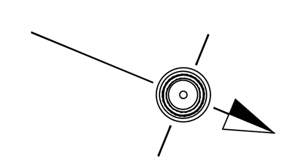


First Floor Plan

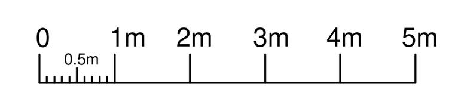


Block Plan 1:500

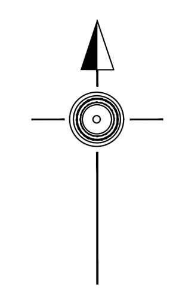
Site Location Plan 1:1250



Plans North



Scale Bar for Plans & Elevations



Site Plans North

STAC architecture SNAITH+THRUSH ARCHITECT COLLABORATION

STAC Architecture Limited
www.stac-architecture.com
info@stac-architecture.com

Client	Mr & Mrs Markham
Project	Basement Extension 17 Courthope Road, London. NW3 2LE

General Notes:

All dimensions to be checked on site prior to commencement of any works, and/or preparation of any shop drawings.

Sizes of and dimensions to any structural elements are indicative only. See structural engineers drawings for actual sizes / dimensions.

Sizes of and dimensions to any service elements are indicative only. See service engineers drawings for actual sizes and dimensions

~~DO NOT SCALE FROM THIS DRAWING~~

This drawing is to be read in conjunction with all other architects drawings, specifications and all other consultants' information.

All proprietary systems shown on this drawing are to be installed strictly in accordance with the manufacturers / suppliers recommended details.

Any discrepancies between information shown on this drawing and any other contract information or manufacturers / suppliers recommendations is to be brought to the attention of the architect.

Drawing Notes:

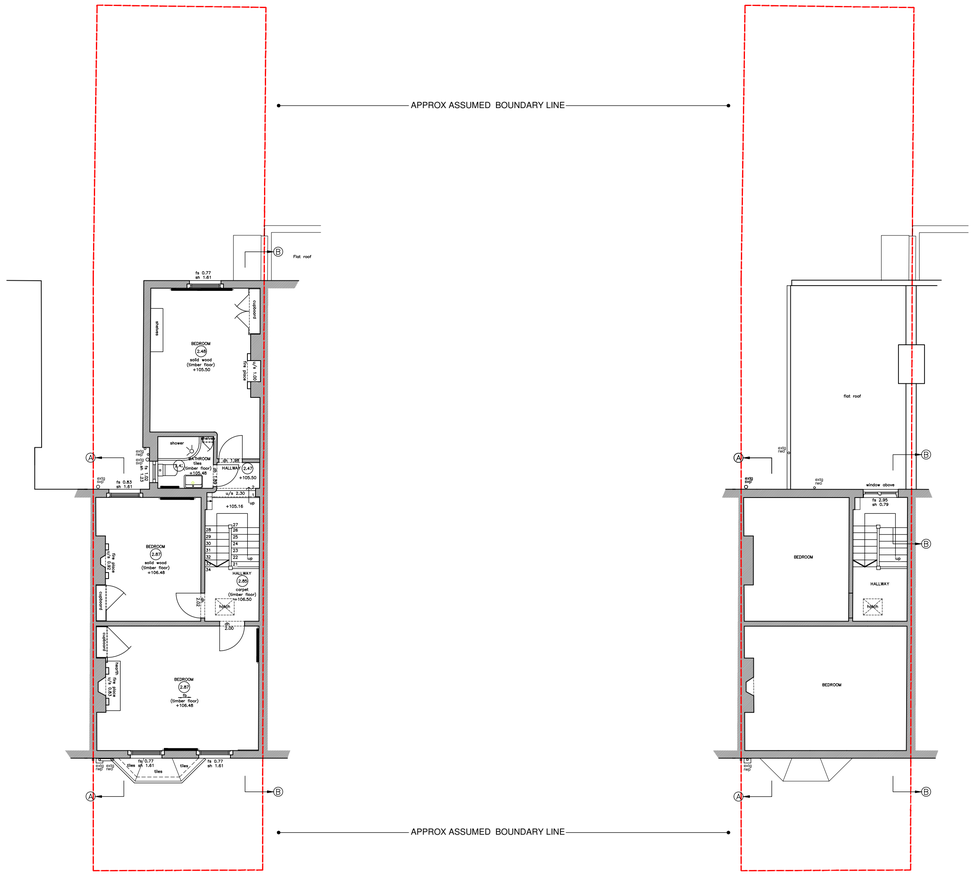
Status	Revision	Date
P1	ISSUED FOR PLANNING	??.01.25

Drawing Status: FOR PLANNING

Drawing: GENERAL ARRANGEMENT
SITE LOCATION, BLOCK PLAN, CELLAR, GROUND & FIRST FLOOR PLANS AS EXISTING

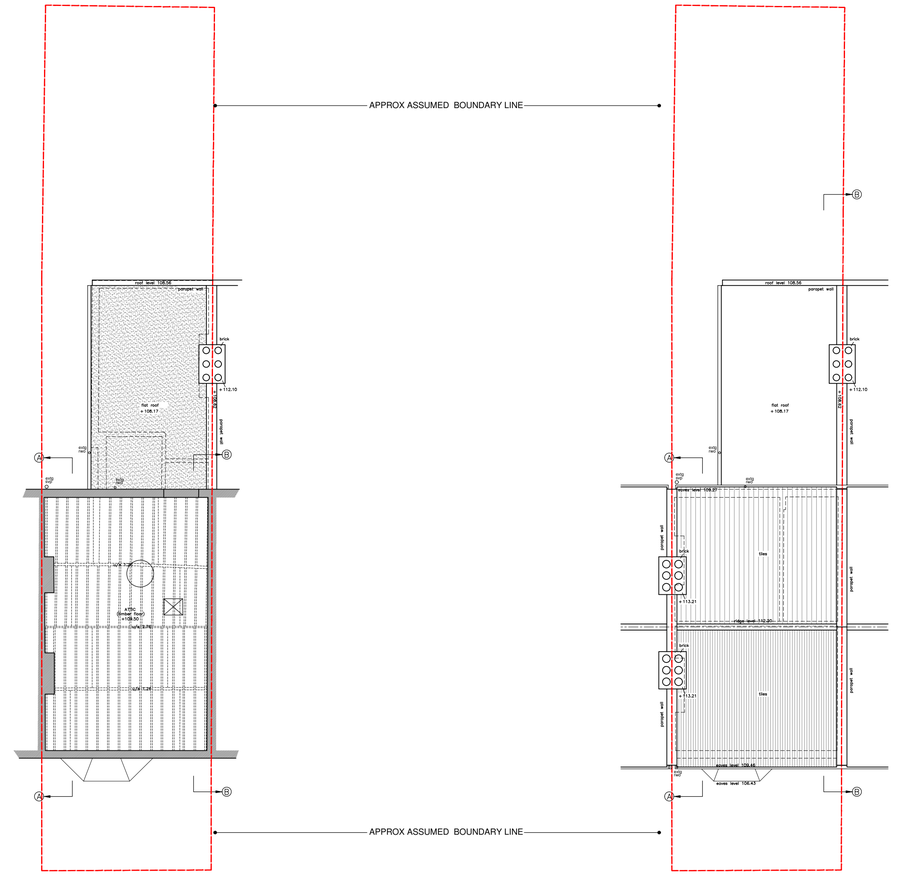
Drawn	Checked	Date	Scale
DS		Sept' 24	as shown & 1:100@A1

Project	Reference	Number	Revision
0350	F	04	P1



Second Floor Plan

High Level Second Floor Plan



Roof Void Plan

Roof Plan

0 1m 2m 3m 4m 5m
0.5m

Scale Bar for Plans & Elevations

Plans North

STAC architecture SNAITH+THRUSH ARCHITECT COLLABORATION

STAC Architecture Limited
www.stac-architecture.com
info@stac-architecture.com

Client
Mr & Mrs Markham

Project
Basement Extension
17 Courthope Road, London. NW3 2LE

General Notes:

All dimensions to be checked on site prior to commencement of any works, and/or preparation of any shop drawings.

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Drawing Notes:

Status	Revision	Date
P1	ISSUED FOR PLANNING	??.01.25

Drawing Status: FOR PLANNING

Drawing: GENERAL ARRANGEMENT
SECOND FLOOR, SECOND FLOOR HIGH-LEVEL, ROOF VOID AND ROOF PLANS AS EXISTING

Drawn	Checked	Date	Scale
DS		Sept' 24	1:100@A1

Project	Reference	Number	Revision
0350	F	05	P1

MATERIALS KEY

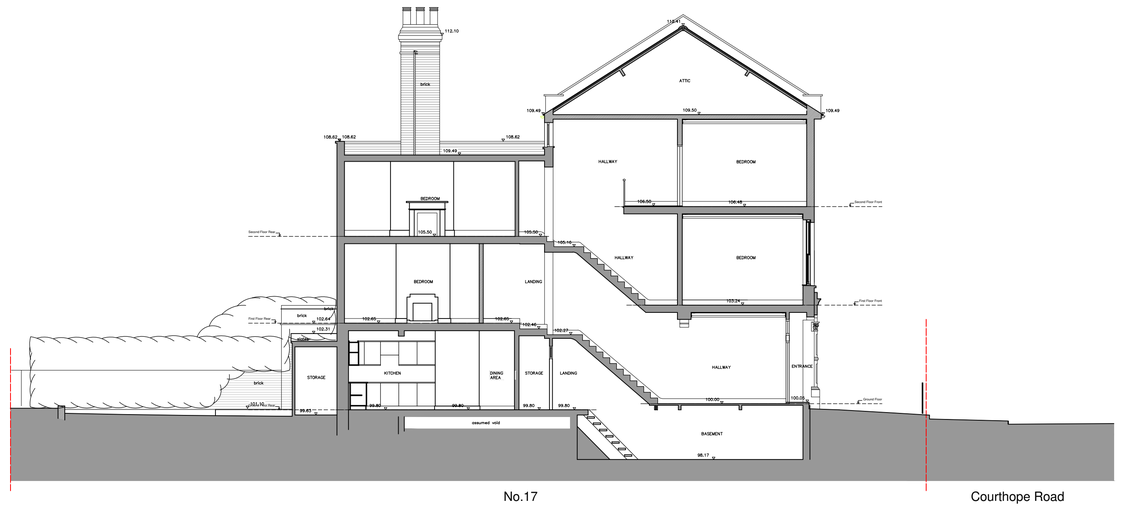
1. BROWN CONCRETE ROOF TILES
2. NATURAL BLUE/ GREY SLATE
3. LONDON STOCK BRICKWORK
4. WHITE PAINTED STONE DETAILING
5. TIMBER DOUBLE GLAZED SASH WINDOW WITH WHITE PAINTED STONE CILLS
6. TIMBER DOOR
7. TIMBER FASCIA AND BLACK uPVC GUTTERS AND DOWNPIPES

Front Elevation

Rear Elevation

Side Elevation

Section A-A



Section B-B

0 0.5m 1m 2m 3m 4m 5m

Scale Bar for Plans & Elevations

STAC Architecture Limited
www.stac-architecture.com
info@stac-architecture.com
STAC architecture SNAITH+THRUSH ARCHITECT COLLABORATION

Client: Mr & Mrs Markham

Project: Rear Extension, Loft Extension and Internal Alterations
17 Courthope Road, London. NW3 2LE

General Notes:

All dimensions to be checked on site prior to commencement of any works, and/or preparation of any shop drawings.

Sizes of and dimensions to any structural elements are indicative only. See structural engineers drawings for actual sizes / dimensions.

Sizes of and dimensions to any service elements are indicative only. See service engineers drawings for actual sizes and dimensions

~~DO NOT SCALE FROM THIS DRAWING~~

This drawing is to be read in conjunction with all other architects drawings, specifications and all other consultants' information.

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Any discrepancies between information shown on this drawing and any other contract information or manufacturers / suppliers recommendations is to be brought to the attention of the architect.

Drawing Notes:

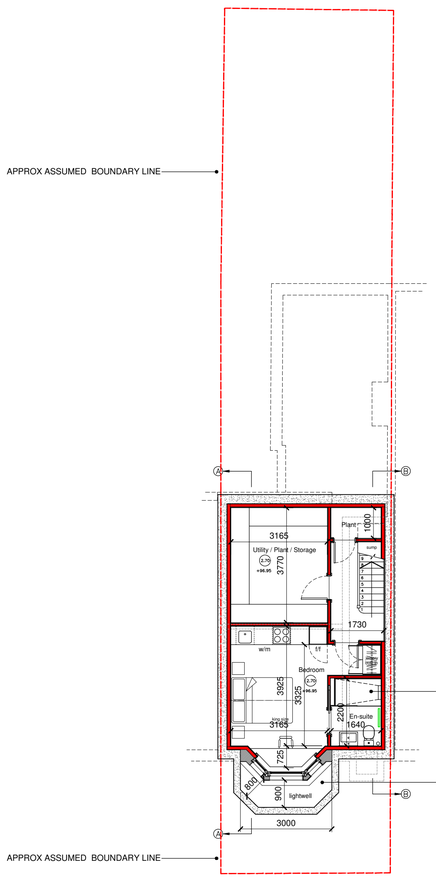
Status	Revision	Date
P1	ISSUED FOR PLANNING	??.01.25

Drawing Status: FOR PLANNING

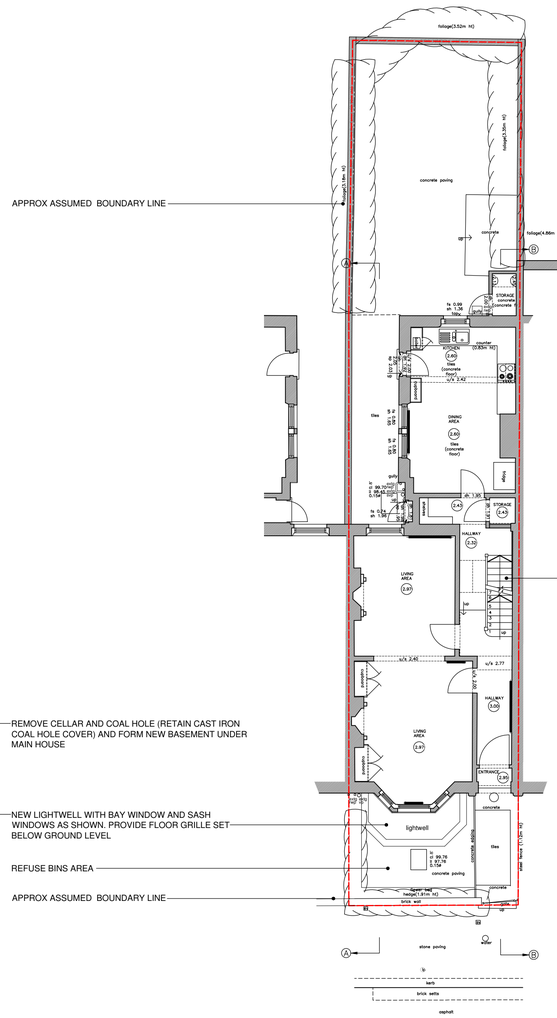
Drawing: GENERAL ARRANGEMENT ELEVATIONS AND SECTIONS AS EXISTING

Drawn	Checked	Date	Scale
DS		Sept' 24	1:100@A1

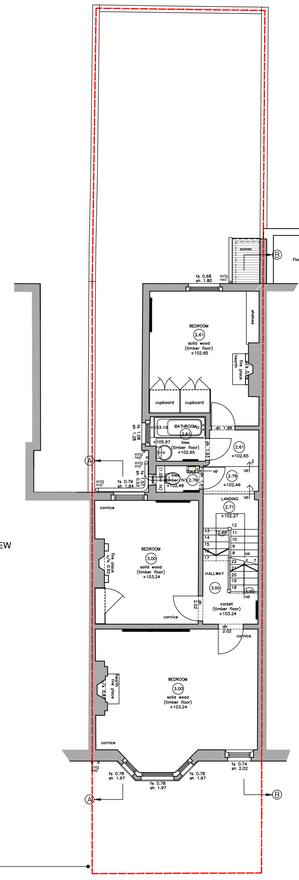
Project	Reference	Number	Revision
0350	F	06	P1



Cellar Floor Plan



Ground Floor Plan



First Floor Plan

Block Plan 1:500 0 5m 10m 20m 30m 40m

Site Location Plan 1:1250 0 5m 10m 20m 30m 40m 50m

Plans North

0 0.5m 1m 2m 3m 4m 5m

Scale Bar for Plans & Elevations

Site Plans North

STAC architecture SNAITH+THRUSH ARCHITECT COLLABORATION

STAC Architecture Limited
www.stac-architecture.com
info@stac-architecture.com

Client: Mr & Mrs Markham

Project: Basement Extension
17 Courthope Road, London. NW3 2LE

General Notes:

All dimensions to be checked on site prior to commencement of any works, and/or preparation of any shop drawings.

Sizes of and dimensions to any structural elements are indicative only. See structural engineers drawings for actual sizes / dimensions.

Sizes of and dimensions to any service elements are indicative only. See service engineers drawings for actual sizes and dimensions

~~FIGURED DIMENSIONS TO BE FOLLOWED IN PREFERENCE TO SCALED DRAWINGS~~

This drawing is to be read in conjunction with all other architects drawings, specifications and all other consultants' information.

All proprietary systems shown on this drawing are to be installed strictly in accordance with the manufacturers / suppliers recommended details.

Any discrepancies between information shown on this drawing and any other contract information or manufacturers / suppliers recommendations is to be brought to the attention of the architect.

Drawing Notes:

Status	Revision	Date
P1	ISSUED FOR PLANNING	??.01.25

Drawing Status: FOR PLANNING

Drawing: GENERAL ARRANGEMENT
SITE LOCATION, BLOCK PLAN, CELLAR, GROUND & FIRST FLOOR PLANS AS PROPOSED

Drawn	Checked	Date	Scale
DS		Nov'24	as shown@A1

Project	Reference	Number	Revision
0350	D	06	P1

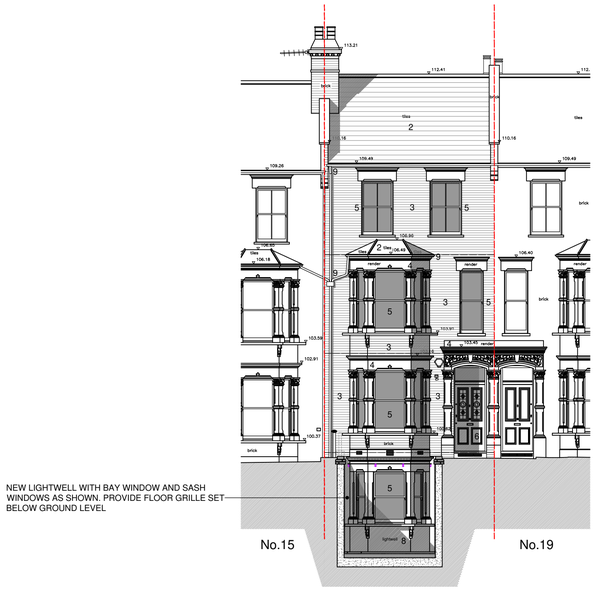
0 1m 2m 3m 4m 5m
0.5m

Scale Bar for Plans, Elevations & Sections

MATERIALS KEY

1. BROWN CONCRETE ROOF TILES
2. NATURAL BLUE/ GREY SLATE
3. LONDON STOCK BRICKWORK
4. WHITE PAINTED STONE DETAILING
5. TIMBER DOUBLE GLAZED SASH WINDOW WITH WHITE PAINTED STONE CILLS
6. TIMBER DOOR
7. TIMBER FASCIA AND BLACK uPVC GUTTERS AND DOWNPIPES
8. RENDER, PAINTED

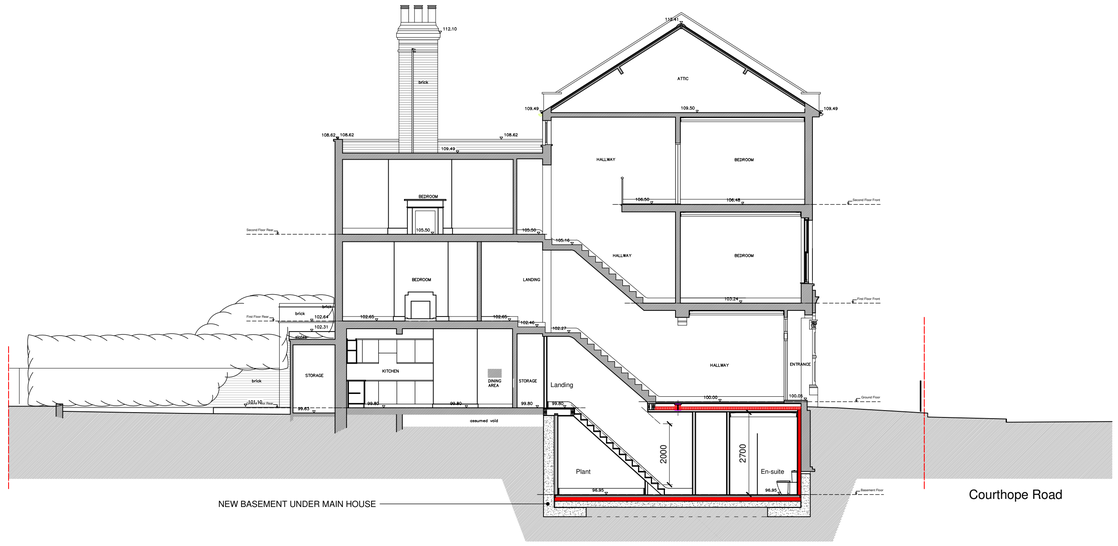
Front Elevation



Front Lightwell Section

Side Elevation

Section A-A



Section B-B

STAC Architecture Limited
www.stac-architecture.com
info@stac-architecture.com
STAC architecture SNAITH+THRUSH ARCHITECT COLLABORATION

Client: Mr & Mrs Markham

Project: Basement Extension
17 Courthope Road, London. NW3 2LE

General Notes:

All dimensions to be checked on site prior to commencement of any works, and/or preparation of any shop drawings.

Sizes of and dimensions to any structural elements are indicative only. See structural engineers drawings for actual sizes / dimensions.

Sizes of and dimensions to any service elements are indicative only. See service engineers drawings for actual sizes and dimensions

[redacted]

This drawing is to be read in conjunction with all other architects drawings, specifications and all other consultants' information.

All proprietary systems shown on this drawing are to be installed strictly in accordance with the manufacturers / suppliers recommended details.

Any discrepancies between information shown on this drawing and any other contract information or manufacturers / suppliers recommendations is to be brought to the attention of the architect.

Drawing Notes:

Status	Revision	Date
P1	ISSUED FOR PLANNING	??.01.25

Drawing Status: FOR PLANNING

Drawing: GENERAL ARRANGEMENT
ELEVATIONS AND SECTIONS A-A & B-B AS PROPOSED

Drawn	Checked	Date	Scale
DS		Nov'24	1:100@A1

Project	Reference	Number	Revision
0350	D	07	P1

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Key to Exploratory Hole Logs, Plans and Sections

Backfill Symbols		Pipe Symbols		Principal Soil Types		Principal Rock Types		Drilling Records	
Arisings		Plain Pipe		Topsoil		Mudstone		Water Strike	
Concrete		Slotted Pipe		Made Ground		Claystone		Depth Water Rose	
Blacktop		Piezometer		Clay		Siltstone		Total Core Recovery (%) [TCR]	
Bentonite		Piezometer Tip		Silt		Sandstone		Solid Core Recovery (%) [SCR]	
Gravel Filter		Filter Tip		Sand		Limestone		Rock Quality Index (%) RQD]	
Sand Filter		Extensometer		Gravel		Chalk		Fracture Index (fractures / m) [FI]	
		Inclinometers		Peat					

All soil and rock descriptions are in general accordance with BS5930 2015, BS EN ISO 14688-1:2002+A1:2013 and BS EN ISO 14689-1:2003. Chalk descriptions are also based on CIRIA C574 and "Logging the Chalk – R.N. Mortimer 2015". The Geology Code is only provided where a positive identification of the sample strata has been made.

Location / Method Identifiers	
BH	Borehole (undefined)
CP	Cable Percussive
RC	Rotary Core
RO	Rotary Open Hole
ODC	Rotary Odex/Symmetrix drilling cased
CP+RC	Cable Percussive to Rotary Core
SNC	Sonic
CFA	Continuous Flight Auger
FA	Flight Auger
VC	Vibro Core
WLS+RC	Windowless (Dynamic) Sampler to Rotary Core
WLS	Windowless Sampler
WS	Window Sampler
HA	Hand Auger
C	Road / Pavement Core
IP	Inspection Pit (Hand Excavation)
TP	Trial Pit (Machine Excavated)
OP	Observation Pit (Supported Excavation Hand or Machine)

In-situ Test Location / Method	
DP	Dynamic Probe
CPT	Cone Penetration Test
CBR	In-situ CBR Test
DCP	CBR using Dynamic Cone Penetrometer
CBRT	CBR using TRL Probe
PB	Plate Bearing Test
SPT (S)	Standard Penetration Test (Split Barrel Sampler)
SPT (C)	Standard Penetration Test (Solid Cone)
N	SPT Result
-/-	Blows/Penetration (mm) after seating drive
-*/-	Total Blows / Penetration (mm)
( )	Extrapolated Value
PPT	Perth Penetration (In-House Method - Equivalent N Value)
HP / UCS	Strength from Hand Penetrometer (kN/m^2)
IVN	Strength from Hand Vane ((kN/m^2) P = peak, R = residual
PID	Photo Ionisation Detector (ppm)
MEXE	Mexi-Cone CBR (%)

Samples / Test Type	
B	Bulk Sample
BLK	Block Sample
C	Core Sample
CBRS	CBR Mould Sample
D	Small Disturbed Sample
ES	Environmental Sample (Soil)
EW	Environmental Sample (Water)
GS	Environmental Sample (Gas)

Samples / Test Type	
SPTLS	Standard Penetration Test Split Barrel Sample
TW	Thin Wall Push In Sample (e.g. Shelby Sampler)
U	Undisturbed Open Drive Sample (blows to take)
UT	Thin Wall Undisturbed Open Drive Sample (blows to take)
W	Water Sample (Geotechnical)
SP	Sample from Stockpile
P	Piston Sample
AMAL	Amalgamated Sample

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APPENDIX B

Field Sampling and In-Situ Test Methods and Results

B

Soil and Rock Descriptions

All soil and rock descriptions are in general accordance with BS5930 Ref [1].

Anthropogenic soils ('made ground' or 'fill') describe materials which have been placed by man and can be divided into those composed of reworked natural soils and those composed of or containing man-made materials. 'Fill' is used to describe material placed in a controlled manner and 'made ground' is used to describe materials placed without strict engineering control.

The classification of materials such as topsoil is based on visual description only and should not be interpreted to mean that the material complies with criteria used in BS 3882 Ref [6].

The geology code is only provided on logs where a positive identification of the sample strata has been made.

Inspection Pit

Inspection pits are hand excavated from the surface (maximum depth 1.2 – 1.5m) using appropriate tools to locate and avoid existing buried services at exploratory hole positions. They are also regularly used as part of investigations on existing structures to expose and determine foundation detail.

Dynamic Sampling - Window or Windowless

Window sampling is carried out by driving hollow steel tubes incorporating a longitudinal access slot (window) and a cutting shoe into the ground using a percussive 'breaker'. This enables recovery of a continuous soil sample for examination and sub-sampling.

Windowless samplers are designed for taking disturbed, continuous soil samples to depths up to 10 metres (depending on ground conditions). The samplers comprise steel tubes of about 50-100mm diameter with a rigid plastic liner (no window) and are driven into the ground with a sliding hammer mounted on a tracked purpose-designed soil sampling rig. After driving and extracting the sampler from the ground, the plastic liner is extracted together with the enclosed soil sample. The sample can then either be extracted, split and sub-sampled or plastic end caps may be fitted, the tube labelled and transported for future examination and sub-sampling.

Soil samples are disturbed by the driving process with both techniques and can be regarded as being between Class 5 up to Class 3 samples at best (in favourable ground).

The major advantage of using windowless samplers is that the plastic liner greatly reduces the possibility of cross-contamination between successive samples.

An equivalent in-situ test to the Standard Penetration Test can be carried out with the windowless sampler rig.

Standard Penetration Test (SPT)

The Standard Penetration Test (SPT) is specified in BS EN ISO 22476-3 Ref [7]. In this test, an open-ended tube is driven into the ground by blows from a free-falling hammer (with specified sizes, weights and distances).

The tube is seated by driving to a penetration of 150mm, or by 25 blows, whichever occurs first. It is then driven for a maximum of a further 300mm and the number of blows is termed the penetration resistance (N). If 300mm penetration cannot be achieved in 50 blows, the test drive is terminated and penetration depth is recorded.

When testing in gravels, a conical end piece is attached to the tube. The test is then called an SPT(C).

A classification of relative density descriptions as used on borehole logs, based upon uncorrected SPT N values, is given within BS5930 Ref [1] and set out as follows:

Classification based on uncorrected SPT N Value	Term
0 - 4	Very Loose
4 - 10	Loose
10 – 30	Medium Dense
30 – 50	Dense
Over 50	Very Dense

Hand Penetrometer Test

The handheld soil penetrometer consists of a spring loaded and calibrated plunger which is forced into cohesive soil. A reading of unconfined compression strength (equal to twice cohesion) is given on a calibrated scale. The average of a set of three readings shall be recorded.

In common with other hand methods of strength assessment it does not give an accurate indication of bearing capacity in stiff or fissured soils, because of the small test area.

Disturbed Samples

Disturbed samples were taken from exploratory holes in general accordance with BS 5930 [1] and BS EN ISO 22475-1 Ref [8] as required and stored in appropriately labelled containers. Details of the type, size and depth of sample will be recorded within the exploratory hole record. Such samples can be regarded as being between Class 5 up to Class 3 quality depending upon their method of sampling.

Monitoring Well

A groundwater and/or ground gas monitoring well consists of a perforated pipe, which is installed in the ground. The standpipe is typically 50mm nominal in diameter and is installed in a lined borehole. It is perforated from the base with a sand/gravel surround through the soil horizon of interest to an appropriate depth below ground level. Above this there is a bentonite seal with solid pipework and is provided with an end cap or a gas valve at the top as appropriate.

Gas monitoring is carried out via the gas tap. Water sampling/purging can be undertaken by removing the gas tap and bung.

The well is usually completed at the surface with a flush cast iron cover or raised lockable cover.

Groundwater Monitoring – Dip Meter

The dip meter is used to measure standing water levels within boreholes. The probe is lowered into the borehole until the meter detects the groundwater with an audible ‘beep’. The level is then read from the tape.

Groundwater Monitoring – Digital Level Loggers

Digital loggers placed within borehole standpipes measuring water pressure, barometric pressure and temperature were used to record data over the monitoring period. The data was processed, using proprietary software, to determine temperature and barometric pressure compensated water levels.

The equipment can record parameters at pre-determined time intervals and has a capacity of many thousands of readings and is therefore suitable for monitoring over extended periods of time.

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	110.139
Test Date:	04/06/2024
Report Date:	04/06/2024
File Name:	110.139.spt
Test Operator:	BOB

Instrumented Rod Data

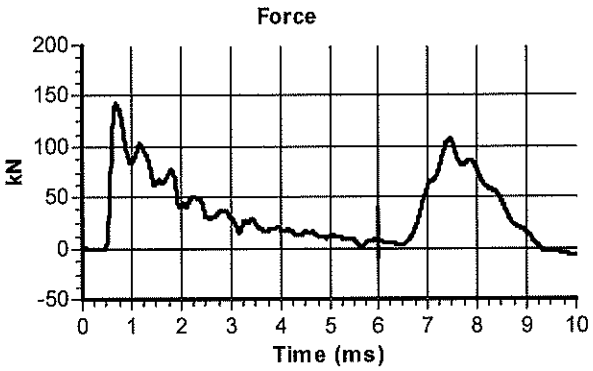
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.4
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	73547
Accelerometer No.2:	64789

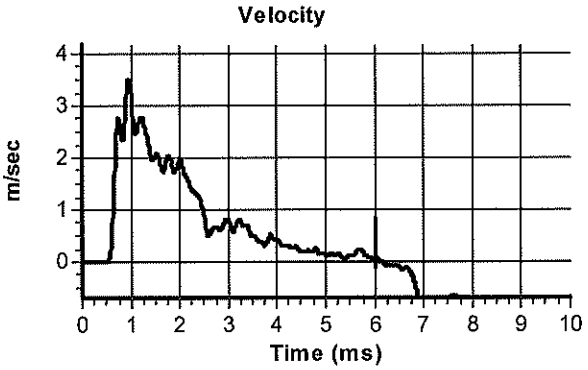
SPT Hammer Information

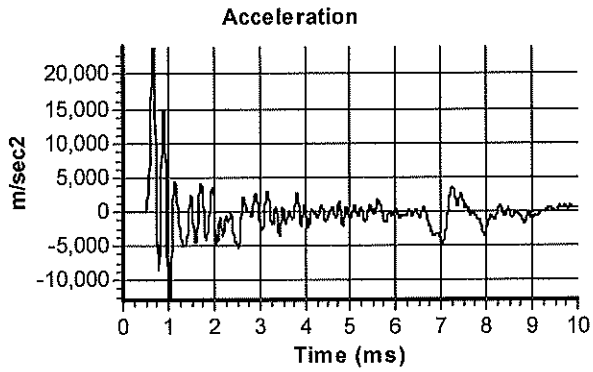
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	14.7

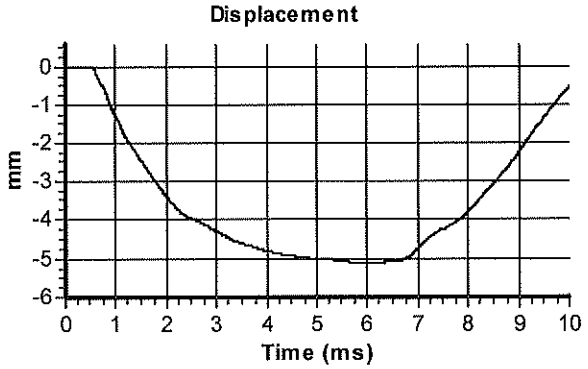
Comments / Location

CHARLSWOOD









Calculations

Area of Rod A (mm2):	957
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	359

Energy Ratio E_r (%): **76**

Signed: Bob Stewart

Title: Technician

The recommended calibration interval is 12 months

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Tel: 01342 333100
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www.southerntesting.co.uk

Project:	17 Courthope Road	**Project ID:**	J15878	**Figure: SPT1**
Client:	Mr J Markham	**Project Engineer:**	VF	

STANDARD PENETRATION TEST (SPT) RESULTS

*** Note: N60 correction for energy delivered to rods only. Engergy loss due to length of rods and overburden pressure not considered.**

Location ID	Test Depth (m bgl)	Test Type	SPT Hammer Ref.	Energy Ratio %	Seating Blows/Penetration				Main Test Blows/Penetration								N Value	N60 *	Reported Result
					SB1	SP1	SB2	SP2	MB1	MP1	MB2	MP2	MB3	MP3	MB4	MP4			
BH1	1.20	S	110.139	76	1	75	0	75	1	75	0	75	1	75	1	75	3	4	N=3 (1,0/1,0,1,1)
BH1	2.00	S	110.139	76	3	75	4	75	2	75	2	75	1	75	2	75	7	9	N=7 (3,4/2,2,1,2)
BH1	3.00	S	110.139	76	1	75	2	75	3	75	3	75	3	75	3	75	12	15	N=12 (1,2/3,3,3,3)
BH1	4.00	S	110.139	76	3	75	3	75	2	75	4	75	4	75	3	75	13	16	N=13 (3,3/2,4,4,3)
BH1	5.00	S	110.139	76	1	75	2	75	3	75	3	75	4	75	4	75	14	18	N=14 (1,2/3,3,4,4)
BH1	6.00	S	110.139	76	1	75	2	75	3	75	4	75	5	75	4	75	16	20	N=16 (1,2/3,4,5,4)
BH1	7.00	S	110.139	76	2	75	2	75	4	75	4	75	4	75	4	75	16	20	N=16 (2,2/4,4,4,4)

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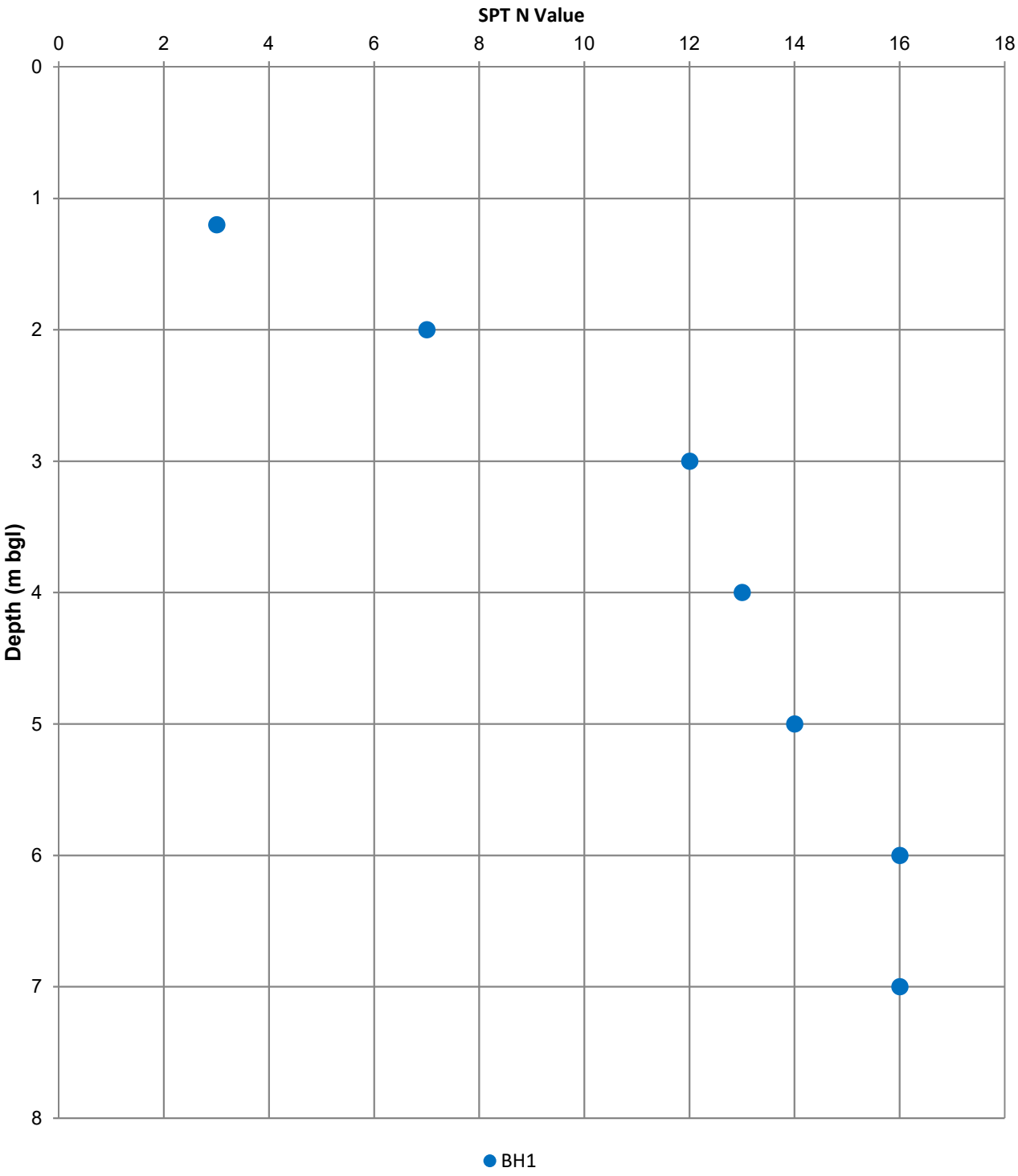
Borehole No.

BH1

Project ID:	J15878	**Project Title:**	17 Courthope Road	**Final Depth:**	7.45 m bgl
Client:	Mr J Markham	**Location:**	London, NW3 2LE	**Date Drilled:**	19/12/24

SPT N Value vs Depth (m bgl)



Date Reported: **20/12/2024**

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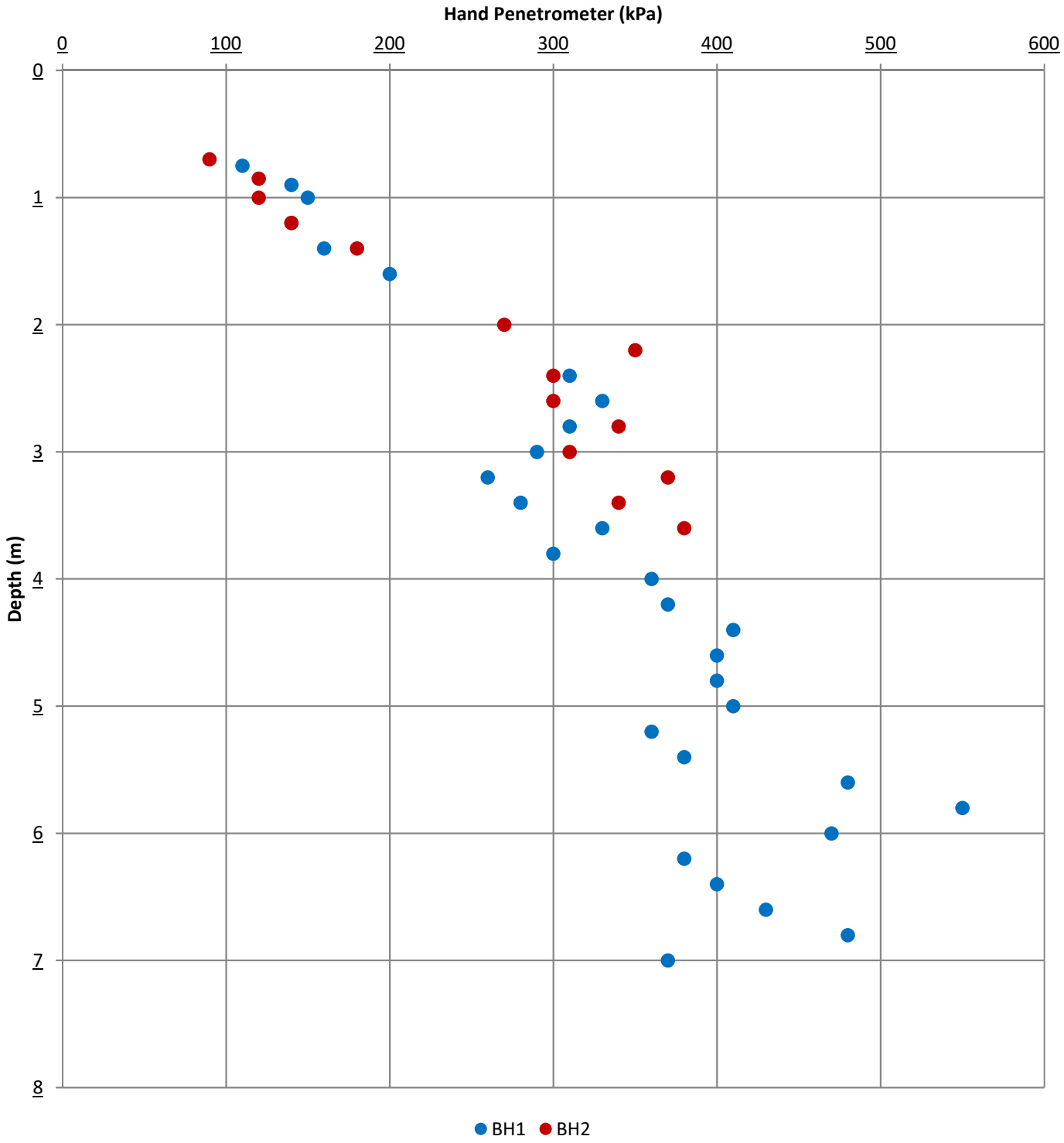
Project ID:	J15878	**Project Title:**	17 Courthope Road		
Client:	Mr J Markham	**Location:**	London, NW3 2LE	**Date Drilled:**	19/12/24

Hand Penetrometer vs Depth (m bgl)



Date Reported: **20/12/2024**

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APPENDIX C

Geotechnical Laboratory Test Methods and Results

C

Southern Testing Environmental & Geotechnical | ST Consult Environmental & Geotechnical

Plasticity Index and Water Content Summary

BS1377-2:2022 cl. 5, BS EN ISO 17892-1:2014 + A1:2022, BS EN ISO 17892-12:2018 + A2:2022

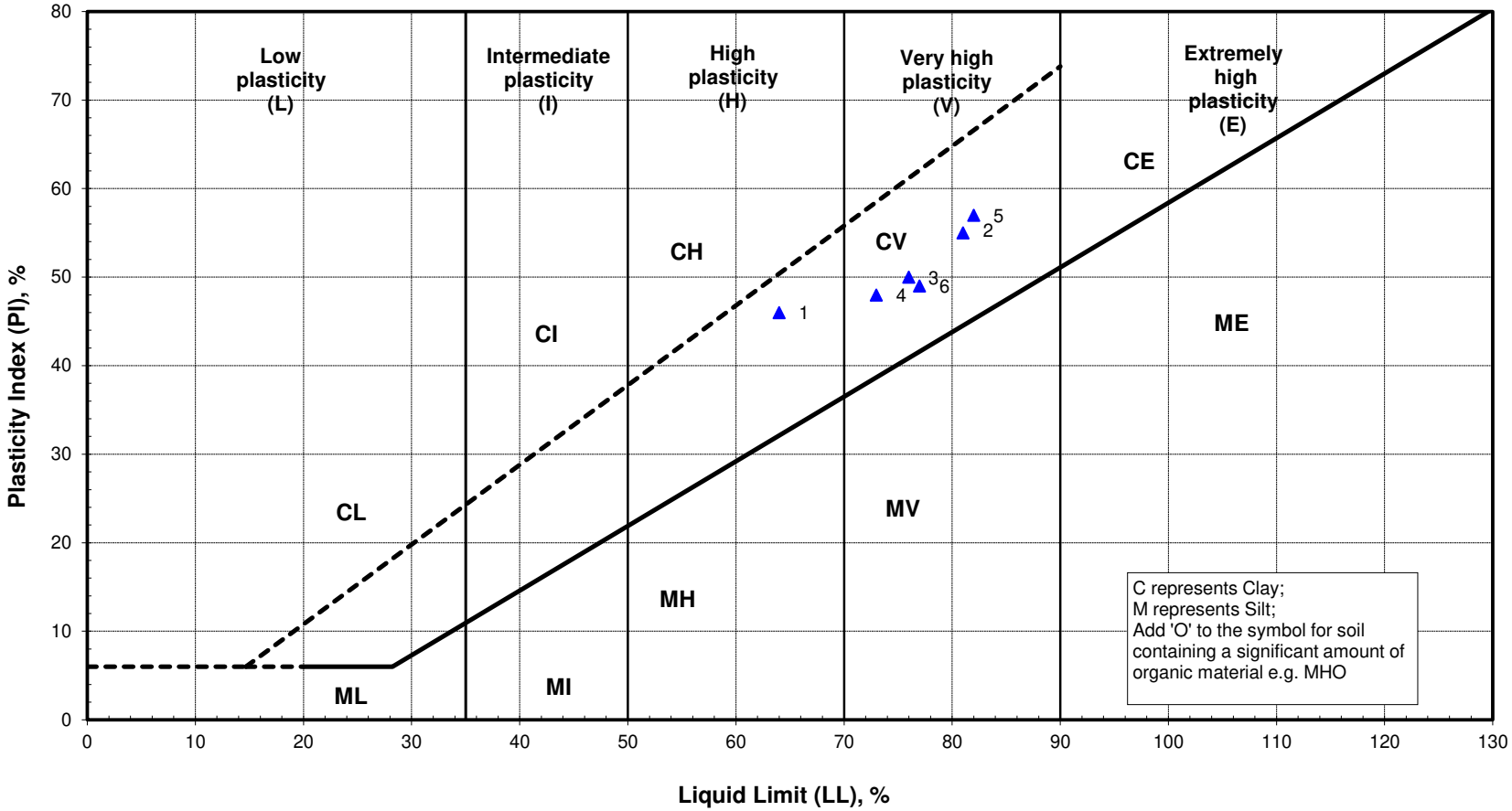
Project Name	*17 Courthope Road, London*						**Project Number**		*J15878*	
Client	*STAC Architecture*				**PE**	*VF*	**Date Issued**		*05-Feb-25*	
Location ID	Depth m	Sample Type	Visual Description	Comments	Initial WC %	Liquid Limit %	Plastic Limit %	Plasticity Index	Classi-fication	Passing 425 micron %
BH1	1.00	D	*Stiff grey brown mottled yellow brown CLAY.*		*35*	*64*	*18*	*46*	*CH*	*100*
BH1	2.50	D	*Very stiff brown veined grey CLAY.*		*29*	*81*	*26*	*55*	*CV*	*100*
BH1	3.50	D	*Stiff brown veined grey CLAY.*		*32*	*76*	*26*	*50*	*CV*	*100*
BH1	4.50	D	*Stiff brown CLAY.*		*31*	*73*	*25*	*48*	*CV*	*100*
BH2	2.25	D	*Stiff brown veined grey slightly gravelly CLAY. Gravel consists of fine and medium subangular claystone.*		*29*	*82*	*25*	*57*	*CV*	*98*
BH2	3.00	D	*Stiff brown veined grey CLAY.*		*32*	*77*	*28*	*49*	*CV*	*100*

Plasticity Chart for Atterberg Limit Tests

Project Name	*17 Courthope Road, London*			**Project Number**	*J15878*
Client Name	*STAC Architecture*	**PE**	*VF*	**Date Issued**	*05-Feb-25*

Key

No.	TH No.	Depth
1	BH1	1.00
2	BH1	2.50
3	BH1	3.50
4	BH1	4.50
5	BH2	2.25
6	BH2	3.00



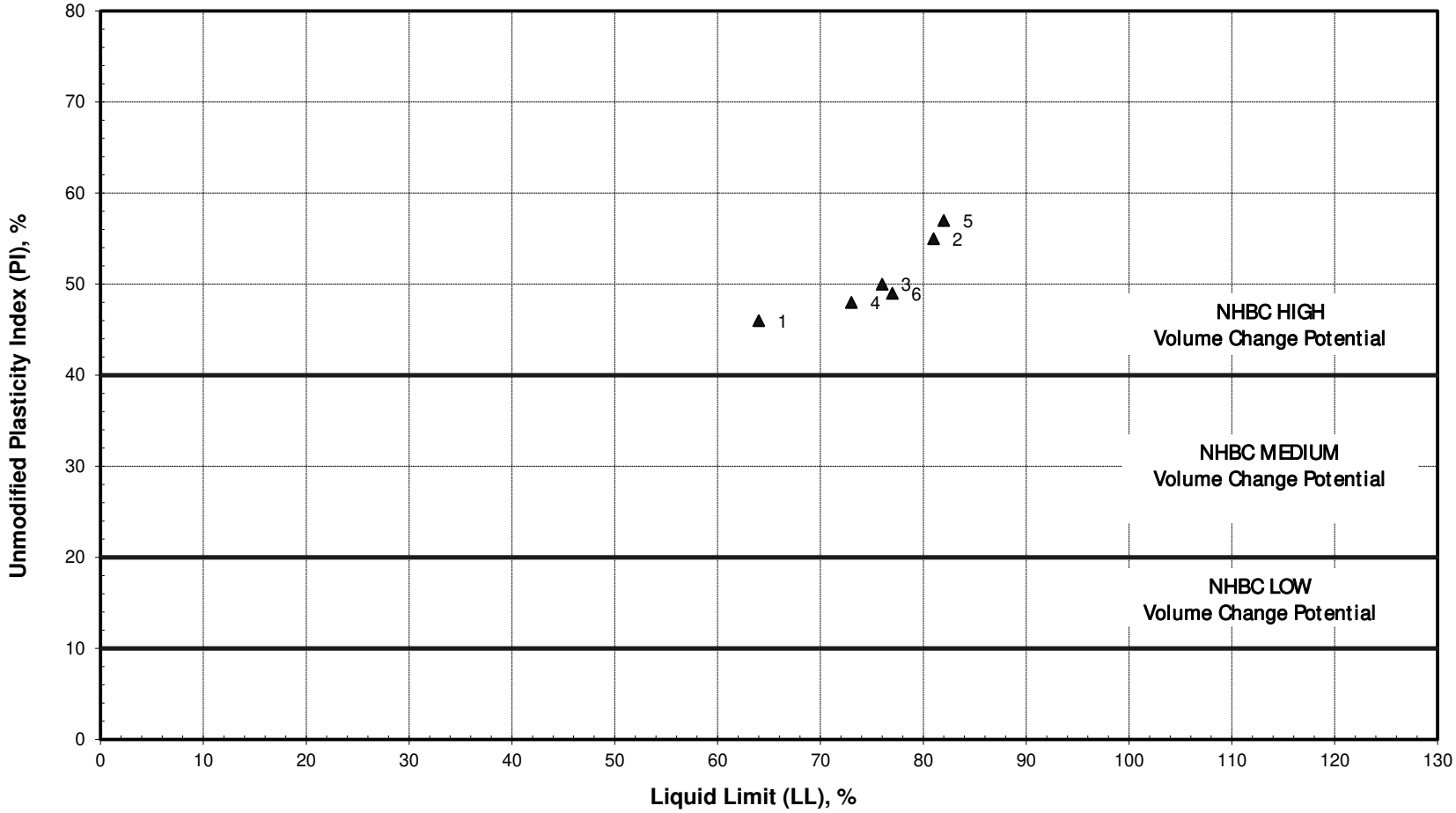
Liquid Limit		**Plastic Limit**		**Plasticity Index**	
Maximum Value	82	Maximum Value	28	Maximum Value	57
Minimum Value	64	Minimum Value	18	Minimum Value	46
Average Value	76	Average Value	25	Average Value	51

NHBC Classification for Volume Change Potential

Project Name	*17 Courthope Road, London*			**Project Number**	*J15878*
Client Name	*STAC Architecture*	**PE**	*VF*	**Date Issued**	*05-Feb-25*

Key

No.	TH No.	Depth
1	BH1	1.00
2	BH1	2.50
3	BH1	3.50
4	BH1	4.50
5	BH2	2.25
6	BH2	3.00



Liquid Limit		**Plastic Limit**		**Unmodified Plasticity Index**	
Maximum Value	82	Maximum Value	28	Maximum Value	57
Minimum Value	64	Minimum Value	18	Minimum Value	46
Average Value	76	Average Value	25	Average Value	51

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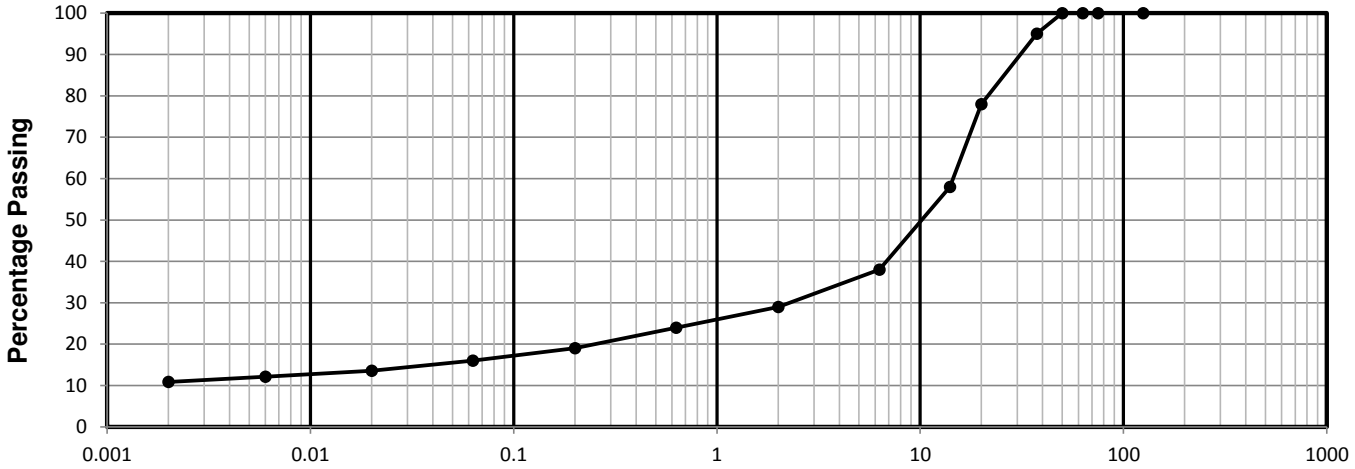
PARTICLE SIZE DISTRIBUTION REPORT

BS EN ISO 17892-4:2016 cl. 5.2, 5.4

Project Name	*17 Courthope Road, London*			**Project Number**	***J15878***
Client Name	*STAC Architecture*	**PE**	*VF*	**Date Issued**	*05-Feb-25*

Particle Size	% Passing
125mm	100
75mm	100
63mm	100
50mm	100
37.5mm	95
20mm	78
14mm	58
6.3mm	38
2mm	29
630µm	24
200µm	19
63µm	16
20µm	14
6µm	12
2µm	11

Particle Size Distribution Chart



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES
	SILT			SAND			GRAVEL			
11	5			13			71			0

Sedimentation pre-treatment: None

Visual Description of Sample:

Brown patched dark grey silty slightly sandy very gravelly CLAY. Gravel consists of fine to coarse angular to well rounded flint.

Particle Density (Assumed) Mg/m³	**2.65**
Coefficient of Uniformity	**N/A**

Test Methods:

Wet & Dry Grading BS EN ISO 17892-4:2016 cl. 5.2
Sedimentation by Pipette BS EN ISO 17892-4:2016 cl. 5.4

Location	BH1
Depth (m)	2.00
Sample Type	D

Comments:

Tested By	STL Lab
Checked By	Timon

Southern Testing Laboratories Ltd
Keeble House
Stuart Way
East Grinstead
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RH19 4QA

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e: contamresults@southerntesting.co.uk

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7 Woodshots Meadow,
Croxley Green
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Herts,
WD18 8YS

t: 01923 225404
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e: reception@i2analytical.com

Analytical Report Number : 24-060898

Project / Site name:	17 Courthope Road, London	**Samples received on:**	23/12/2024
Your job number:	J15878	**Samples instructed on/ Analysis started on:**	23/12/2024
Your order number:	J15878 1	**Analysis completed by:**	08/01/2025
Report Issue Number:	1	**Report issued on:**	08/01/2025
Samples Analysed:	8 soil samples		

Anna Goc
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting
air	- once the analysis is complete

Excel copies of reports are only valid when accompanied by this PDF certificate.

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-060898
Project / Site name: 17 Courthope Road, London
Your Order No: J15878 1

Lab Sample Number				416582	416583	416584	416585	416586
Sample Reference				BH1	BH1	BH1	BH1	BH2
Sample Number				ES	ES	ES	ES	ES
Water Matrix				N/A	N/A	N/A	N/A	N/A
Depth (m)				0.50	1.50	2.50	3.50	0.30
Date Sampled				19/12/2024	19/12/2024	19/12/2024	19/12/2024	19/12/2024
Time Taken				1200	1200	1200	1200	0900
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	18	13	15	21
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.8	0.8	0.5
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	8.1	8.1	8.2	7.9	7.6
Total Sulphate as SO_4	%	0.005	MCERTS	0.089	0.031	0.105	1.35	0.152
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	410	90	820	6600	680
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	205	45.1	408	3320	338
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	6.9	-	-	-	7.5
Total Sulphur	mg/kg	50	MCERTS	310	98	310	3800	650
Total Sulphur	%	0.005	MCERTS	0.031	0.01	0.031	0.382	0.065
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	6.3	-	-	-	7.2
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	3.7	-	-	-	4.5
Heavy Metals / Metalloids								
Magnesium (leachate equivalent)	mg/l	2.5	NONE	19	-	-	-	24
Magnesium (water soluble)	mg/kg	5	NONE	37	-	-	-	47

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-060898
Project / Site name: 17 Courthope Road, London
Your Order No: J15878 1

Lab Sample Number				416587	416588	416589
Sample Reference				BH2	BH2	BH2
Sample Number				ES	ES	ES
Water Matrix				N/A	N/A	N/A
Depth (m)				1.00	1.75	3.00
Date Sampled				19/12/2024	19/12/2024	19/12/2024
Time Taken				0900	0900	0900
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	23	9.2	19
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.8
General Inorganics						
pH (L099)	pH Units	N/A	MCERTS	7.7	8	7.7
Total Sulphate as SO_4	%	0.005	MCERTS	0.062	0.062	3.99
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	390	460	6200
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	196	228	3120
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-
Total Sulphur	mg/kg	50	MCERTS	190	190	14000
Total Sulphur	%	0.005	MCERTS	0.019	0.019	1.42
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-
Heavy Metals / Metalloids						
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-
Magnesium (water soluble)	mg/kg	5	NONE	-	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-060898
Project / Site name: 17 Courthope Road, London

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
416582	BH1	ES	0.5	Brown clay and sand with gravel
416583	BH1	ES	1.5	Brown clay
416584	BH1	ES	2.5	Brown clay
416585	BH1	ES	3.5	Brown clay
416586	BH2	ES	0.3	Brown clay and loam with gravel
416587	BH2	ES	1	Brown clay and sand with gravel
416588	BH2	ES	1.75	Brown clay and sand with gravel
416589	BH2	ES	3	Brown clay and sand with gravel

Analytical Report Number : 24-060898
Project / Site name: 17 Courthope Road, London

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters Heating/Cooling (PrW) DI Process Water (DI PrW)
Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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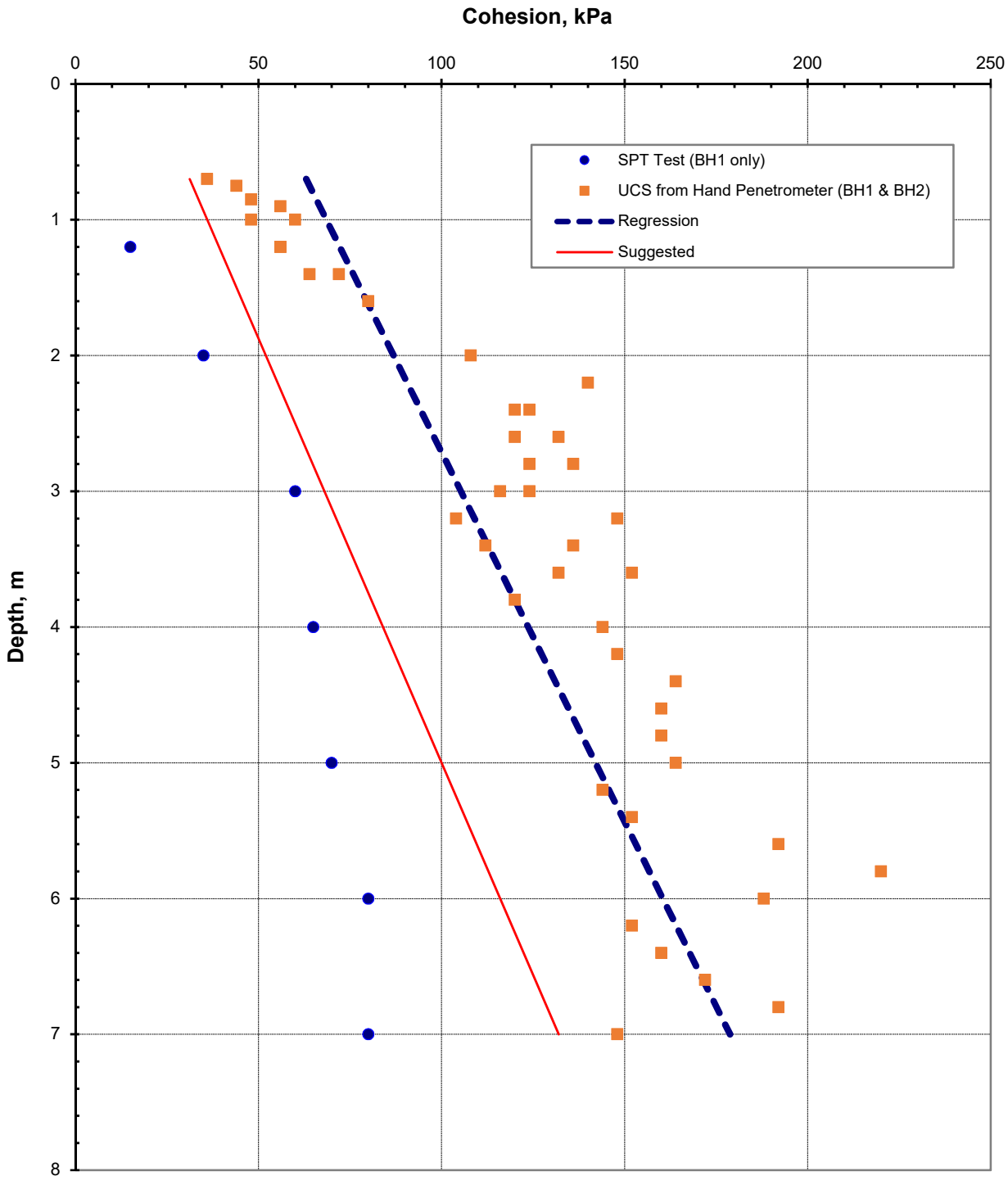
APPENDIX D

Geotechnical Figures

D

Plot of Cohesion vs Depth



Linear Regression of the Test Results: *Slope =* 18.4 *kPa/m,* *Zero intercept =* 50.2 *kPa*

Suggested Design Line: *Slope =* 16.0 *kPa/m,* *Zero intercept =* 20.0 *kPa*

Client:	Mr J Markham	**Site:**	17 Courthope Road, London		
Job No:	J15878	**Date:**	13/02/2025	**Figure No:**	C01

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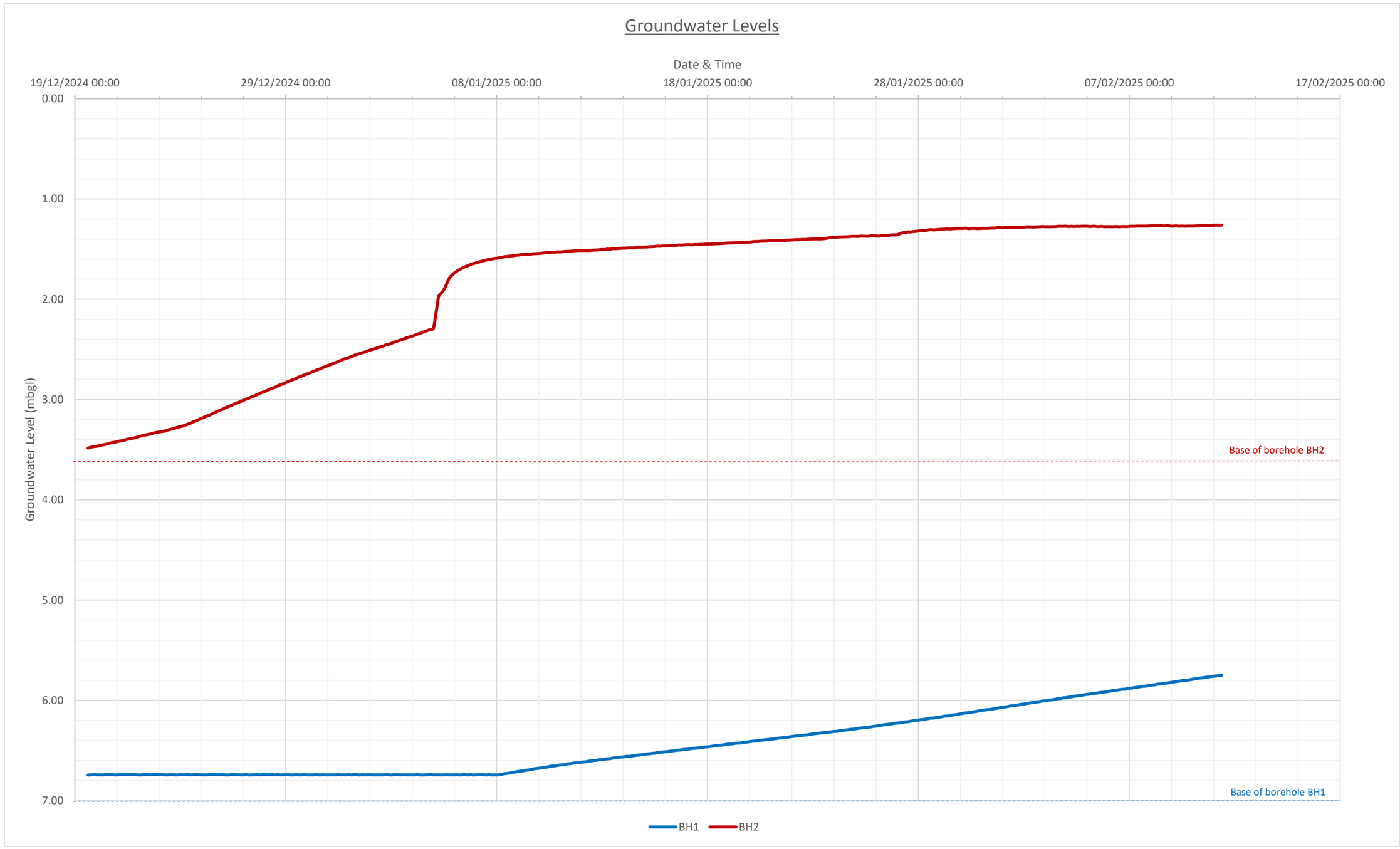
APPENDIX E

Monitoring

E



Site: 17 Courthope Road, London, NW3 2LE	STL: J15878	Fig No: GW1
Date: 18 February 2025	Graph showing groundwater levels in metres below ground level (19th December 2024 to 11th February 2025)	

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