Basement Impact Assessment
15 Lyncroft Gardens, London NW6 1LB

Hydrogeology, Land Stability and Ground Movement Assessment

21 July 2020

MAUND GEO-CONSULTING

Produced for:

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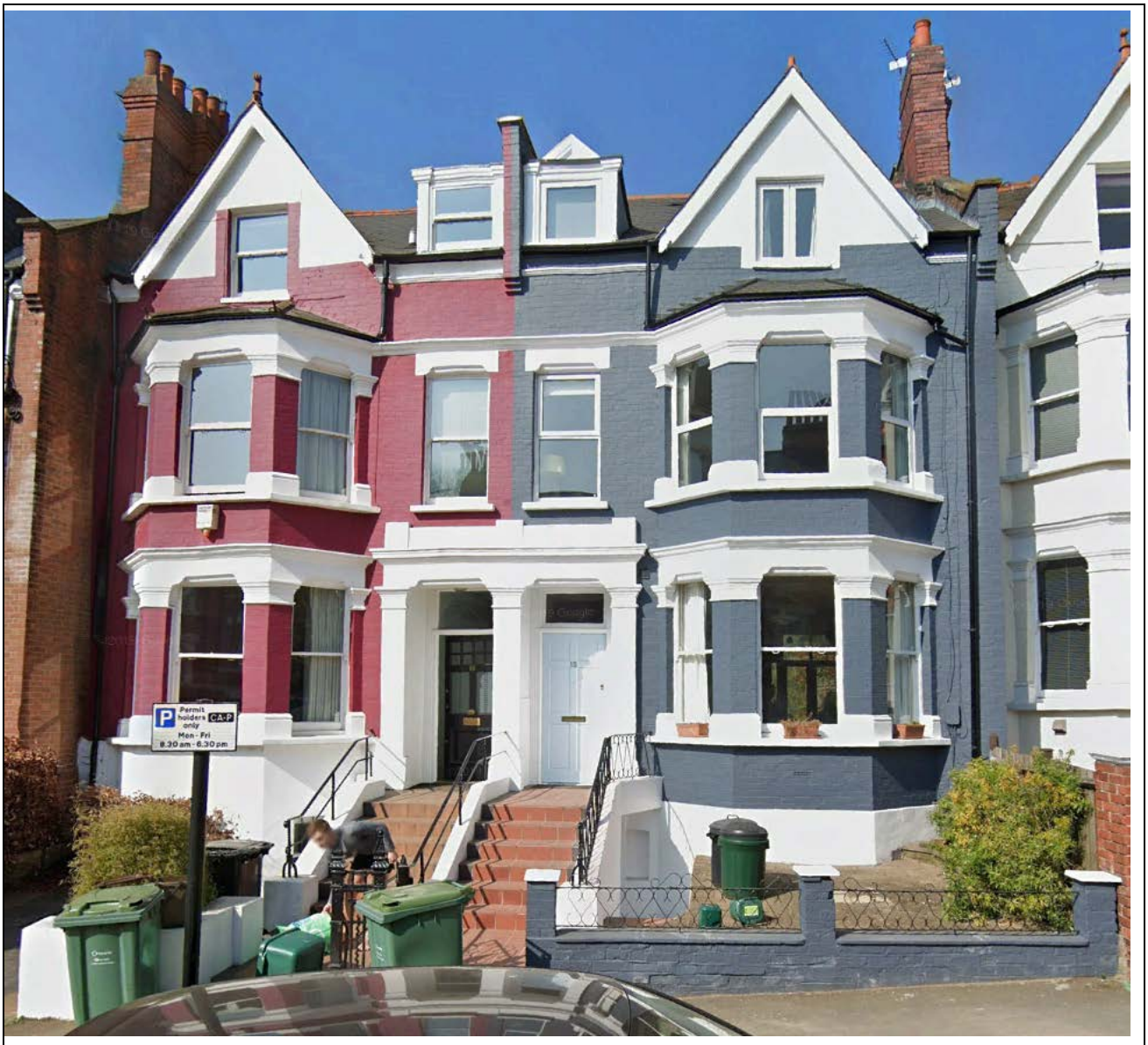

Report Title	Basement Impact Assessment	**Site Address**	15 Lyncroft Gardens, London NW6 1LB
Work Stage	Hydrogeology, Land Stability and Ground Movement Assessment	**Report Date**	July 2020
Brief Description of the Report Contents	Desk study and geotechnical interpretation of the ground and groundwater conditions, for a Basement Impact Assessment and Ground Movement Assessment		

Document Control Sheet

Project Title	Basement Impact Assessment 15 Lyncroft Gardens, London NW6 1LB
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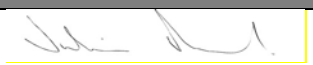
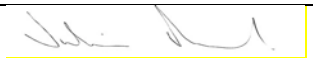
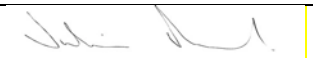
Record of Issue

Issue	Status	Date	Author	
A	Draft	25/11/19	Julian Maund BSc PhD CEng MIMMM CGeol FGS UK Registered Ground Engineering Adviser	
B	Final	20/05/2020	Julian Maund BSc PhD CEng MIMMM Cgeol FGS UK Registered Ground Engineering Adviser	
C	Final	21/07/2020	Julian Maund BSc PhD CEng MIMMM Cgeol FGS UK Registered Ground Engineering Adviser	

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Croft Structural Engineers	Philip Henry	1	21/07/2020
Advantage Basements	Steve Mcstea	1	21/07/2020
Campbell Reith	Christos Botsialis	1	21/07/2020

Contents

1 Non-Technical Summary

A basement impact assessment (BIA) has been undertaken for hydrogeology and land stability in general accordance with CPG4 (2018) for the site within the grounds of 15 Lyncroft Gardens, London NW6 1LB, in the London Borough of Camden.

The proposed basement is located at 15 Lyncroft Gardens, a mid-terrace house. The basement will extend an existing cellar to provide additional accommodation. The proposed basement will occupy an area of approximately 110 m^2.

The BIA report considered relevant information from existing sources included in the 'Guidance for subterranean development' produced for the London Borough of Camden' (November 2010) and a Groundsure Enviro/Geo insight Report with historical maps and BGS records.

A ground investigation at the site was undertaken by Maund Geo-Consulting Ltd in October 2019 which comprised one borehole and two hand dug trial pits to expose party wall footings. The borehole (BH01) was drilled to 7.95 m below ground level (bgl), while the trial pits (TP01 and TP02) were excavated to a depth of 0.4m bgl.

The ground investigation confirmed the ground conditions as a layer of Made Ground of sandy gravel composition to a depth of approximately 0.8m which overlies firm to stiff silty clay of the London Clay Formation to a depth of at least 7.95 m bgl. Groundwater was encountered as a seepage at 3.50m during the ground investigation. Subsequent monitoring indicated groundwater at 3.90 to 4.02 m bgl (approximately 65.98 to 66.10 mAOD).

An assessment of hydrogeology has shown that the strata underlying site is considered non-productive strata of very low permeability and is not designated as an aquifer within Environment Agency (EA) guidelines. Seepage of groundwater may be anticipated at a depth of 3.5 m, which would be anticipated to be below the base of the basement floor.

An assessment of land stability has been made from the excavation and construction of the basement. It has been calculated that heave in the centre of the basement is not expected to exceed 16 mm resulting from the excavation and construction. The foundation formation will be able to accommodate a maximum imposed load from the retaining wall of 296 kPa with net settlement of < 25 mm.

The maximum damage category for the adjacent properties has been calculated to be within Category 1 (slight damage). The assessment has indicated a potential movement of 2.8mm vertical and 4mm horizontal for the footway of Lyncroft Gardens. The maximum damage category for the host property has also been calculated to be within Category 1.

An appropriate monitoring regime should be adopted and maintained throughout construction to manage risk and potential damage to the neighbouring structures as construction progresses onsite.

2 Introduction

2.1 Terms of Reference

Maund Geo-Consulting Ltd was instructed on 16 September 2019 by Croft Structural Engineers Ltd (Croft) to undertake the hydrogeology and geology sections of a Basement Impact Assessment (BIA) including a Ground Movement Assessment (GMA) for a proposed development at 15 Lyncroft Gardens, London NW6 1LB. The hydrology section of the BIA is being undertaken separately by Croft.

2.2 Scope and Objective

This report has been written in general accordance with 'Camden geological, hydrogeological and hydrological study - Guidance for subterranean development' produced for the London Borough of Camden (LBC) by Arup (November 2010), hereafter referred to as the GSD. The guidance sets out the methodology for a risk-based impact assessment to be undertaken with regard to hydrology, hydrogeology and land stability in support of Local Plan Policy A5 (2017). The BIA comprises stages in which information is obtained to enable LBC to decide on the impact of the development for the planning application. The LBC Guidance CPG4 Basements (March 2018) requires a BIA to be undertaken for new basements in 5 stages:

1. Screening
2. Scoping
3. Site investigation
4. Impact assessment
5. Review and decision making (By LBC)

As a site investigation has already been undertaken as part of the BIA for 15 Lyncroft Gardens (Factual Report included in Appendix D) the screening part of the assessment has been assessed based on existing information including the site investigation, so the project has been completed in the following sequence:

1. Desk Study of background information
2. Site Investigation including interpretation
3. Screening
4. Scoping
5. Impact Assessment

This report considers the hydrogeological and land stability elements of the BIA only. Hydrology is considered in a separate report by Croft Structural Engineers Ltd.

2.3 Author

This report has been prepared by Dr Julian Maund, director of Maund Geo Consulting Ltd, who is a chartered engineer and chartered geologist with over 35 years' experience. Dr Maund is a UK and Ireland Registered Ground Engineering Adviser and a member of the Association of Geotechnical Specialists.

2.4 Sources of Information

Background information has been derived from Groundsure Geo Insight and Enviro Insight reports obtained on 19/10/19 for the site (Appendix B). Geological information has been derived from on-line BGS sources (Geology of Britain Viewer) and the GSD. Mapping and aerial photography have been obtained from Google Earth. The full list of information is shown below in Table 2.1. Information is also derived from the site investigation undertaken specifically for the proposed development by Maund Geo-Consulting Ltd on 18/10/19.

The following baseline data indicated in Table 2.1 have been referenced to complete the BIA in relation to the proposed development:

Table 2.1 Information type and sources

Information Type	Source
Site walkover and discussion with residents	During SI on 18/10/19
Current/historical mapping	Groundsure Reports, Google Earth
Geological mapping	GSD
Underground tunnels	Groundsure
Hydrogeological data	Groundsure/GSD/EA
Current/historical hydrological data	Groundsure/GSD/EA/ LBC
Flood risk mapping	Groundsure/GSD EA/ LBC
Unexploded Ordnance	(http://bombsight.org)
Ground and groundwater conditions	Site Investigation

3 Desk Study - Background Information on the Site

3.1 Location

The site is located at 15 Lyncroft Gardens, at approximate National Grid Reference TQ 25391, 85395 and Post Code NW6 1LB in the West Hampstead area of the London Borough of Camden.

3.2 Description

The existing building comprises a three storey terraced brick mid-terrace house occupying the western side of Lyncroft Gardens, as shown on the Street View image below in Figure 2.1. The proposed basement will occupy the area below the house, extending the existing cellar.

Figure 3.1 Street View Image of the site March 2018

3.3 Present use

15 Lyncroft Gardens is a residential dwelling and is currently occupied by the owner who is proposing the basement construction. The area of the proposed basement is partly occupied by a cellar, which will need to be increased in size beneath the property to make additional accommodation.

3.4 Proposed use

The proposed development relevant to this BIA is understood to comprise the extension of the existing cellar. The proposed basement measures approximately 21.5 m in an E-W direction and 6.5 m in an N – S direction including a lightwell as shown on Drawings 149206-08 dated 04/09/19 by Advantage Basements in Appendix A.

3.5 Topography, geomorphology and drainage

The ground level at the site is at approximately 70 m AOD. No detailed topographical survey is currently available. The land in the vicinity of the site slopes slightly along Lyncroft Garden from the junction with the Finchley Road (~75.00) in the north east to ~64 m AOD at Fortune Green Road in the south west.

There are no discernible geomorphological features in the vicinity of the site. There are no open watercourses within at least 500 m of the site.

The site itself is not within a Flood Zone, although the road has a low flood risk from surface water as indicated on the surface water flooding map in Figure 3.2 below.

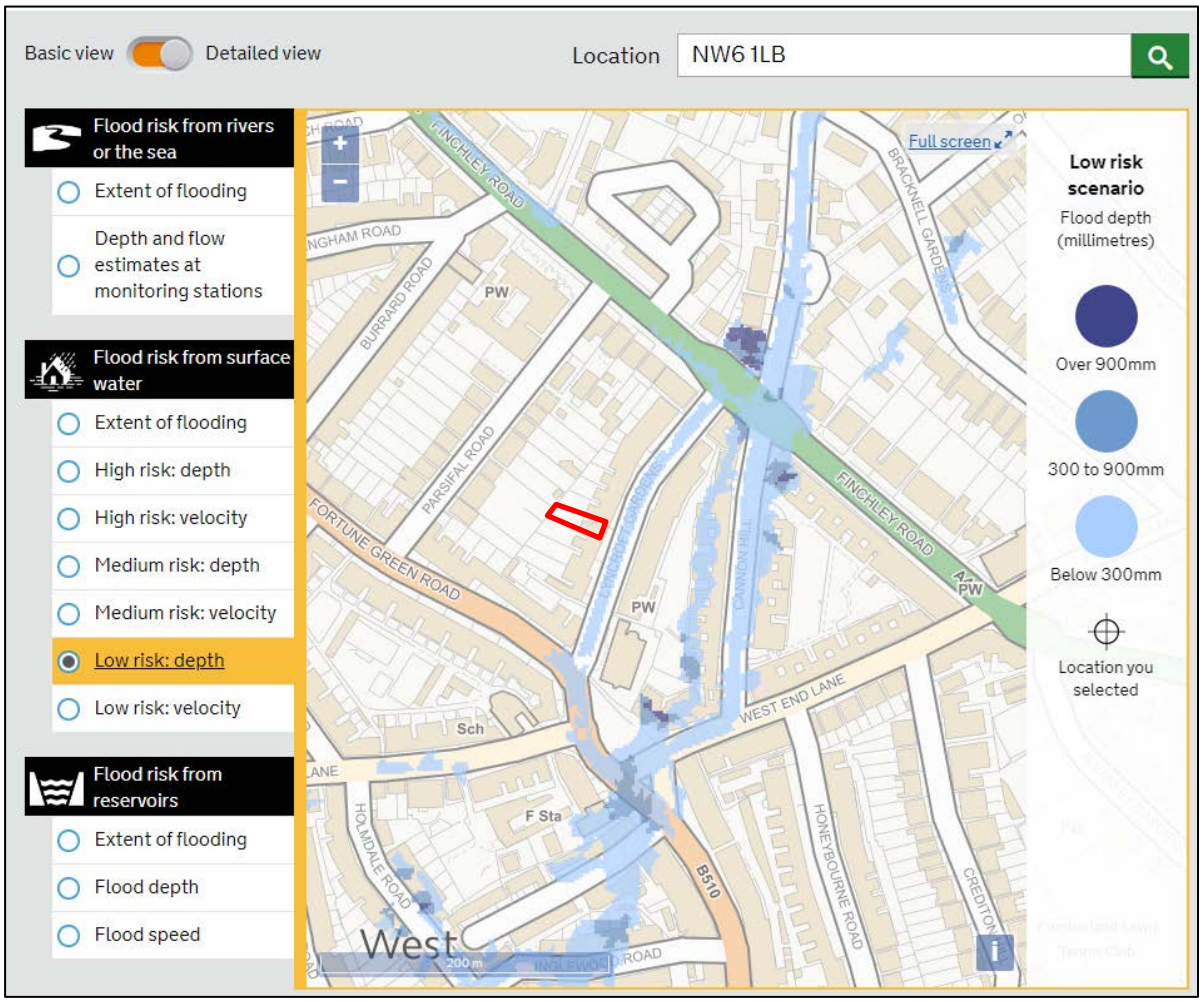

Figure 3.2 Surface water flooding

3.6 Geology

Geological information obtained from Figure 4 of the GSD at 1: 10 000 and the BGS website geological mapping at 1 50 000 scale shows the site to be directly underlain by the London Clay Formation. No superficial deposits are shown. A review of boreholes in the vicinity available from the BGS Geology of Britain Viewer indicates comparable geology.

3.7 Hydrogeology/groundwater

The property is located on the London Clay, which is classified as an unproductive stratum. Figure 8 of the GSD confirms this classification.

The site does not lie within a ground water protection zone. The closest protection zone is outside the search zone of a 500m radius.

The London Clay underlying the site is not classified as a groundwater vulnerability zone, as designated by the Environment Agency. The Groundsure Enviroinsight Report (Appendix B) indicates the nearest ground water vulnerability zone is outside the search zone of 250m.

3.8 Natural Hazards

The Groundsure report (Appendix B) findings on natural hazards are summarised in Table 3.1

Table 3.1 Natural Hazards

Natural Hazard	Risk (Stated by BGS in Groundsure report)	Comment
Natural ground subsidence	Moderate	Not applicable to the topography of the site.
Shrink-Swell	Moderate	The site is underlain by the London Clay Formation (LFC) which comprises potentially moderate to high plasticity clays. This material has potential shrink swell properties.
Landslide	Very Low	Not applicable to the site geology
Soluble Rock	Negligible	Not applicable to the site geology
Compressible Ground	Negligible	Clay soil of the LCF is subject to consolidation from additional imposed loads, which are limited by appropriate foundation design
Collapsible rock	Negligible	Not applicable to the site geology
Running Sand	Very Low	Not applicable to the site geology
Radon	Not in a Radon affected area	No Radon protection measures are necessary

3.9 History of site

The Groundsure Insights Maps in Appendix C includes historical mapping surveys from 1871 to 2014.

The earliest record of 1865-1870 indicates the site was undeveloped agricultural land. By 1915 current house at 15 Lyncroft Gardens was constructed, as was the rest of Lyncroft Gardens and is little changed to the present day.

3.9.1 WW2 bomb sites

A record of known bomb sites is presented in Figure 3.3 from the website http://bombsight.org. While this does not claim to be a definitive record, it shows nothing recorded in the environs of the site. The lack of change of building development in the area of the site suggests no bomb related destruction occurred at the site.

Figure 3.3 WWII Bomb record

3.10 Underground features

The Groundsure Geoinsight Report (Appendix B) has not identified any mining, underground workings or natural cavities within at least 500 m of the site.

The Groundsure Geoinsight Report (Appendix B) has not identified any tunnels or railways within 250m of the site.

3.11 Other factors e.g. contamination and archaeology

The Groundsure Enviroinsight Report (Appendix B) has not identified any 'Environmental Permits, Incidents and Registers' or 'Landfill and Other Waste Sites' within at least 500 m of the site boundary.

No specific archaeological investigation has been undertaken. The 'Groundsure' survey has not identified any known 'Environmentally Designated Sensitive Sites' within 250 m of the site (Appendix B).

4 Site Investigation

A site investigation was undertaken by Maund Geo-Consulting Ltd on 18/10/19. A report of the site investigation comprising exploratory hole records and laboratory testing is included in Appendix D.

The site investigation comprised:

- 1 No. borehole (BH01) carried out using cable percussive methods to a depth of 7.95 m bgl,
- 2 No. hand dug trial pits to expose footings,
- The in-situ strengths of the subsoil encountered were assessed by means of SPTs in BH01 at 1 m intervals,
- Disturbed soil samples were obtained from BH01 for laboratory geotechnical testing and further examination.
- A 50 mm diameter groundwater monitoring well was installed to a depth of 5.0 m in BH01

The locations of the above exploratory holes are shown in Figure 4.1 below. The exploratory hole records and laboratory test results are shown in Appendix D.

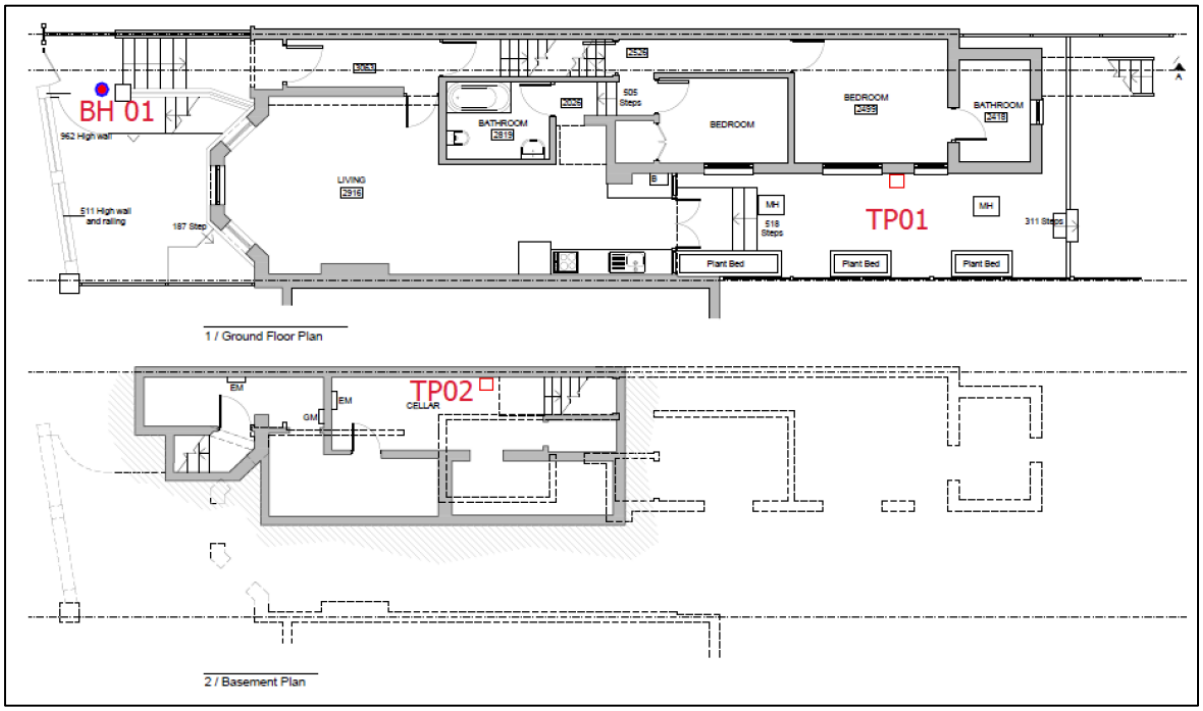

Figure 4.1 Exploratory hole locations

4.1 Details of laboratory tests

Laboratory tests to determine the geotechnical properties of the soil were scheduled by Maund Geo-Consulting Ltd and carried out by I2 Analytical Ltd generally in accordance with BS1377:1990 and BRE Special Digest 1 2005. The tests included:

- 5 moisture content and plasticity tests (BS1377:1990)
- 2 Water soluble sulphate and pH (BRE SD1)

5 Ground Conditions

5.1 Stratigraphy

The ground conditions encountered in BH01 are summarised in Table 5.1 below. For a full description refer to exploratory records in Appendix D.

Table 5.1 Summary of ground conditions

Stratum	Description	Depth at top of Strata (m)	Approx. level (m AOD)	Thickness of Strata (m bgl)
MADE GROUND	Ceramic tiles	0	70.0	0.02
MADE GROUND	Fine sandy clayey Gravel of brick and flint.	0.002	69.08	0.78
London Clay Formation	Firm to very stiff brown silty CLAY with occasional bands of fine sand and fine gravel sized selenite crystals	0.4	46.60	Proven for 7.15

5.2 Groundwater

Groundwater was encountered as a seepage during drilling at 3.50m (~66.50 m AOD).

Groundwater readings from post investigation monitoring on the site are shown in Table 5.2 indicating groundwater is present at a depth of up to 4.02m based on current readings

Table 5.2 Groundwater monitoring in BH01

Date of monitoring	Groundwater Depth (metres below ground level – Approximately 70.00 m AOD)	Approximate Groundwater level (m AOD)
28/10/19	3.90	66.10
08/11/19	4.02	65.98

5.3 Consideration of the individual strata, with reference to the basement.

The anticipated formation level of the basement floor slab will be approximately 2.5 m bgl at 67.5 m AOD, within the London Clay. An overall excavation depth of 3.00 m is assumed for a ground movement assessment.

The overall ground model is illustrated in the conceptual model in Section 6.2 below.

5.3.1 Made Ground

Below the existing concrete surface, the made ground has been described as a sandy, clayey red brown fine to coarse Gravel of brick and chert. Made ground encountered was approximately 0.8m thick. No SPT results were obtained in this material. This material is considered to represent build-up of site levels at the front of the house. Trial pits TP01 to the rear of the property had 0.4m of made ground and TP02 in the cellar showed 0.075m of made ground.

The made ground is described as an inert material with no visual or olfactory indications of contamination.

The risk of the onset of contamination leaching from the site is considered to be negligible considering the thickness of the made ground, the lack of indication of contaminants, and the impermeability of the underlying strata.

5.3.2 London Clay

The London Clay Formation (LCF) was encountered during the site investigation at a depth of 0.8 m bgl to termination of BH01 at 7.95 m bgl. A plot of SPT N values against depth is shown in Figure 5.1 which shows N values ranging between 9 and 26, with a clear pattern of N values increasing with depth.

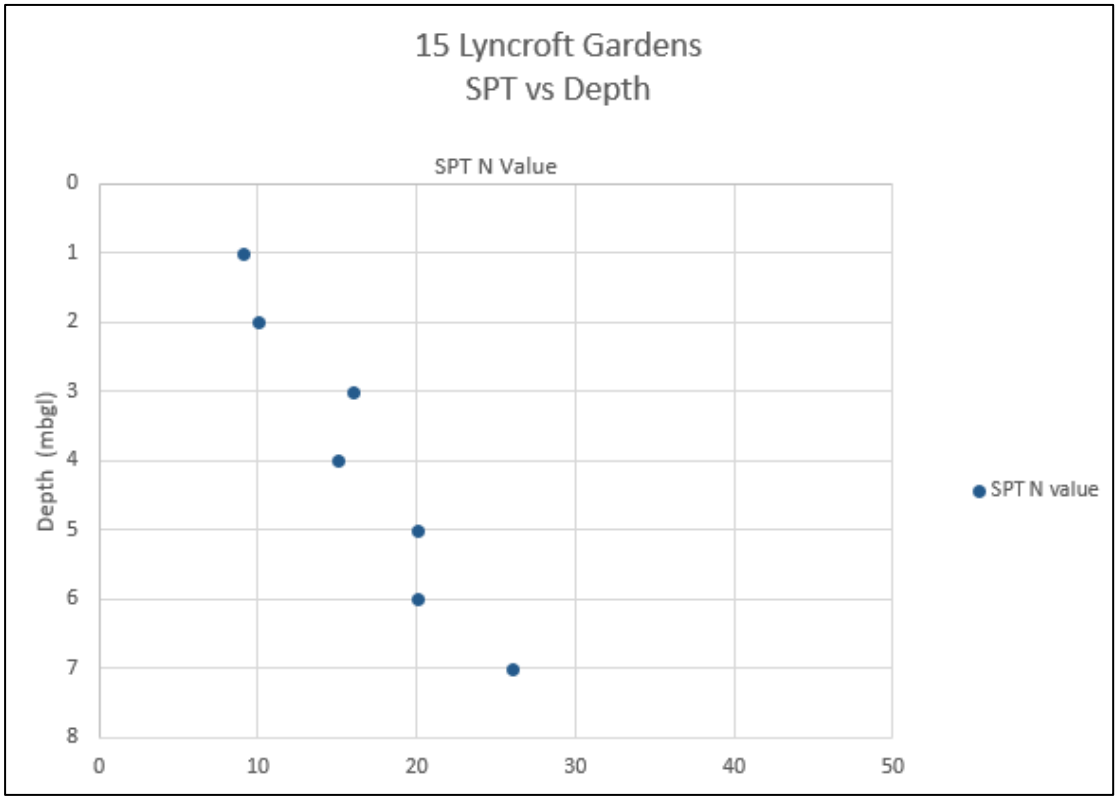

Figure 5.1 SPT N values for London Clay Formation

5 No. Atterberg Limit tests carried out on samples of London Clay showed high to very high plasticity (PI average of 38%). Given a F1 of 4.5 (Stroud and Butler 1975) the recorded SPTN values correlate to undrained strengths of 40 kPa to 117 kPa.

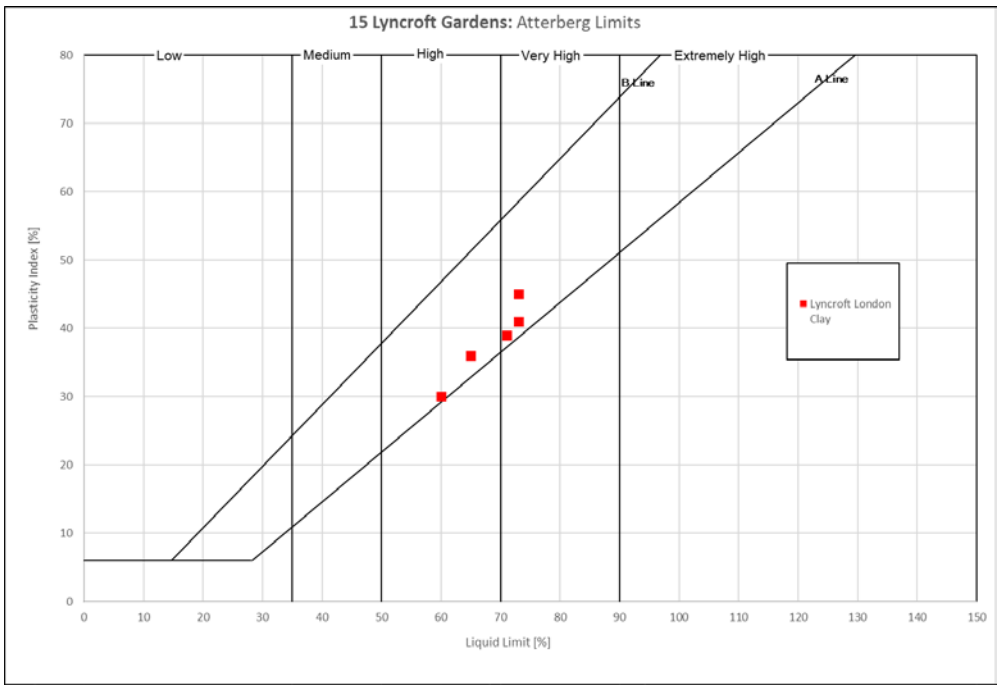

Figure 5.2 Atterberg Limits London Clay Formation

Figure 5.3 shows the undrained stiffness profile based on correlation with SPT N values.

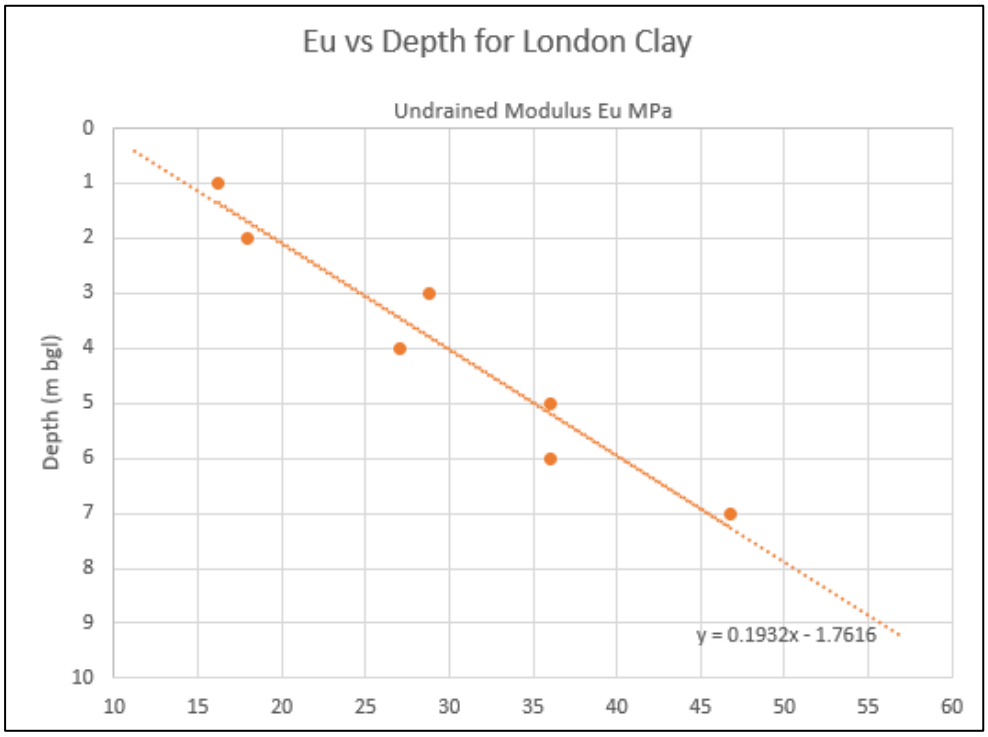

Figure 5.3 Relationship of stiffness with depth in London Clay Formation

The deformation moduli (E_u and E') of the LCF has been cautiously estimated from the relationship between undrained cohesion for an axial strain of 0.1% and plasticity of the LCF where E_u is based on a PI of 38% and an OCR >4 giving a E_u/C_u ~ 400 (after Jamiolkowski et al. 1979). and E' is 0.75 Eu after Burland, Standing J.R., and Jardine F.M. (eds.) (2001). Poisson Ratio is taken as v_u = 0.5 undrained and v' = 0.2 drained.

As there is a clear linear relationship of SPT and C_u with depth, the corresponding E_u / E' is assessed to increase linearly with depth from 15/11.25 MPa at the interface with made ground to 50.0/37.5 MPa at 8.00 m AOD as indicated in Figure 5.3, for purposes of settlement / heave modelling in Section 6.

The characteristic values of geotechnical parameters are a cautious estimate in accordance with BS EN 1997, based on the data obtained from the ground investigation (Appendix D) have been summarised in Table 5.3 as follows:

Table 5.3 Geotechnical Design Parameters

	Design Level	Class	Undrained Cohesion	Effective angle of shearing resistance	Bulk unit weight	Deformation Modulus E_u (E')	K_a	K_p
Strata	**m bgl / (mAOD)**		**Cu (kPa)**	**MPa**	**kN/m³**	**MPa**		
London Clay Formation	0.8 (69.20)	CH/ CV	27 – 90 (32 +11.5z)	24*	20**	15 + 5z*** (11.25 +7z)	0.35	2.5

Notes:

* Burland, Standing J.R., and Jardine F.M. (eds.) (2001)

**BS8004 2015

***E_u is based on 400 C_u. (Jamiolkowski et al. 1979). E' based on 0.75E_u. (Burland, Standing J.R., and Jardine F.M. (eds.) 2001).

Active and Passive pressure coefficients k_a and k_p from BS EN 1997-1 Annex C

The parameters in Table 5.3 are unfactored (Serviceability Limit State) and considered to be 'a cautious estimate'.

Groundwater is assumed to be below formation level, at circa 3.5 m bgl.

6 Geotechnical Assessment of Ground Conditions

6.1 Introduction

The information obtained from the ground investigation on the soil conditions in relation to the proposed basement construction has been assessed for impacts on existing building structures. The principle impacts are ground movements from the excavation for the basement. These movements are vertical and horizontal movements of the foundation formation level from isostatic readjustment from the excavation and possible vertical and horizontal impacts of existing structures from the basement wall construction.

6.2 Presumed Bearing resistance

The foundation formation level of the basement will be at approximately 67.00 m AOD or 3.0 m below ground level. At the formation level an undrained shear strength of approximately 59 kPa has been evaluated from the SPT profile. Wall loads provided by Croft Structural Engineers (Drawing SK01 in Appendix A) comprise the following shown in Table 6.1, based on a wall thickness of 0.35m:

Table 6.1 Wall loading

Wall No.	Combined SLS kN/m	Total kPa	Net Loading kPa	Adequacy Factor (DA1- 2)
1	100	296	225	1.09
2	60	176	116	1.76
3	30	86	26	3.29
4	60	176	116	1.76
5	100	296	225	1.09
6	30	176	116	3.29
A	60	176	116	1.76
B	60	176	116	1.76

The net loading allows for the removal of 3m depth of soil (~60 kPa) over part of the house where full excavation is required to basement level. Where there is an existing cellar the excavation will be extended approximately 1.7m resulting in removal of a load of ~34 kPa. The wall loads will be taken by the basement floor slab which will be initially 1m wide (Drawing SK01-10 in Appendix A). Preliminary calculations show that there will be an adequacy factor (overdesign factor) of between 1.09 and 3.29 (EC7 DA1 Combination 2). This indicates the ground will accommodate the imposed load without significant (<25 mm) settlement. The actual settlement will however be determined from the net effect from the removal of soil during the basement excavation where heave is a more significant factor.

6.3 Effect of Heave from soil excavation

The proposed basement will require the excavation from the exiting ground level of approximately 70.0 m AOD to approximately 67.00 m AOD (3.0 m depth). For purposes of this assessment it is assumed the unit weight of the soil (γ_k) to be removed is 20 kN/m^3 giving an overall negative load of 60 kPa in areas of full excavation and 34kPa where 1.7m of soil will be removed.

Dimensions of the excavation is based on Drawing SK-01 dated September 19, included Appendix A.

The ground model is based on the ground conditions assessment in Section 5. The effects of short term un-drained and long term drained conditions have been considered cumulatively, which is a conservative assessment as a worst case. The long and cross sections in Figures 6.1 and 6.2 have been drawing to intersect the greatest movement contours from the Pdisp plot.

The heave has been evaluated using Pdisp version 20.12, which shows a maximum heave of up to – 9.6 mm[1] under short term undrained conditions as shown in Figure 6.1 below in which location of adjacent properties 13 and 17 Lyncroft Gardens are diagrammatically indicated. Long term drained conditions are shown in Figure 6.2 where up to -6.3 mm was determined. As can be seen from Figures 6.3 and 6.4 the short term displacement becomes less than -4.0 mm and -5.2 mm at the boundary with the nearest properties of 13 and 17 Lyncroft Gardens respectively, reducing to less than 1 mm within those properties for each case. Similarly, long term movements reduce to less than +0.5 mm and -0.75 mm at the boundary (Figure 6.5 and 6.5). The combined movements are discussed further in Section 9 and 10.

[1] Note that heave is stated as a negative number in PDisp, but is a positive number in the Ground Movement Assessment in Section 9

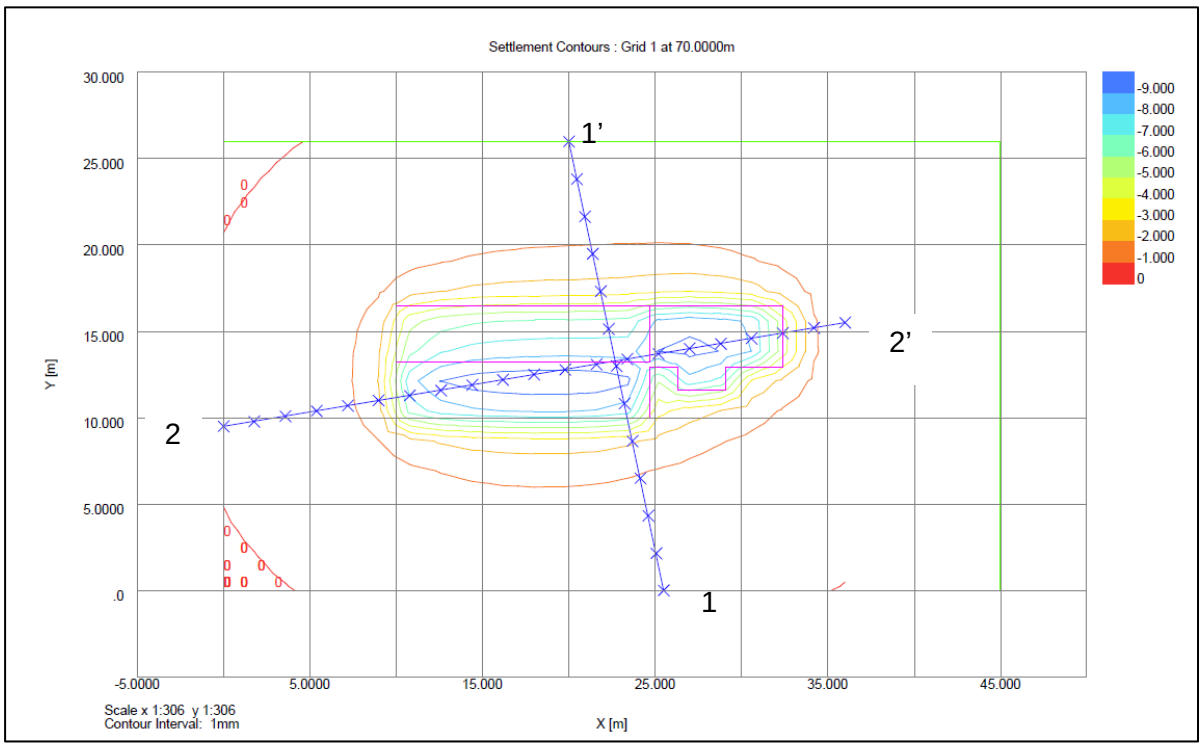

Figure 6.1 Heave- short term undrained condition

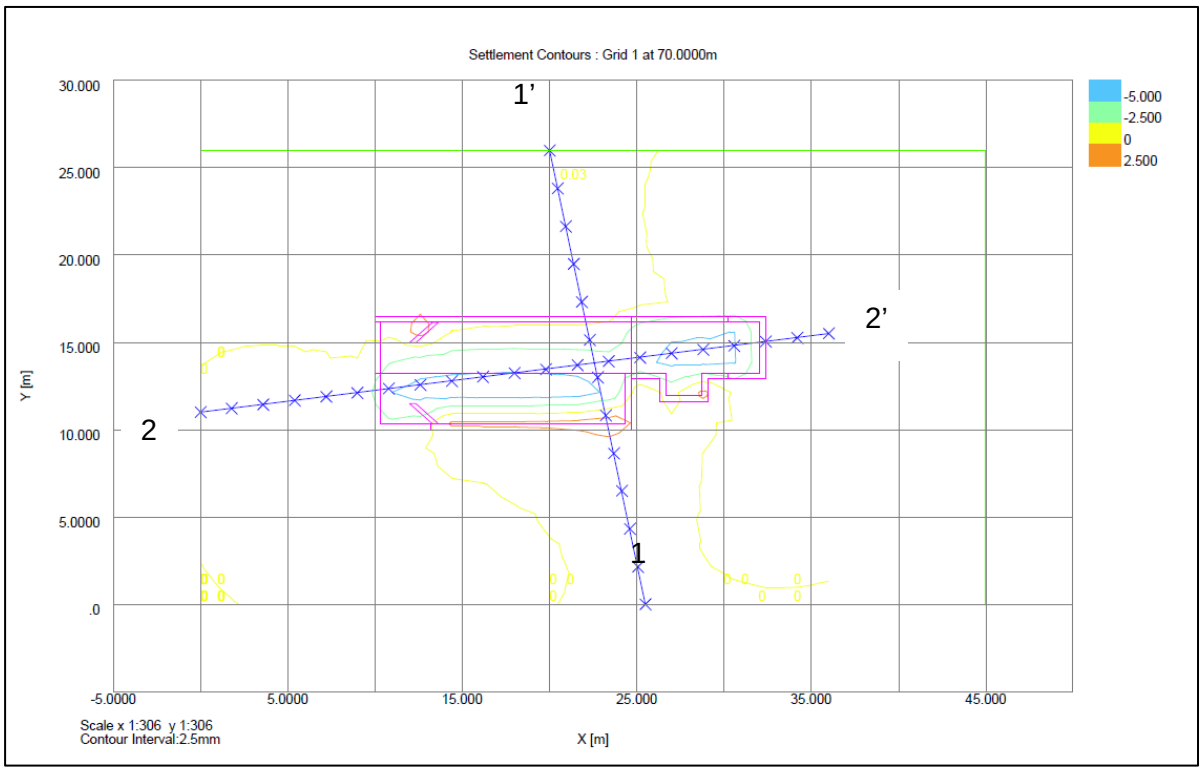

Figure 6.2 Heave- long term drained condition

Cross sections of the effects of the basement excavation and construction are shown in Figures 6.3 and 6.4, in which the boundaries with 13 and 17 Lyncroft are diagrammatically indicated. These models have been used as a basis for the ground movement assessment and damage assessment in Section 9 and 10 respectively.

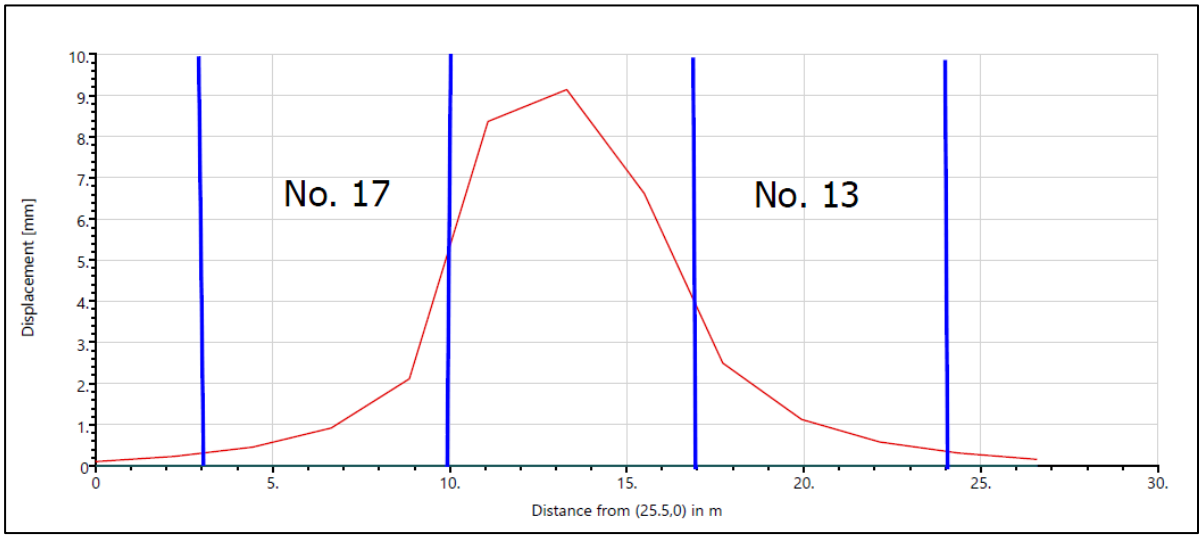

Figure 6.3 Heave- short term undrained condition in excavation- Section 1-1'

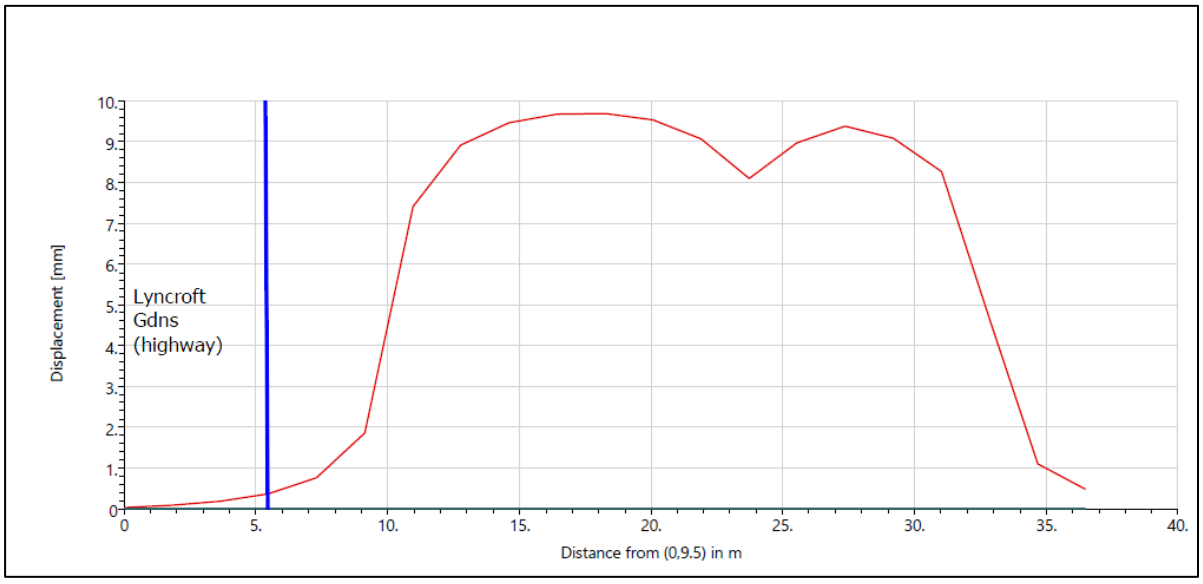

Figure 6.4 Heave- short term undrained condition in excavation- Section 2-2'

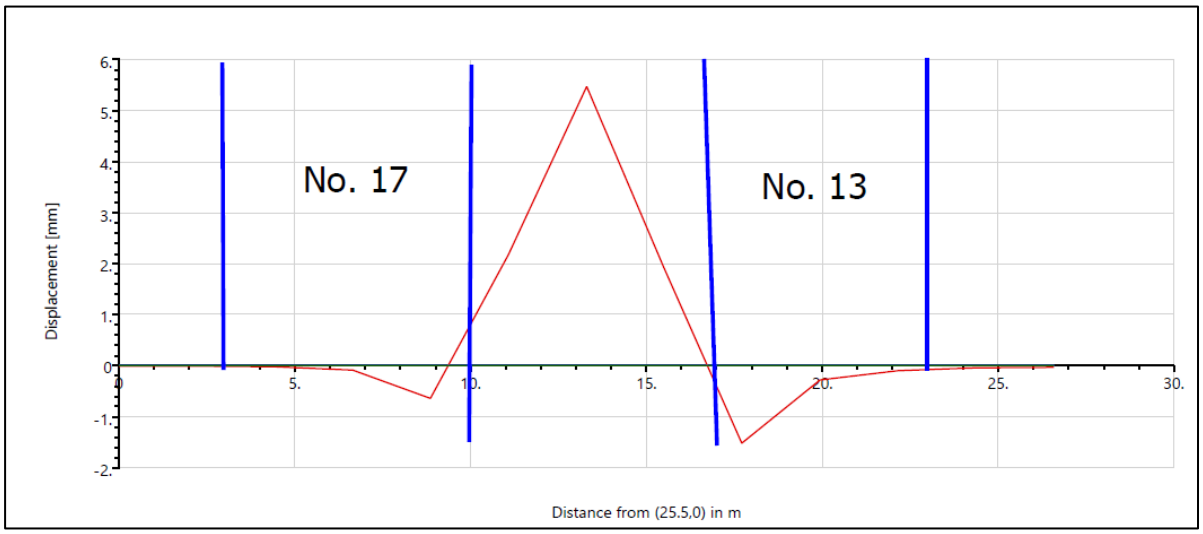

Figure 6.5 Heave- long term drained condition- Section 1-1'

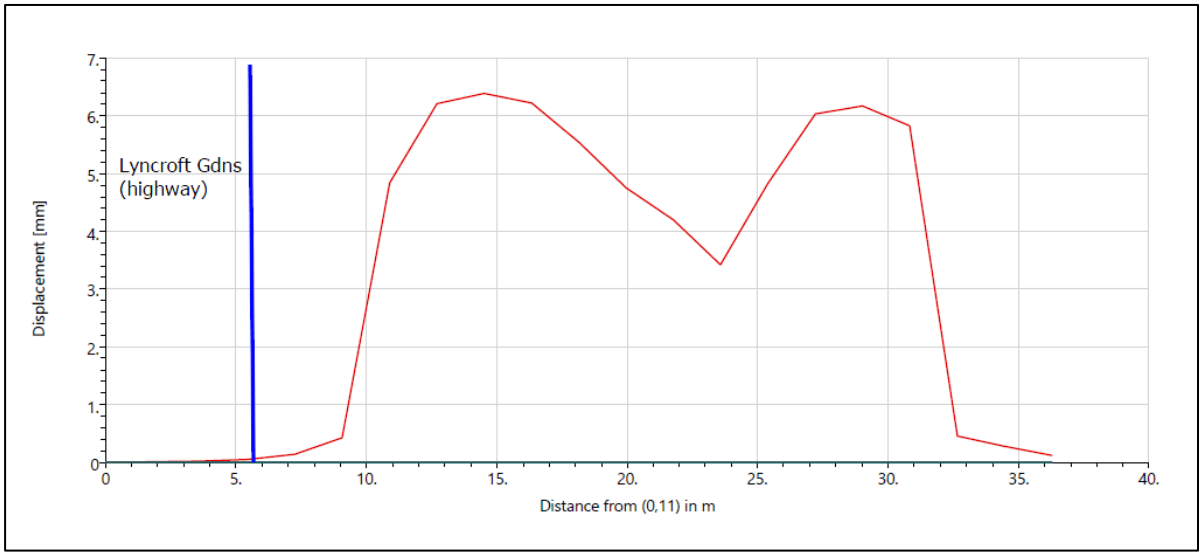

Figure 6.6 Heave- long term drained condition- Section 2-2'

Full output of the PDisp model is included in Appendix D.

6.4 Sub –surface Concrete

The results of lab testing for sulphate and pH are summarised below in Table 5.1. The full analysis is included in Appendix D.

Table 6.1 Sulphate and pH categories

Sample depth	Soil Type	Sulphate S04 2:1 extract	pH	Sulphate Class (DS)	ACEC Class
0.4	Made Ground	0.044 g/l	7.8	DS-1	AC1s
1.8	London Clay Formation	0.096 g/l	8.0	DS-1	AC1s

It is recommended that an overall design sulphate class of DS-1 and an Aggressive Chemical Environment for Concrete (ACEC) class of AC1s is adopted for the basement slab and underpinning. If a concrete piled solution is to be adopted, then DS-3 AC2s should be considered to take into account the greater presence of gypsum related minerals which occur more frequently at greater depth.

7 Screening

7.1 Introduction

Screening is undertaken as outlined in Section 6.2 of the GSD recommendations. It identifies if there are hydrogeological and land stability issues associated with the proposed development that requires detailed analysis and investigation. If there are no significant issues identified in the screening stage, then further stages are not required. The report follows the flow charts set out in CPG4 (2018) and makes reference to the GSD.

7.2 Subterranean (Groundwater) flow

This section answers questions in Figure 1 of CPG4:

The source of information for the assessment of subterranean flow is from the GSD and a site-specific Groundsure Environmental Insight Report obtained in October 2019 for 15 Lyncroft Gardens (Appendices B and C) along with the ground investigation undertaken at 15 Lyncroft Gardens on 18 October 2019 (Appendix D).

Table 7.1: Responses to Figure 1, CPG4

Question	Response	Action required
1a. Is the site located directly above an aquifer?	No. The site is underlain by the London Clay Formation. This is considered an unproductive stratum.	None
1b. Will the proposed basement extend beneath the water table surface?	Groundwater was not struck during investigation to 7.95m bgl. Post investigation monitoring shows groundwater ranges between 3.9 and 4.02 m bgl (65.98 to 66.10m AOD) which is below the basement formation level of at 3m	It is recommended that groundwater seepage is allowed for in the Basement Method Statement.

Question	Response	Action required
2. Is the site within 100m of a watercourse, well, or potential spring line?	No. There are no known wells or spring-lines within 100 m of the site[b,c].	None
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No. The site is not within the catchment of the ponds [b]	None
4. Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?	No The basement is entirely below the existing building and concrete forecourt	None
5. As part of site drainage, will more surface water than at present be discharged to ground (e.g. via soakaways and/or SUDS)?	No, the basement is entirely below the existing building and concrete forecourt.	None. Due to the geology of the London Clay Formation close to ground level, soakaway drainage will not be suitable
6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond or spring lines?	No. There are no recorded local ponds or spring lines within 250 m of the site	None

a. Camden Geological, Hydrogeological, and Hydrological Study, Arup, 2010. (Fig. 8).
b. Camden Geological, Hydrogeological, and Hydrological Study, Arup, 2010. (Fig. 11).
c. Camden Geological, Hydrogeological, and Hydrological Study, Arup, 2010. (Fig. 14).

In summary, the site is located on the London Clay Formation. Post investigation monitoring of 1 No. boreholes drilled at the site to a depth of 7.95 m bgl indicated that groundwater was encountered between 3.9 and 4.02 bgl, or at least 0.9 m below the basement excavation.

7.3 Slope / Land Stability

This section answers questions posed by Figure 2 in CPG4.

Table 7.2: Responses to Figure 2, CPG4

Question	Response	Action required
1. Does the site include slopes, natural or man-made, greater than about 1 in 8?	No. The site is on very slightly sloping ground of 1 in 20 or less along Lyncroft Gardens	None
2. Will the proposed re-profiling of the landscaping at site change slopes at the property boundary to greater than about 1 in 8?	No.	None
3. Does the development neighbour's land including railway cuttings and the like with a slope greater than about 1 in 8?	No No railway is present with 500m of the site	None.
4. Is the site within a wider hillside setting in which the general slope is greater than about 1 in 8?	No.	None
5. Is the London Clay the shallowest stratum on site?	Yes. Below a layer (≤0.8m) of made ground, the site bears directly onto London Clay.	Determine heave and ground movement from the excavation of the clay and construction of basement walls.

Question	Response	Action required
6. Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?	No trees will be felled.	None
7. Is there a history of shrink/swell subsidence in the local area and/or evidence of such at the site.	No records.	None
8. Is the site within 100 m of a watercourse or a potential spring line?	No [a,b].	None
9. Is the site within an area of previously worked ground?	No. Natural soil occurs less than 0.8 m below the surface of the site. Historical mapping shows no change in land use from at least 1882 to the present day.	None

Question	Response	Action required
10. Is the site within an aquifer?	No. The site is underlain by the London Clay. This is considered an unproductive stratum in EA classifications.	None
11. Is the site within 50m of the Hampstead Heath Ponds?	No.	None
12. Is the site within 5 m of a highway or pedestrian right of way?	Yes The basement lightwell will be 2.5 m from the pedestrian walkway and 4.25 m from the highway.	Assess the ground movement from the basement construction on the pedestrian walkway.
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	No Both No. 13 and No. 17 have cellars and or basements	A ground movement assessment will be undertaken to assess impact (Burland Damage Assessment) as a precaution
14. Is the site over (or within the exclusion zone of) any tunnels?	No.	None.

a. Camden Geological, Hydrogeological, and Hydrological Study, Arup, 2010. (Fig. 8).
b. Camden Geological, Hydrogeological, and Hydrological Study, Arup, 2010. (Fig. 11).
c. Camden Geological, Hydrogeological, and Hydrological Study, Arup, 2010. (Fig. 14).
d. Groundsure Report (Appendix C) September 2016

In summary, the proposed basement is located on level ground and will be founded within the London Clay Formation, which is present from 0.8 m depth below the site surface.

8 Scoping

8.1 Introduction

This section considers the output from the screening survey where further actions are required. It considers the scope of information required in addressing these actions and what the potential impacts are of the basement construction. The existing ground conditions and the location of the basement can be summarised in a conceptual site model as indicated in Figure 8.1.

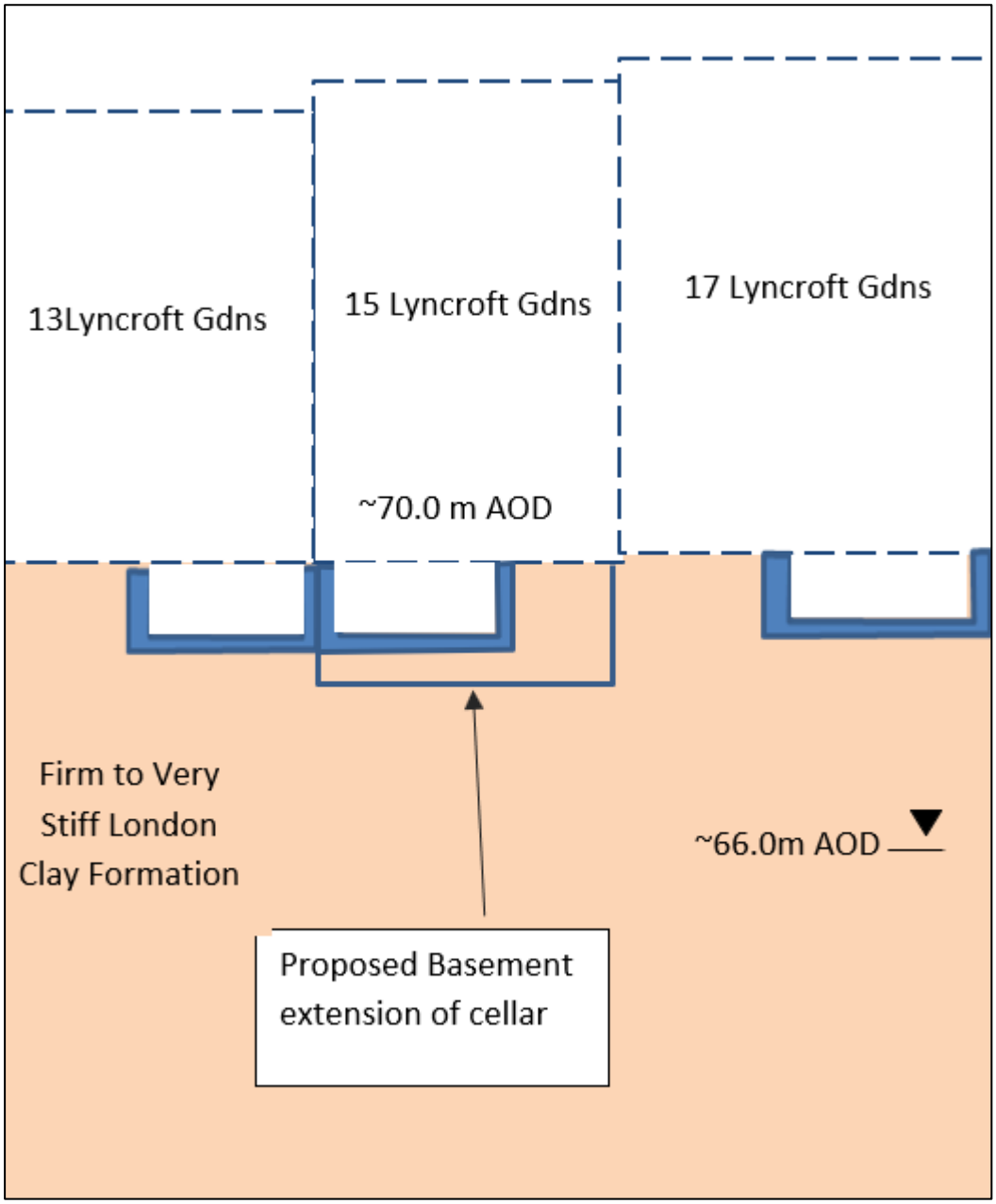

Figure 8.1 Conceptual Site Model (Not to scale, approx. m AOD)

There does not appear to be any requirement for groundwater mitigation measures for groundwater due to the depth of groundwater, as summarised in Table 8.1

Table 8.1 Summary of Scoping Requirements - Hydrogeology

Screening questions of concern - Hydrogeology	Potential Impact	Mitigation
1b. Will the proposed basement extend beneath the water table surface?	Monitoring indicates the basement level is 1.4 m above the recorded water level.	It is recommended that groundwater seepage is allowed for in the Basement Method Statement

The land stability issue relates to the ground movements resulting from the excavation within the London Clay Formation which will be addressed by a ground movement analysis as summarised in Table 8.2

Table 8.2 Summary of Scoping Requirements – Land Stability

Screening questions of concern – Land Stability	Potential Impact	Mitigation
5. Is the London Clay the shallowest stratum on site?	Yes. Below a layer (≤0.8m) of made ground, the site bears directly onto London Clay.	Determine heave and ground movement from the excavation of the clay and construction of basement walls.
12. Is the site within 5 m of a highway or pedestrian right of way?	Yes The basement lightwell will be 2.5 m from the pedestrian walkway and 4.25 m from the highway.	Assess the ground movement from the basement construction on the pedestrian walkway.

9 Impact Assessment

9.1 Groundwater

9.1.1 Groundwater level

The screening process has shown from borehole information that groundwater occurs at a depth of between 3.9 and 4.02m bgl, or approximately 65.98 to 66.10m AOD[2]. At this level groundwater will be 0.9 to 1.02 m below the excavation depth of 3.0 m or 67.00 m AOD (this assumes total excavation allowing for blinding and basement floor slab).

It is proposed that pumping to deal with seepage in the low permeability London Clay Formation is included in the Basement Method Statement.

9.1.2 Impact on groundwater by any contamination from the made ground

The made ground encountered on the site is described as an inert material with no visual or olfactory indications of contamination.

The natural strata underlying the site is of very low permeability and classified as non-water bearing. The risk of leaching into ground water is therefore considered negligible.

9.2 Land Stability

The screening process has identified three issues which require an impact assessment listed below from Tables 7.2 and 8.2.

- Presence of London Clay as the shallowest stratum (excepting a thin layer of granular made ground of < 0.4m);
- Proximity to the highway and
- Proximity of an adjacent structure with differential depth of foundations.

9.2.1 Presence of the London Clay Formation at the surface

The ground investigation indicates that the soil can be readily excavated using conventional plant appropriate for the access constraints imposed by the location of the property. Groundwater is not anticipated to be encountered, based on monitoring records from the site investigation for the full depth of the excavation, although allowance for seepage is recommended.

The impact of the excavation on ground heave has been assessed in Section 6 of this report, which concludes that total heave will be less than 16 mm, which is considered within normal construction tolerance. For evaluation of all ground movements both short term during excavation and long term after construction it was considered necessary to undertake a Ground Movement Assessment, which is included in Section 10 of this report.

[2] Levels are approximate and subject to a site topographical survey.

The ground movement assessment evaluates ground movement in relation to neighbouring properties No. 13 and 17 Lyndhurst Gardens, the footway/highway and the host property.

9.2.2 Stability of Temporary Excavations

It is proposed that the basement retaining walls will be constructed using a hit and miss underpinning technique, with temporary propping supporting the excavation, which is set out in the Basement Method Statement issued by Croft and indicated in Drawing No. SK01 included in Appendix A.

9.2.3 Groundwater Control

As discussed in Section 8.1.1 groundwater is not anticipated to affect the construction works. If localised seepages are encountered of groundwater that is likely to impact the works, groundwater could be controlled by pumping to a tank prior to disposal by tanker to an approved facility. Alternatively discharge of the groundwater could be made to the sewer subject to an agreement at detailed design stage from the local water company in terms of water quality, flow rate and quantity.

9.2.4 Monitoring of groundwater and ground movements

Groundwater levels should be monitored before the works as a precaution. Monitoring of adjacent structures and the highway should be carried out before, during and after construction.

10 Ground Movement Assessment

10.1 Introduction

This section provides an assessment of ground movement that may result from the construction of the basement and to determine how these may affect the adjacent building structures, the highway and host property.

The proposed construction sequence for the basement is summarised as:

Phase 1: Excavate in 1m width max. and install props and trench sheets as excavation progresses

Phase 2: Cast retaining wall and base. Remove props after concrete has gained sufficient strength

Phase 3: Excavate and cast remainder of base slab. Install full length props while central soil mass is being removed. Proceed with above ground construction.

The full details of the construction are included in the Basement Method Statement by Croft. The sequence of casting the retaining walls sections is shown in Drawing SK-01 in Appendix A.

Ground movements resulting from underpinning are not well documented and there is no specific method for assessing their magnitude. It should be noted that CIRIA C760 (2017), which is often used as a reference for ground movement assessments, is for embedded retaining walls and not concrete underpins.

When underpinning is carried out in a well-controlled manner, movements are typically small. A widely accepted movement from the installation of underpins is for 5mm of horizontal and vertical movement for a single stage underpining, in addition to the global movements from excavation and subsequent settlement from the imposed loads acting on the underpins.

The ground conditions at 15 Lyncroft Gardens are predominantly London Clay, which will display heave from excavation and long term settlement from the imposed loads.

The following ground movements have been assessed:

- **Short term vertical heave / settlement movements**: London Clay and is susceptible to short term heave and time dependent swelling on unloading, which will occur because of basement excavation, generating upward ground movements. Short term heave has been analysed by Pdisp in the undrained condition.
- **Long term vertical ground movement in the drained condition:** The net loading / unloading on formation soils will generate ground movement, which could affect adjacent foundations which will happen over a period after construction. This has

been modelled with Pdisp. This takes into account existing stress conditions, and the weight of soil removed and the load from the new basement.

- **Vertical and horizontal movement from underpin installation:** Underpins act as stiff concrete retaining walls, which limits the potential for wall deflection. However, deflections that do occur may generate surface settlements, which could impact adjacent properties.
  From experience within in the industry, at least 5mm of additional ground movement (both vertical and horizontal) is typically anticipated for the proposed single stage underpinning.

10.2 Modelling of movements due to vertical and horizontal stress changes

The predicted ground response due to vertical unloading of the ground through excavation for the proposed basement has been modelled using the OASYS program PDisp version 20.12.

PDisp assumes a linear elastic behaviour of the soil and a flexible structure. The finite stiffness of the structures will tend to redistribute or smooth out the movements, when compared to those predicted by PDisp. The settlement calculations therefore represent free field movements unaffected by the stiffness of the structures and are likely to be conservative (i.e. the distortions of the structure would be less than those obtained from the predicted movements).

The analysis was undertaken for the combination of short-term undrained movements and long-term drained movements. The 'hard layer' base to the analysis was taken as 25 m below ground level. In addition, it has been assumed for ground modelling that the soil mass is removed in its entirety before the underpins and are placed, when in reality this is an incremental process. When the overall mass of the soil removed relative to the load of the re-imposed structure is considered onto a cohesive soil this presents a reasonable scenario.

10.2.1 Vertical Movements due to excavation (Undrained/short term)

The excavation level was assumed at 3.0 m below ground level where full excavation is required or 1.7 where the existing cellar is to be extended. Demolition and excavation of up to 3.0 m of soil will therefore produce an unload at new formation level of - 60 kPa or 34Kpa below the cellar. Poisson's Ratio for London Clay as v_u = 0.5.

A short term (undrained) analysis was undertaken using parameters in Table 5.3 above to determine the heave movements likely to arise as a result of the excavation (i.e., the movements likely to occur prior to the construction of the new structural elements and the consequential vertical loading of the soil). The analysis indicated a maximum heave of 9.2 mm occurring centrally within the excavation (Figure 6.1, 6.3 & 6.4), with 4.0 mm at the boundary with 13 Lyncroft Gardens, and 5.2 mm at 17 Lyncroft Gardens.

10.2.2 Vertical movements following construction of the new basement (drained/long-term)
The movements of the ground following construction are assessed for the long term (drained) case using parameters in Table 5.3 above.

The PDisp assessment indicates that peak heave movements in the long term again occur under the centre of the basement, with a magnitude of 6.3 mm occurring centrally within the excavation (Figure 6.2, 6.5 & 6.6), with -0.5 mm at the boundary with 13 Lyncroft Gardens, and 0.75 mm at 13 Lyncroft Gardens.

10.2.3 Vertical deflection from underpin installation
As indicated above in Section 10.1, 5mm of vertical movement is assumed for installation. The distance behind the wall to which negligible movement occurs has been assumed at 3.5 times the wall height.

10.2.4 Horizontal deflection from underpin installation
As indicated above in Section 10.1, 5mm of horizontal movement (δ_{max}) at the basement wall is assumed for installation. The distance behind the wall to which negligible movement occurs is assumed to be 4 times the height of the underpin of 3m. δ_h is the difference between δ_{max} and the movement of the far wall of the neighbouring property.

It should be reiterated that the movements due to vertical and horizontal stress changes do not occur in isolation to the other movements resulting from the basement construction process and the actual ground movements, particularly around and beyond the perimeter of the proposed basement, will be from the quality of workmanship during excavation and installation.

11 Damage Category Assessment

11.1 Introduction

The calculated ground movements have been used to assess potential 'damage categories' that may apply to neighbouring properties, the highway footway and host property due to the proposed basement construction. The methodology proposed by Burland and Wroth and later supplemented by the work of Boscardin and Cording has been used, as described in *CIRIA Special Publication 200* and *CIRIA C760*. General damage categories are summarised in Table 11.1 below:

Table 11.1: Classification of damage visible to walls (reproduction of Table 6.4, CIRIA C760)

Category	Description	Approx. Crack Width (mm)	Limiting tensile Strain (ε_{lim})
0 (Negligible)	Negligible – hairline cracks	<0.1	0.0 – 0.05
1 (Very slight)	Fine cracks that can easily be treated during normal decoration	<1	0.05 – 0.075
2 (Slight)	Cracks easily filled; redecoration probably required. Some repointing may be required externally.	<5	0.075 – 0.15
3 (Moderate)	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced.	5 -15 or a number of cracks > 3	0.15 – 0.3
4 (Severe)	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows.	15-25 but also depends on number of cracks	> 0.3
5 (Very Severe)	This requires a major repair involving partial or complete re-building.	> 25 but also depends on number of cracks	

11.2 Damage Assessment Categories for neighbouring properties 13 and 17 Lyncroft Gardens

Vertical ground movement for a section through 13 and 17 Lyncroft Gardens are shown in Figure 11.1 and 11.2 respectively. For these wall sections, the combined impact of short-term

heave and long-term settlement/ heave and installation has been shown. The location of the sections is shown diagrammatically in Figures 6.1/6.2. The difference in actual values between 13 and 17 Lyncroft Gardens reflects the deeper excavation on the party wall with No.17, due to the presence of an existing cellar against the party wall with 13 Lyncroft Gardens.

Table 11.2 incorporates superimposed horizontal and vertical movements derived from the wall deflection and heave/settlement due to excavation as outlined in Section 10. The assessment is based on the assumption of stiff clays. While the base of the excavation has an undrained cohesion of 67.5 kPa or 'firm' the clay increases steadily in strength below the excavation therefore an overall category of 'stiff' (75 kPa and greater) is considered appropriate. The assessment has been based on the limiting tensile strain for Category 1 of a strain of 0.075 %.

Table 11.2: Summary of ground movements and corresponding damage category 13 & 17 Lyncroft Gardens

Adjacent Property	13 Lyncroft	17 Lyncroft
Building width - L (m)	6.5	6.5
Building height - H (m)	11	11
L/H = 0.6 (approximated for plotting)	0.5	0.5
max deflection (Δ) in metres (from Fig 11.1/11.2)	0.0021	0.0028
Δ/L (%)	0.032	0.043
εlim	0.075	0.075
Δ/L/εlim	0.43	0.57
length to negligible horizontal movement - 4x wall height (m)	12	12
δh_{max} (m)	0.005	0.005
δh (m)	0.0026	0.026
δh/L (%) = εh	0.040	0.040
Damage Category	1	1

11.3 Impact on Highway/Footway

The ground movement assessment has been undertaken for the footway pavement of Lyncroft Gardens, which is approximately 2.5m from the lightwell. Figure 11.3 indicates that a combined vertical movement of 2.8mm and a horizontal movement of 5mm (a maximum movement assuming no attenuation in the distance from the lightwell). It should be noted that from a utilities search (Croft BIA ref: 190906 Appendix C) only a power cable was identified within the footway. Therefore, it is not considered this ground movement will have a significant impact on the footway or the highway.

11.4 Damage Assessment Categories for 15 Lyncroft Gardens

The Damage Assessment Category for the host property No. 15 Lyndhurst Gardens has been considered. The key factor in considering the damage assessment is the differential movements which might be generated. It is recognised that within the centre of the basement there will be heave of up to 11mm. However, this will act on the basement floor slab only and not on the structure above. It is common practice to install void former below the basement slab to account for heave and the value of 11mm is well within normal construction tolerance. Due to the different depth of excavation on either side of the property differential movements could arise, in the order of 2.5mm, creating a vertical movement strain as indicated in Figure 11.4. Additionally, horizontal strains may be generated. The maximum horizontal strain has been modelled as 5mm for the wall being installed. The overall damage assessment category for 15 Lyncroft Gardens is 1, as indicated in Figure 11.5 and 11.6, as indicated in Table 11.3

Table 11.3: Summary of ground movements and corresponding damage category 15 Lyncroft Gardens

Property	15 Lyncroft
Building width - L (m)	6.5
Building height - H (m)	11
L/H = 0.6 (approximated for plotting)	0.5
max deflection (Δ) in metres (from Fig 11.4)	0.0025
Δ/L (%)	0.038
εlim	0.075
Δ/L/εlim	0.51
length to negligible horizontal movement - 4x wall height (m)	12

Property	15 Lyncroft
δh_{max} (m)	0.005
δh (m)	0.0026
δh/L (%) = εh	0.04
Damage Category	1

12 Monitoring Strategy

The results of the ground movement analysis show that with good construction control, damage to adjacent structures generated by the assumed construction methods and sequence can be controlled to be within Category 1 'slight' damage. A formal monitoring strategy should be implemented on site in order to observe and control ground movements during construction.

The system should operate broadly in accordance with the 'Observational Method' as defined in CIRIA Report 185. Monitoring can be undertaken by installing survey targets to the top of the wall and face of the adjacent building. Baseline values should be established prior to commencement of works. Monitoring of these targets should be carried out at regular time intervals and the results should be analysed to determine if any horizontal translation of the wall or tilt/settlement of the neighbouring structure is occurring. Regular monitoring of these targets will allow ground movement trends to be detected early and a mitigation strategy can be implemented to control further movement. Monitoring data should be checked against predefined trigger limits and can also be further analysed to assess and manage the damage category of the adjacent buildings as construction progresses.

It is recommended that a condition survey is undertaken on all adjacent property facades prior to the works commencing and ideally when monitoring baseline values are established. Existing cracks or structural defects should be carefully recorded, documented and regularly inspected as construction progresses.

13 Conclusions

The results of this Basement Impact Assessment are supported by site investigation data and outline construction methods and sequence provided by the structural engineer.

The maximum damage category for the adjacent properties has been calculated to be within Category 1 (slight damage). The assessment has indicated a potential movement of 2.8 vertical and 4mm horizontal for the footway of Lyncroft Gardens. The maximum damage category for the host property has also been calculated to be within Category 1.

An appropriate monitoring regime should be adopted and maintained throughout construction to manage risk and potential damage to the neighbouring structures as construction progresses onsite.

14 References

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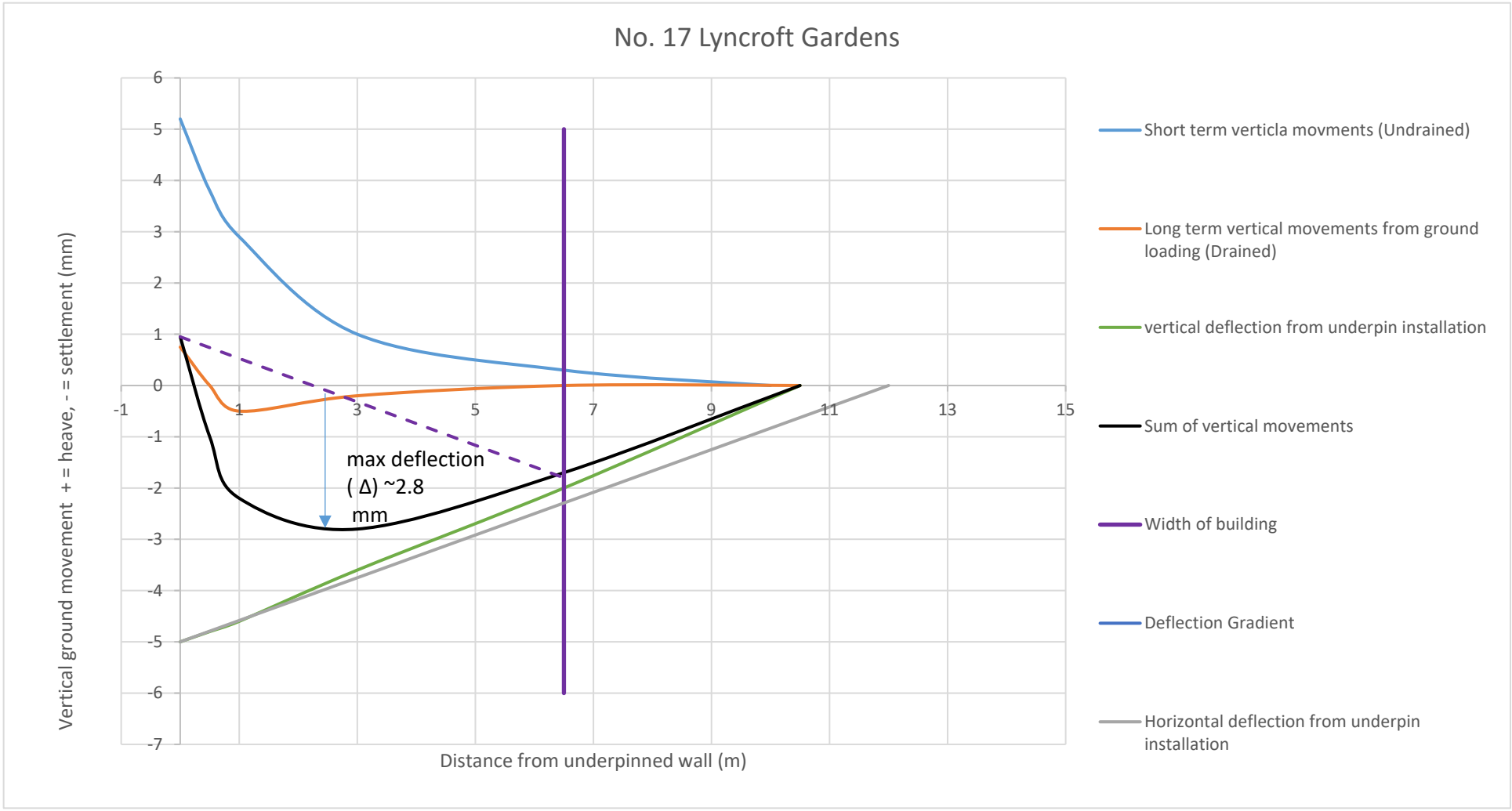
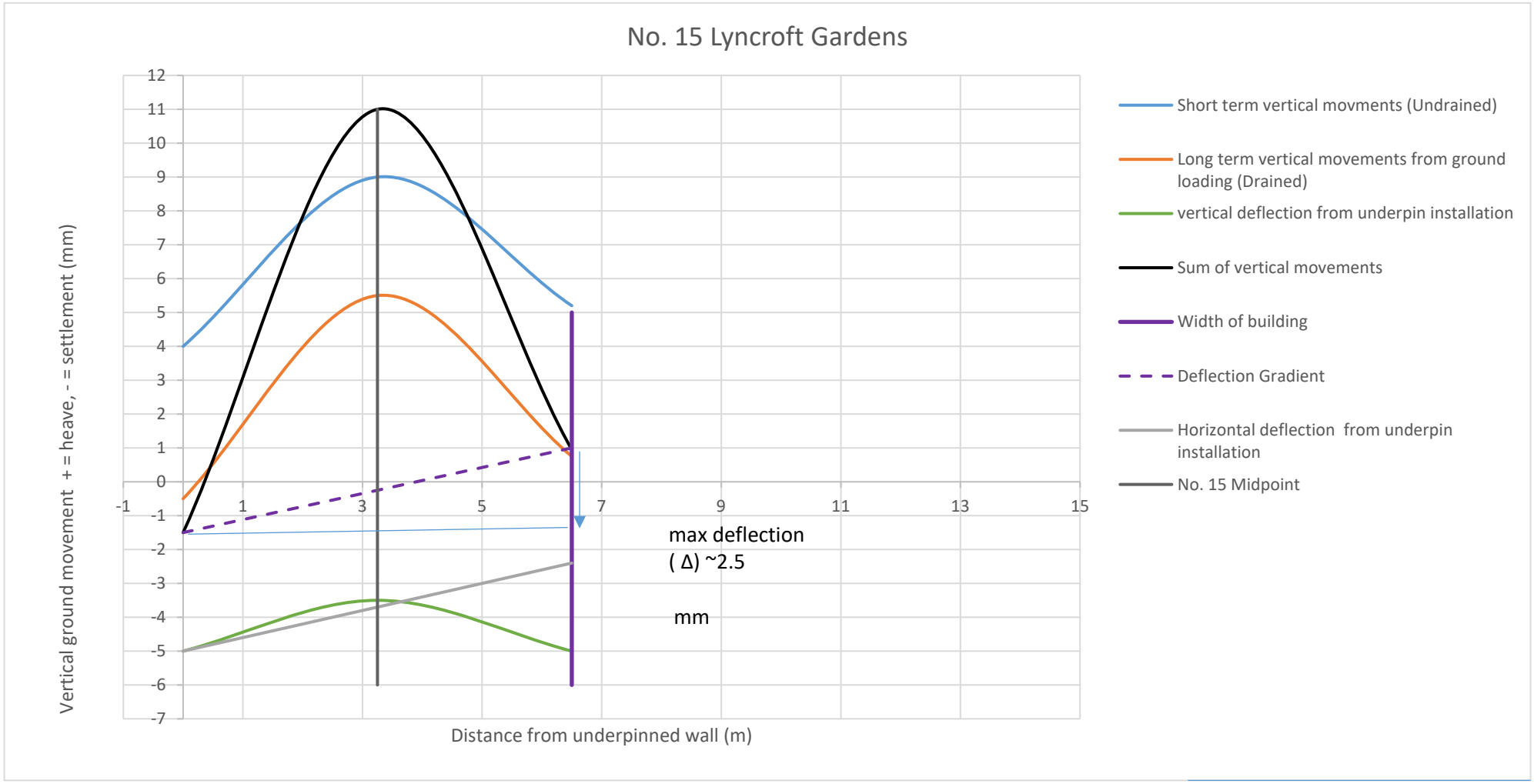
Figures

Client Croft Structural Engineers Ltd.	MAUND GEO-CONSULTING	Project 15 Lyncroft Gardens NW6 1LB
Job No. MGC/19/29	Title Combined Vertical Movements for 13 Lyncroft Gardens	Figure 11.1

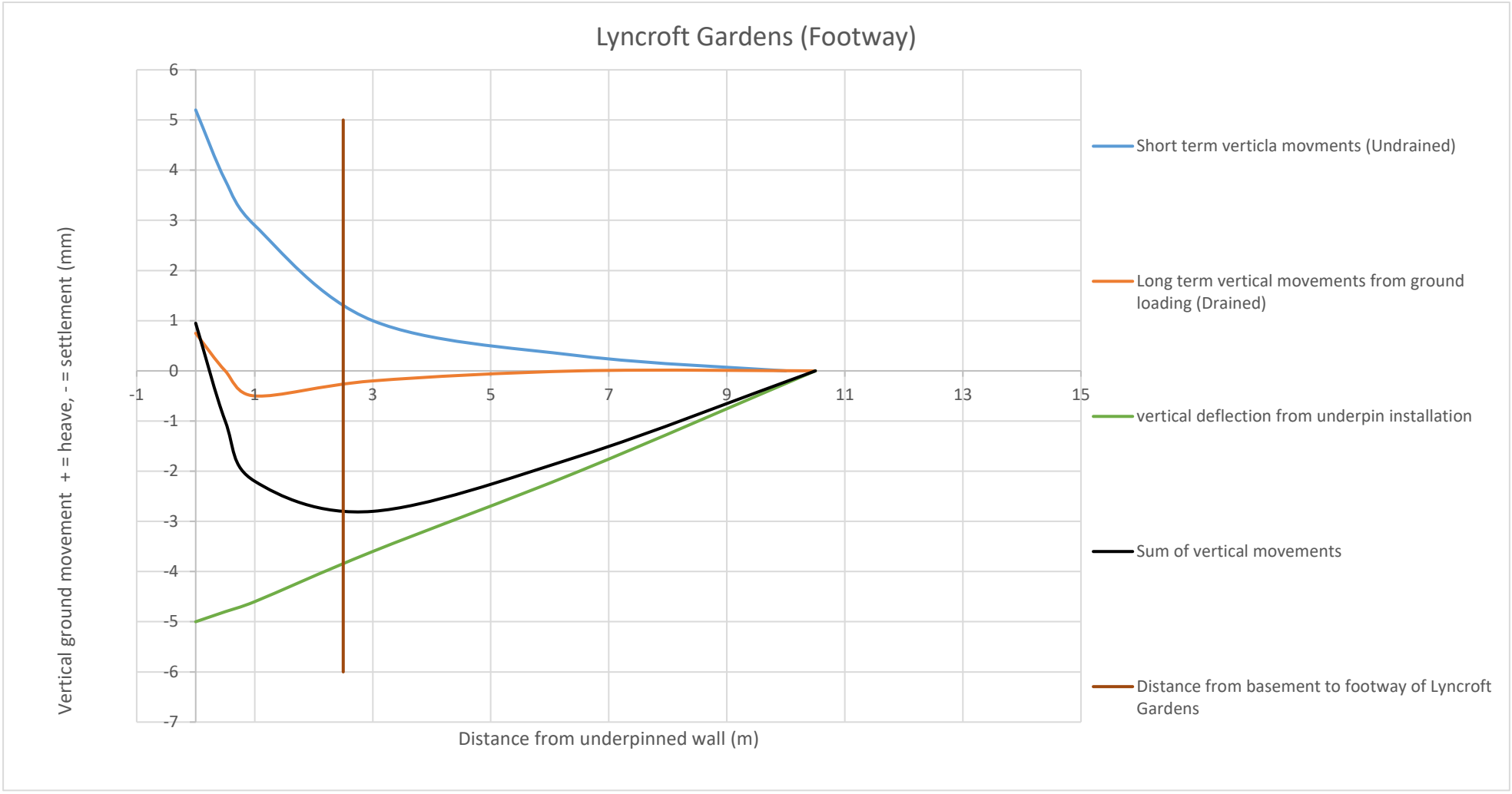


Client Croft Structural Engineers Ltd.	MAUND GEO-CONSULTING	Project 15 Lyncroft Gardens NW61LB
Job No. MGC/19/29	Title Combined Movements Section 1-1', 17 Lyncroft Gardens	Figure 11.2

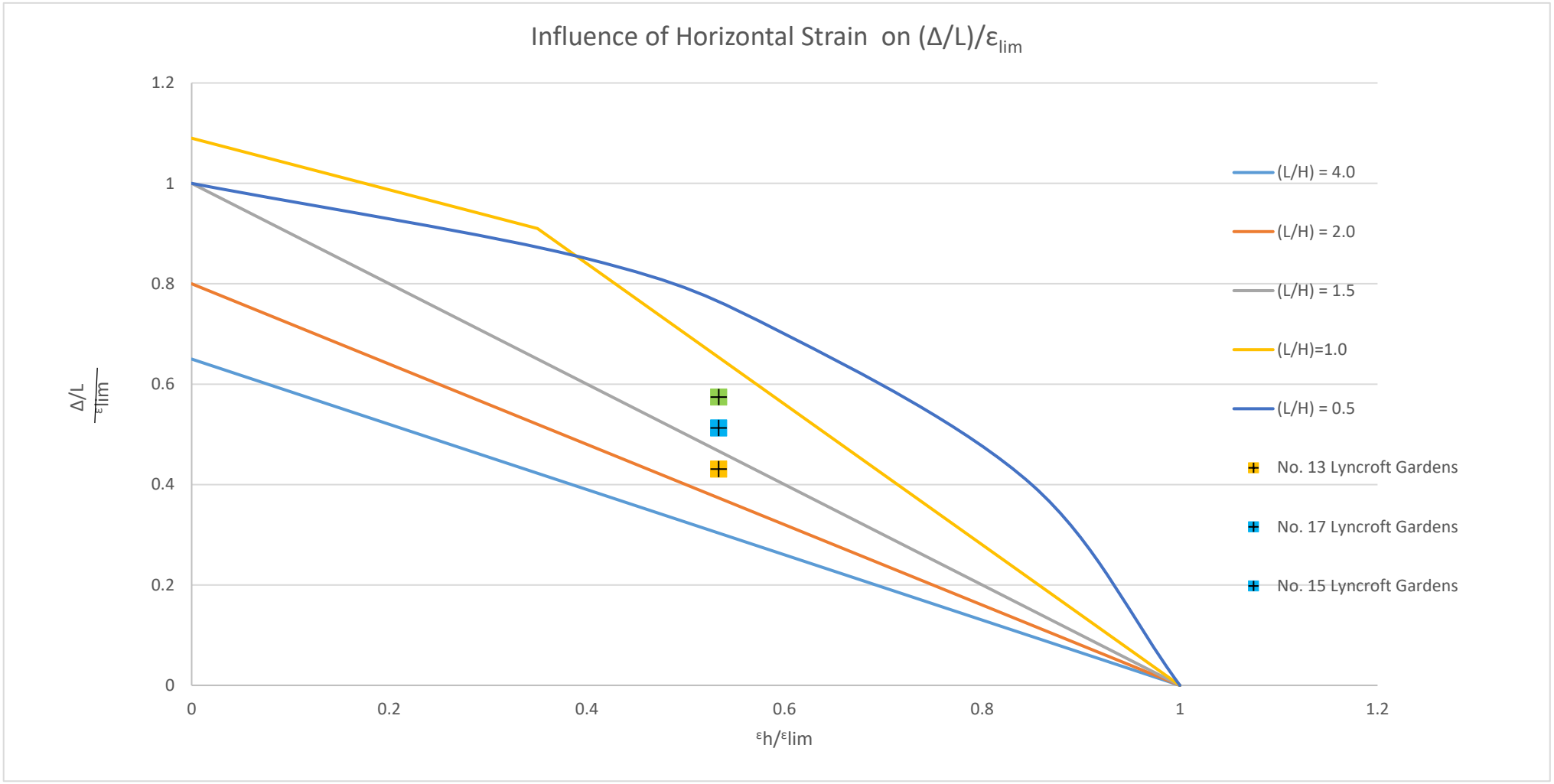


Client		Project
Croft Structural Engineers Ltd.	MAUND GEO-CONSULTING	15 Lyncroft Gardens NW6 1LB

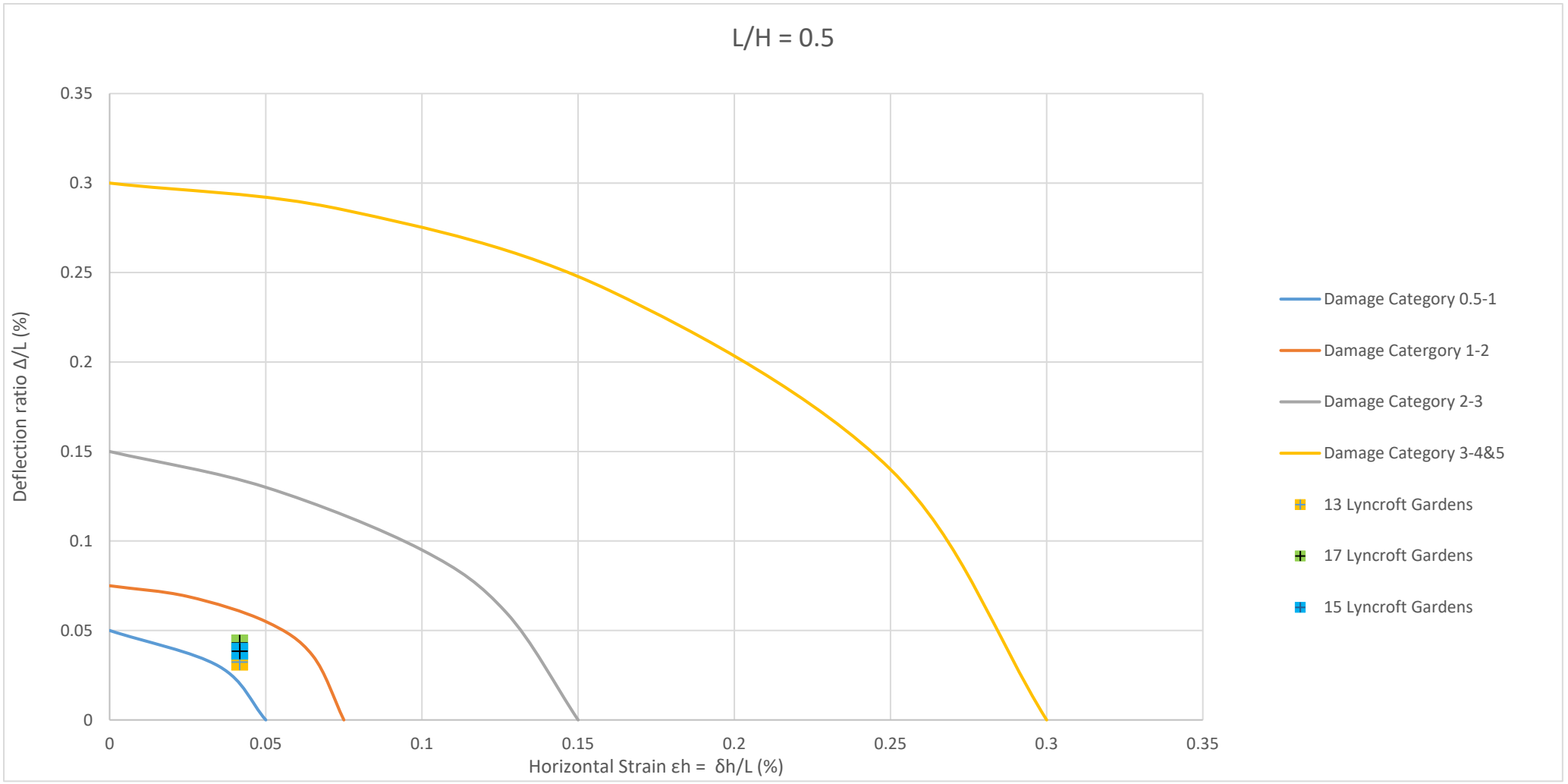
Job No.	Title	Figure
MGC/19/29	Combined Vertical Movements for Host Property	11.4



Client Croft Structural Engineers Ltd.	MAUND GEO-CONSULTING	Project 15 Lyncroft Gardens NW6 1LB
Job No. MGC/19/29	Title Combined Vertical Movements for Lyncroft Gardens Footway Pavement	Figure 11.3



Client Croft Structural Engineers Ltd.	MAUND GEO-CONSULTING	Project 15 Lyncroft Gardens NW6 1LB
Job No. MGC/19/29	Title Influence of Horizontal Strain on Deflection Ratio	Figure 11.5



Client Croft Structural Engineers Ltd.	MAUND GEO-CONSULTING	Project 15 Lyncroft Gardens NW6 1LB
Job No. MGC/19/29	Title Damage Assessment Category	Figure 11.6

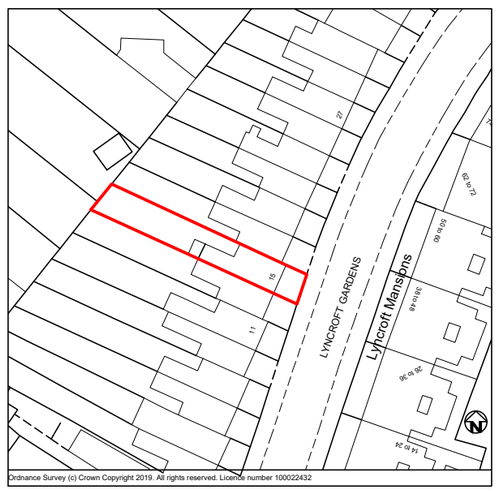
Appendix A Proposed Basement Drawings

0m 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m

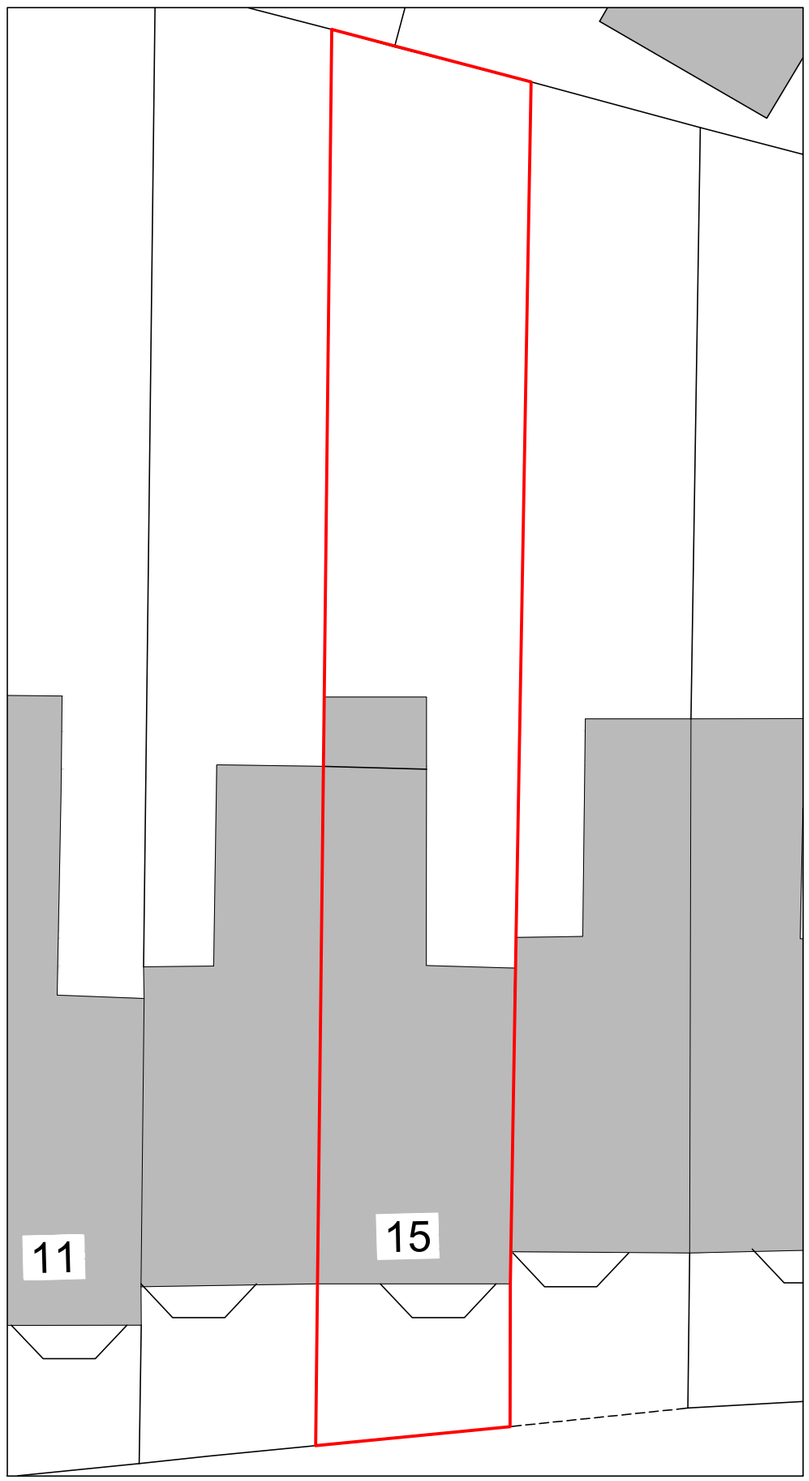
Scale 1:200

0m 20m 40m 60m 80m 100m

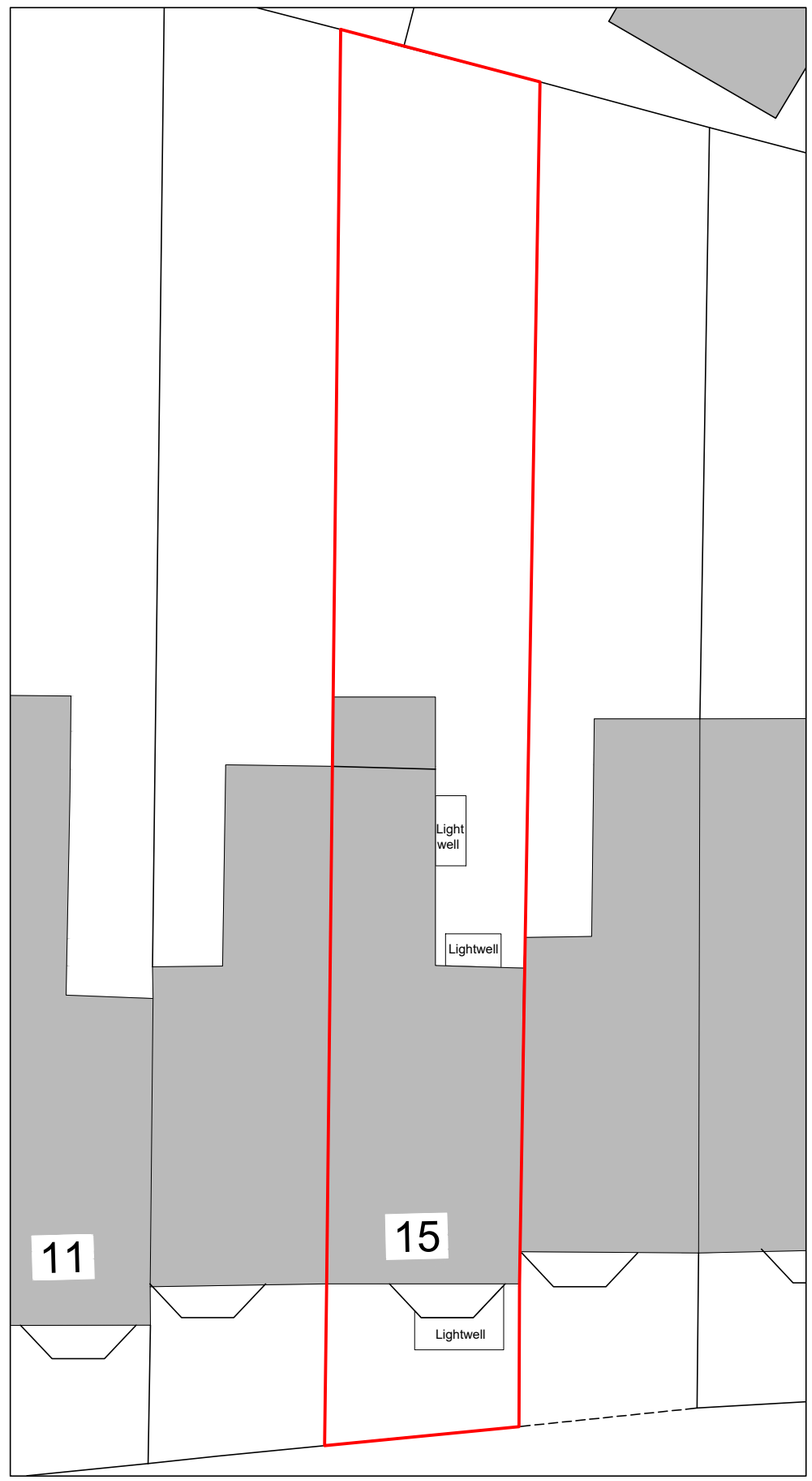
Scale 1:1250



1 / Location Plan 1:1250



2 / Existing Site Plan 1:200



3 / Proposed Site Plan 1:200

Job Title:

Basement Extension

Drawing Title:

Site and Location Plans

Revision Notes:

-

CLIENT : Mr Richard Banks

SITE: 15 Lyncroft Gardens, London NW6 1LB

-

-

ADVANTAGE BASEMENTS

Advantage Basement & Cellar Company Ltd
95 East Hill
Wandsworth
SW18 2QD
Tel: 020 8871 3055
E-mail: info@advantagebasements.co.uk

Scale: As Shown @ A3	Date: 04/09/2019
Drawn By: SS	Checked By: CG

PROJECT	Drawing No	Rev
1492	01	-

\\192.168.10.2\Projects\1492 15 Lyncroft Gardens\Cad\04_Drawings\15 Lyncroft Gardens.dwg

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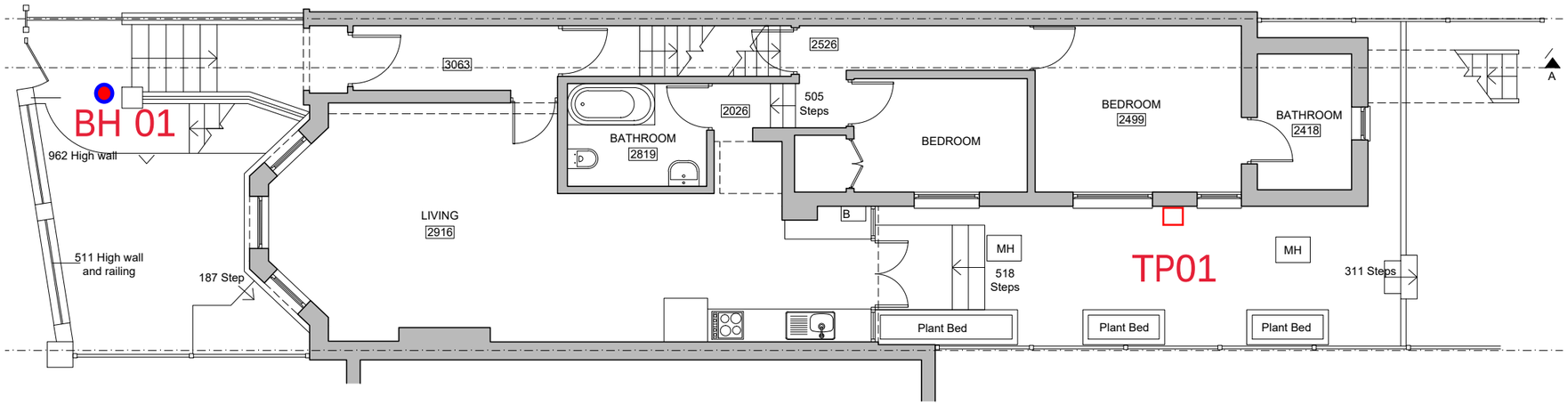
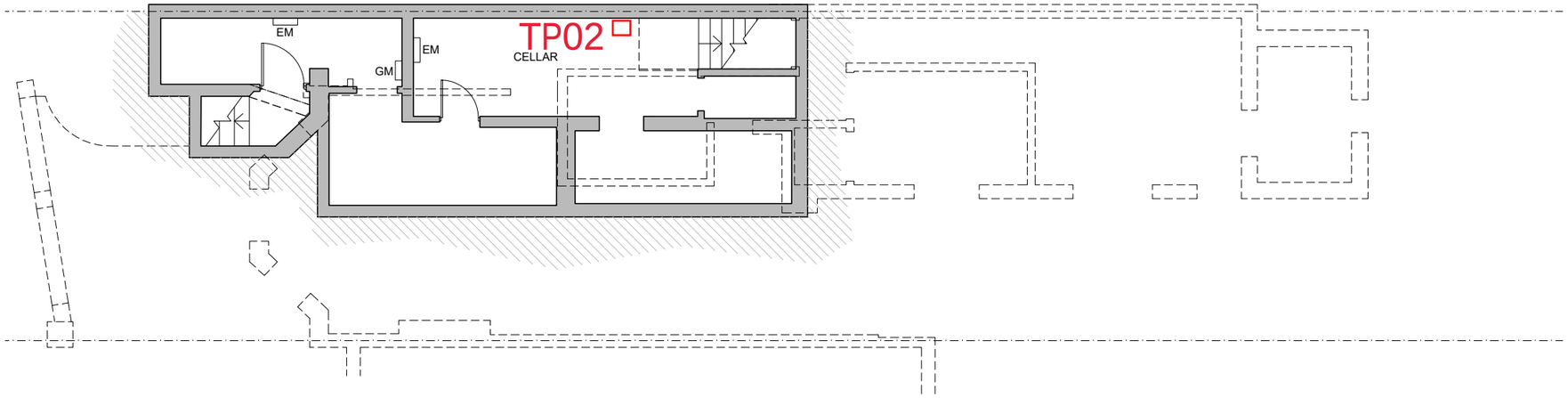
Scale 1:100



1 / Ground Floor Plan



2 / Basement Plan

Job Title:
Basement Extension

Drawing Title:
Existing Floor Plans

Revision Notes:
-

CLIENT : Mr Richard Banks
SITE: 15 Lyncroft Gardens, London NW6 1LB
-
-

ADVANTAGE BASEMENTS
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Scale: 1:100 @ A3 | Date: 04/09/2019

Drawn By: SS | Checked By: CG

PROJECT	Drawing No	Rev
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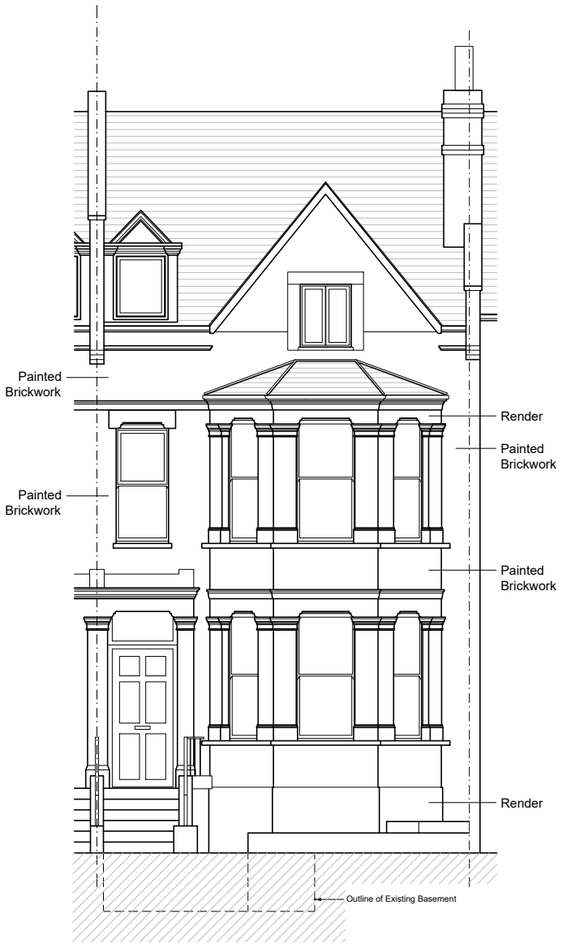
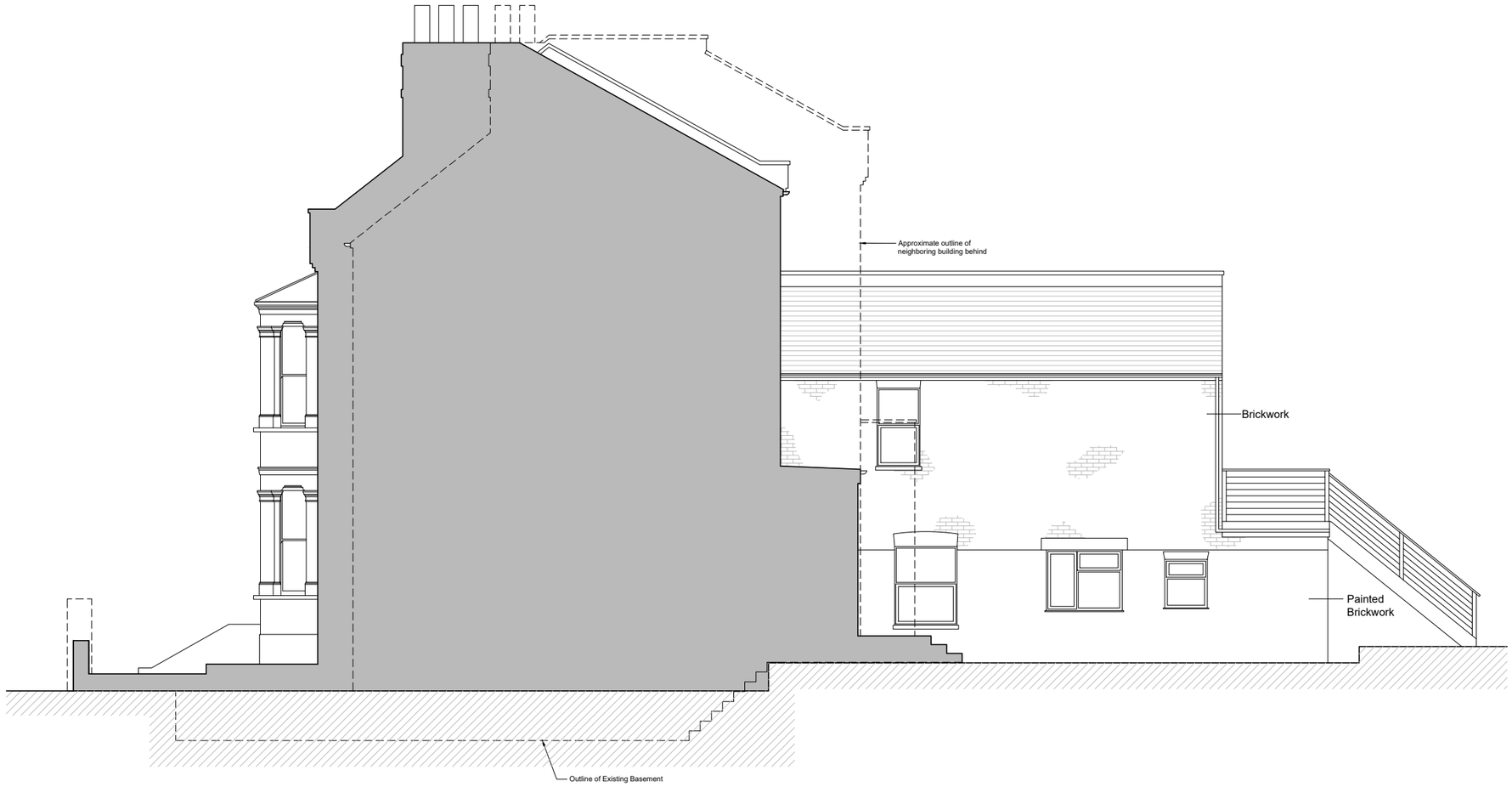


1 / Front Elevation



2 / Side Elevation

Job Title:
Basement Extension

Drawing Title:
Existing Elevations

Revision Notes:
-

CLIENT : Mr Richard Banks
SITE: 15 Lyncroft Gardens, London NW6 1LB
-
-

ADVANTAGE BASEMENTS
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Scale: 1:100 @ A3	Date: 04/09/2019
Drawn By: SS	Checked By: CG

PROJECT	Drawing No	Rev
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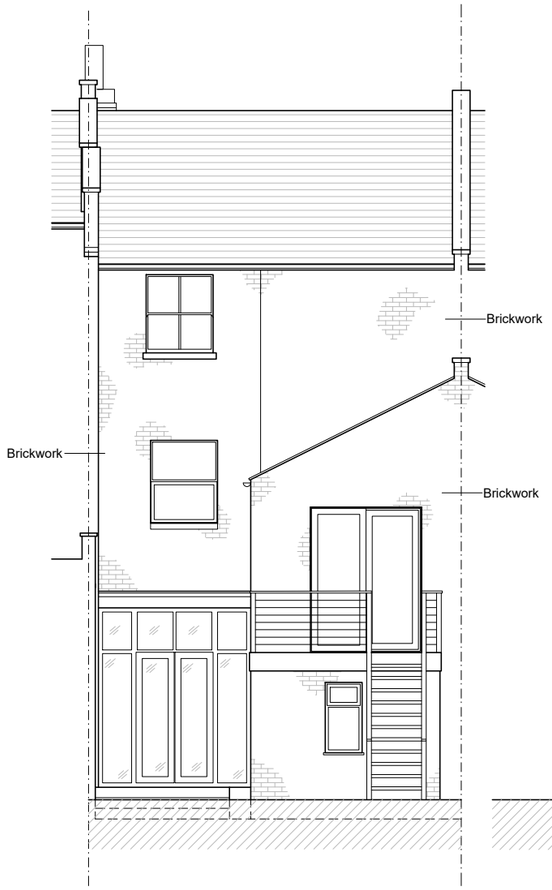
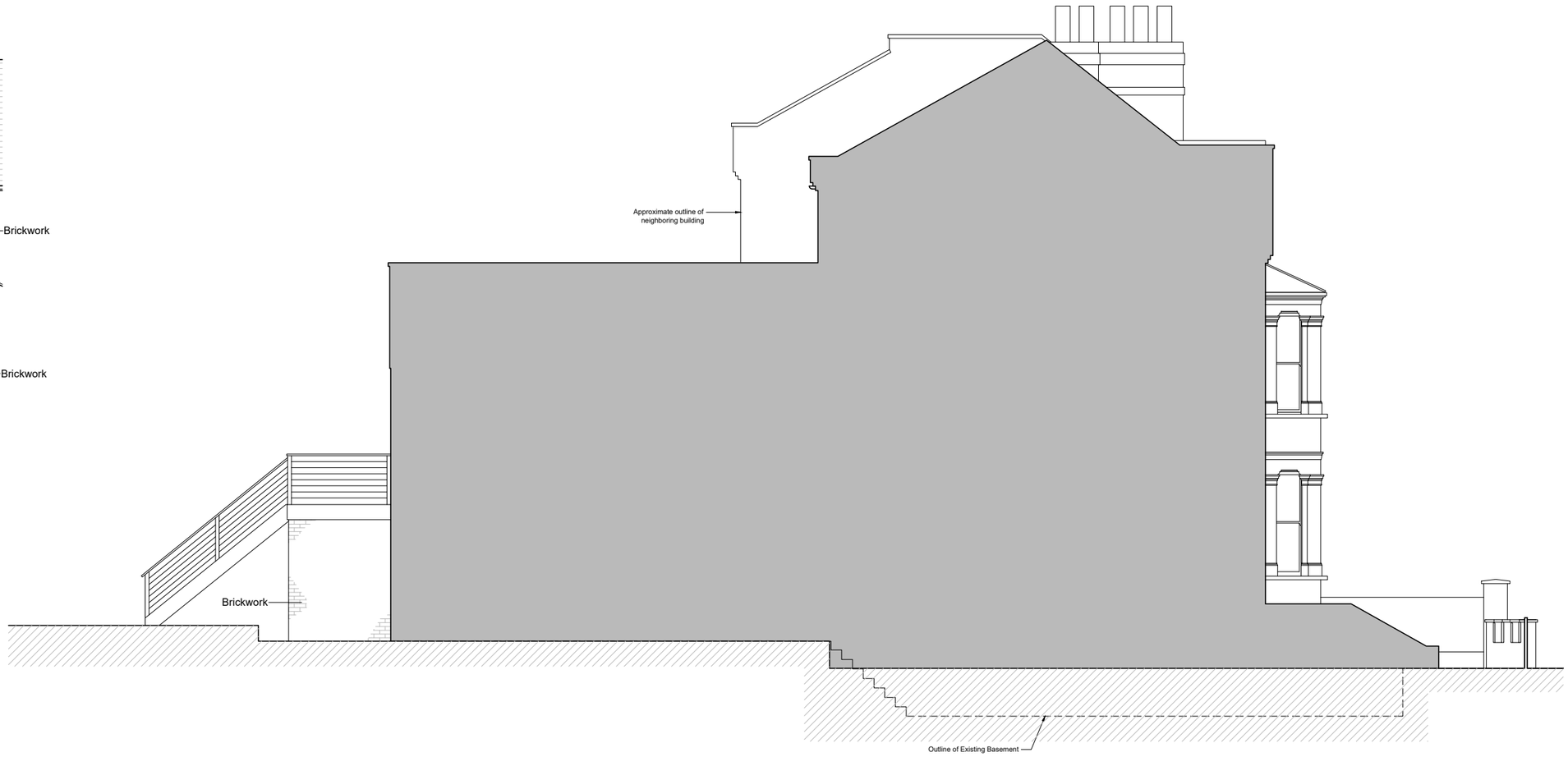


1 / Rear Elevation



2 / Side Elevation

Job Title:
Basement Extension

Drawing Title:
Existing Elevations

Revision Notes:
-

CLIENT : Mr Richard Banks
SITE: 15 Lyncroft Gardens, London NW6 1LB
-
-

ADVANTAGE BASEMENTS

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Scale: 1:100 @ A3	Date: 04/09/2019
Drawn By: SS	Checked By: CG

PROJECT	Drawing No	Rev
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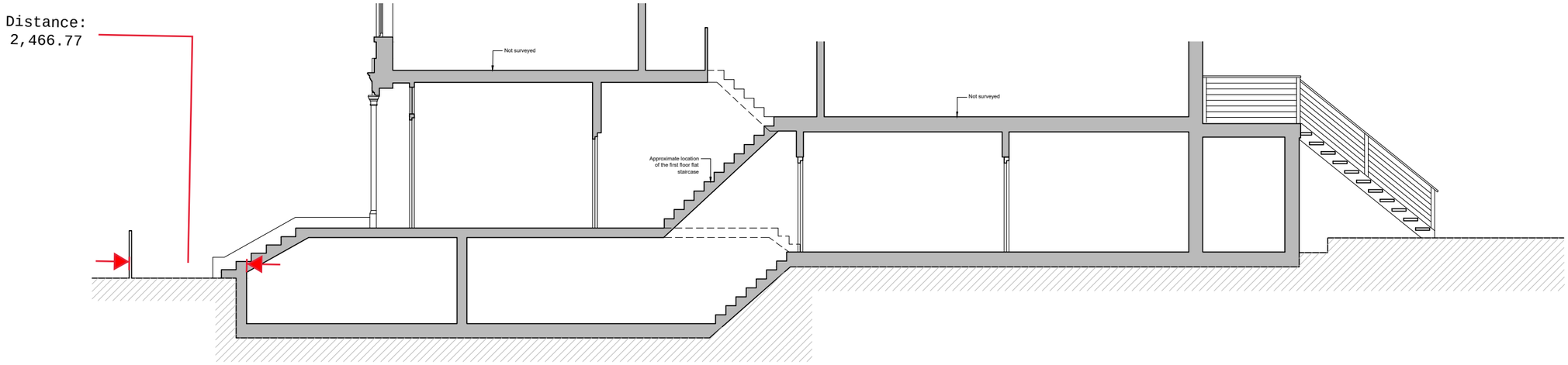
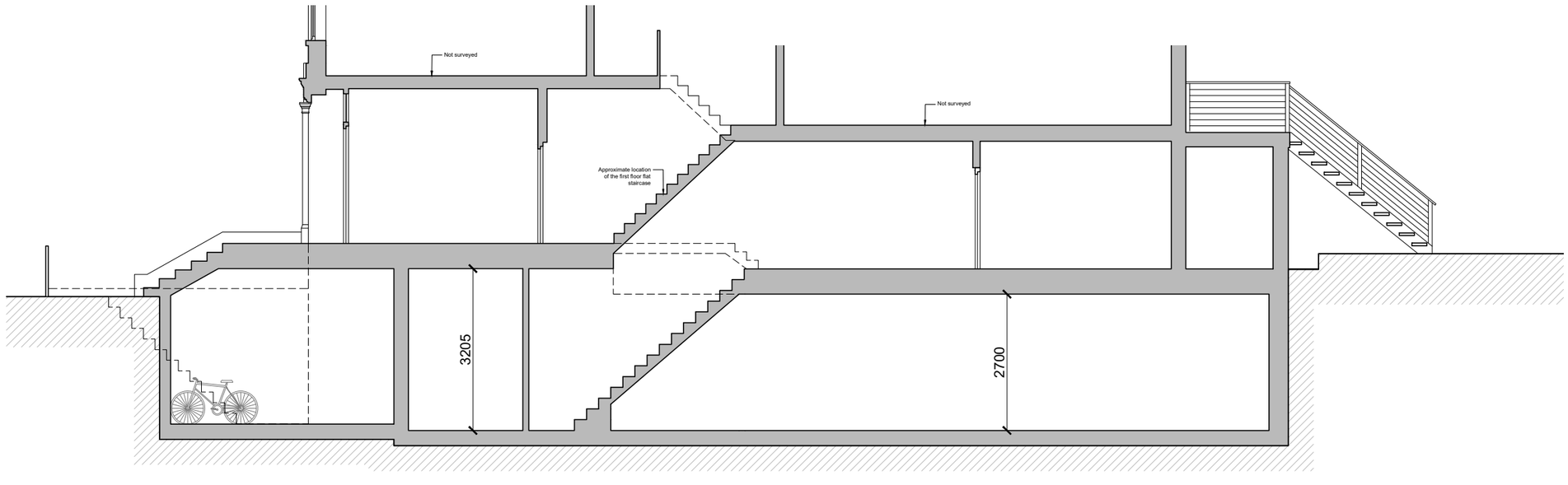


1 / Existing Section A-A



2 / Proposed Section A-A

Job Title:
Basement Extension

Drawing Title:
Existing and Proposed Sections

Revision Notes:
-

CLIENT : Mr Richard Banks
SITE: 15 Lyncroft Gardens, London NW6 1LB
-
-

ADVANTAGE BASEMENTS
Advantage Basement & Cellar Company Ltd
95 East Hill
Wandsworth
SW18 2QD
Tel: 020 8871 3055
E-mail: info@advantagebasements.co.uk

Scale: 1:100 @ A3	Date: 04/09/2019
Drawn By: SS	Checked By: CG

PROJECT	Drawing No	Rev
1492	05	-

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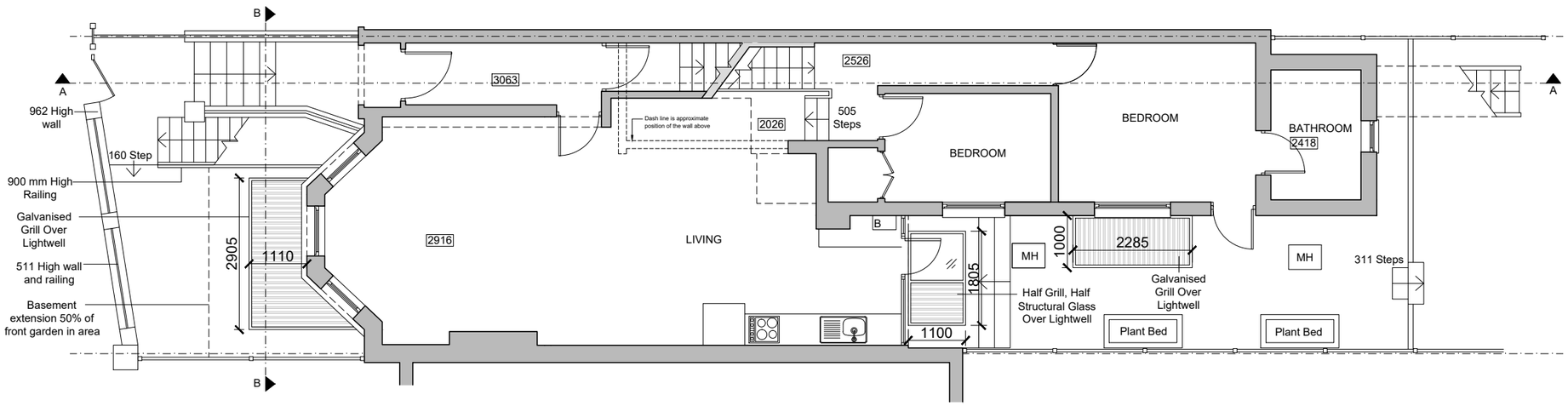
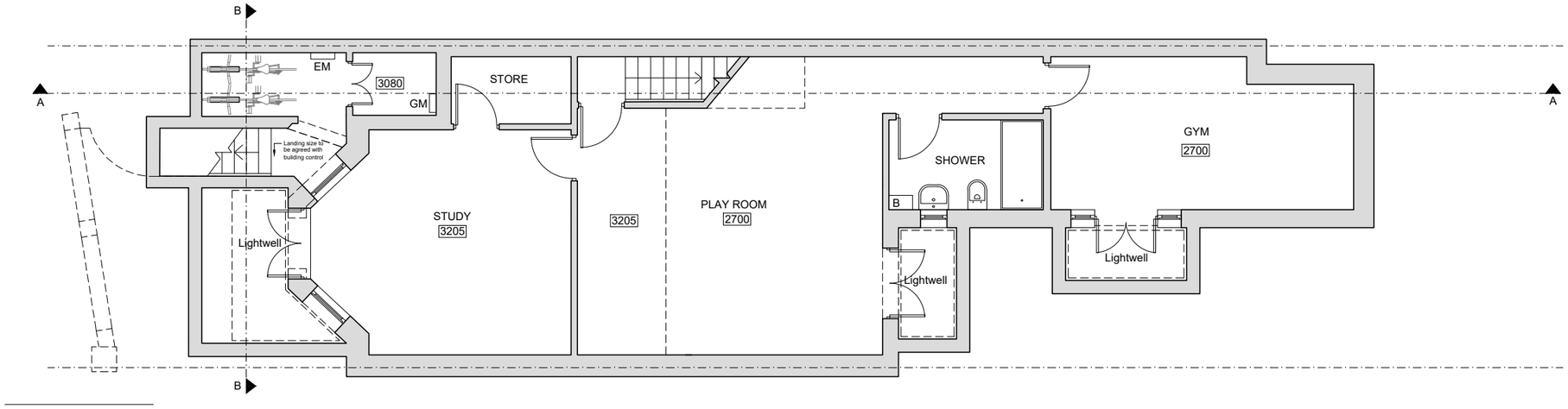


1 / Ground Floor Plan



2 / Basement Plan

Job Title:
Basement Extension

Drawing Title:
Proposed Floor Plans

Revision Notes:
-

CLIENT : Mr Richard Banks
SITE: 15 Lyncroft Gardens, London NW6 1LB
-
-

ADVANTAGE BASEMENTS
Advantage Basement & Cellar Company Ltd
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SW18 2QD
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E-mail: info@advantagebasements.co.uk

Scale: 1:100 @ A3	Date: 04/09/2019
Drawn By: SS	Checked By: CG

PROJECT	Drawing No	Rev
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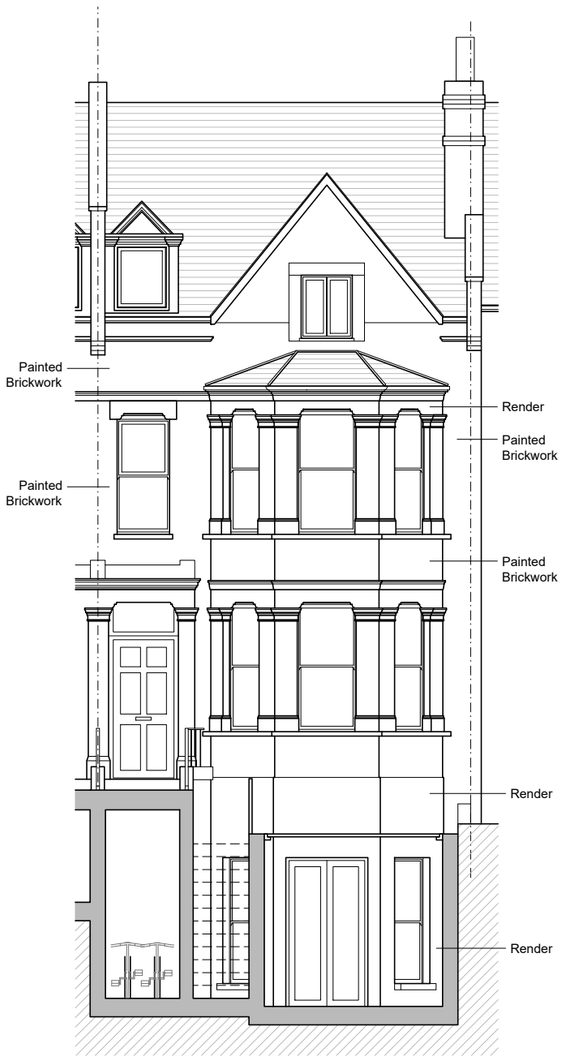
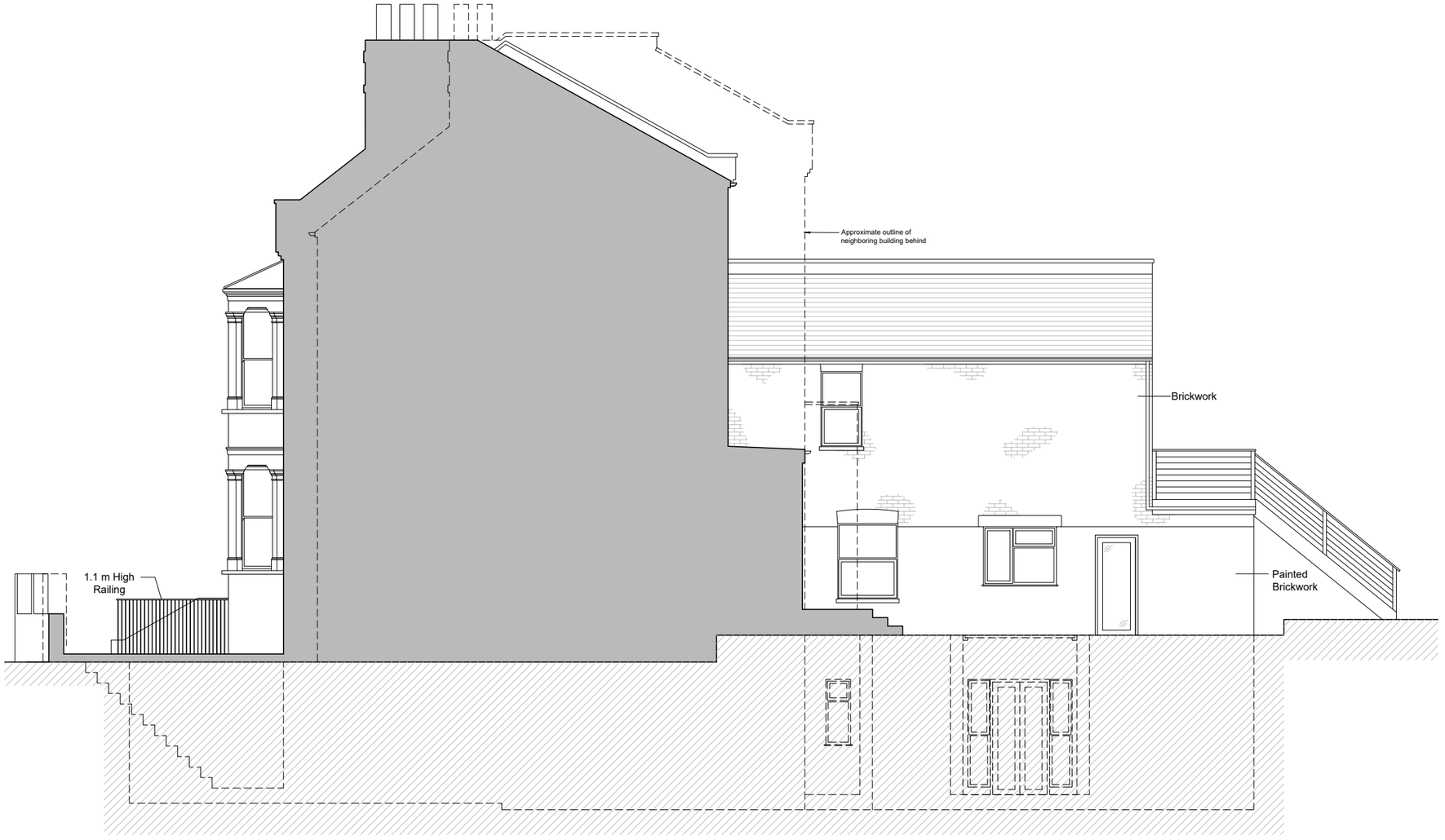
Scale 1:100



1 / Front Elevation



2 / Side Elevation

Job Title:
Basement Extension

Drawing Title:
Proposed Elevations

Revision Notes:
-

CLIENT : Mr Richard Banks
SITE: 15 Lyncroft Gardens, London NW6 1LB
-
-

ADVANTAGE BASEMENTS
Advantage Basement & Cellar Company Ltd
95 East Hill
Wandsworth
SW18 2QD
Tel: 020 8871 3055
E-mail: info@advantagebasements.co.uk

Scale: 1:100 @ A3	Date: 04/09/2019
Drawn By: SS	Checked By: CG

PROJECT	Drawing No	Rev
1492	07	-

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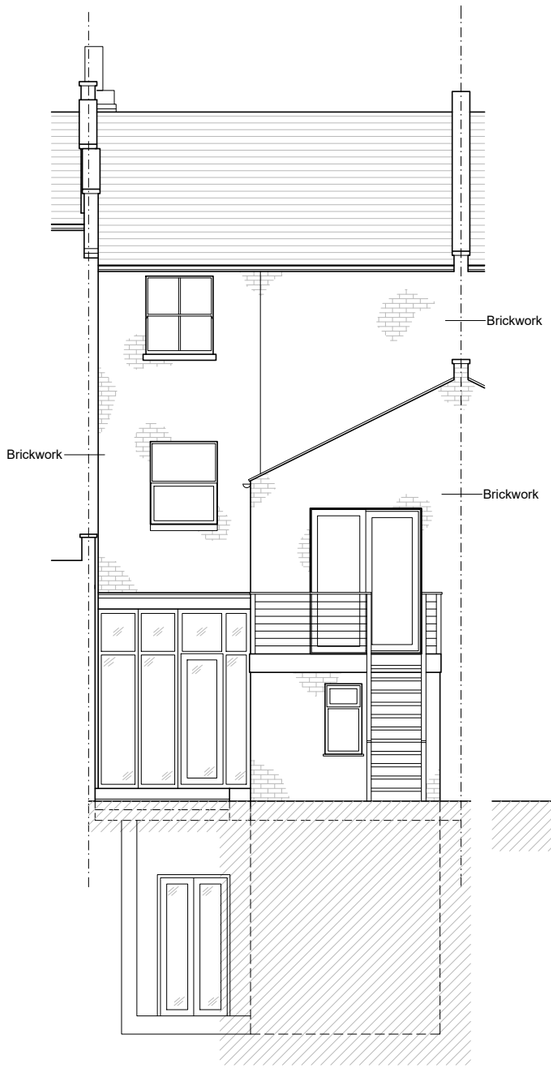
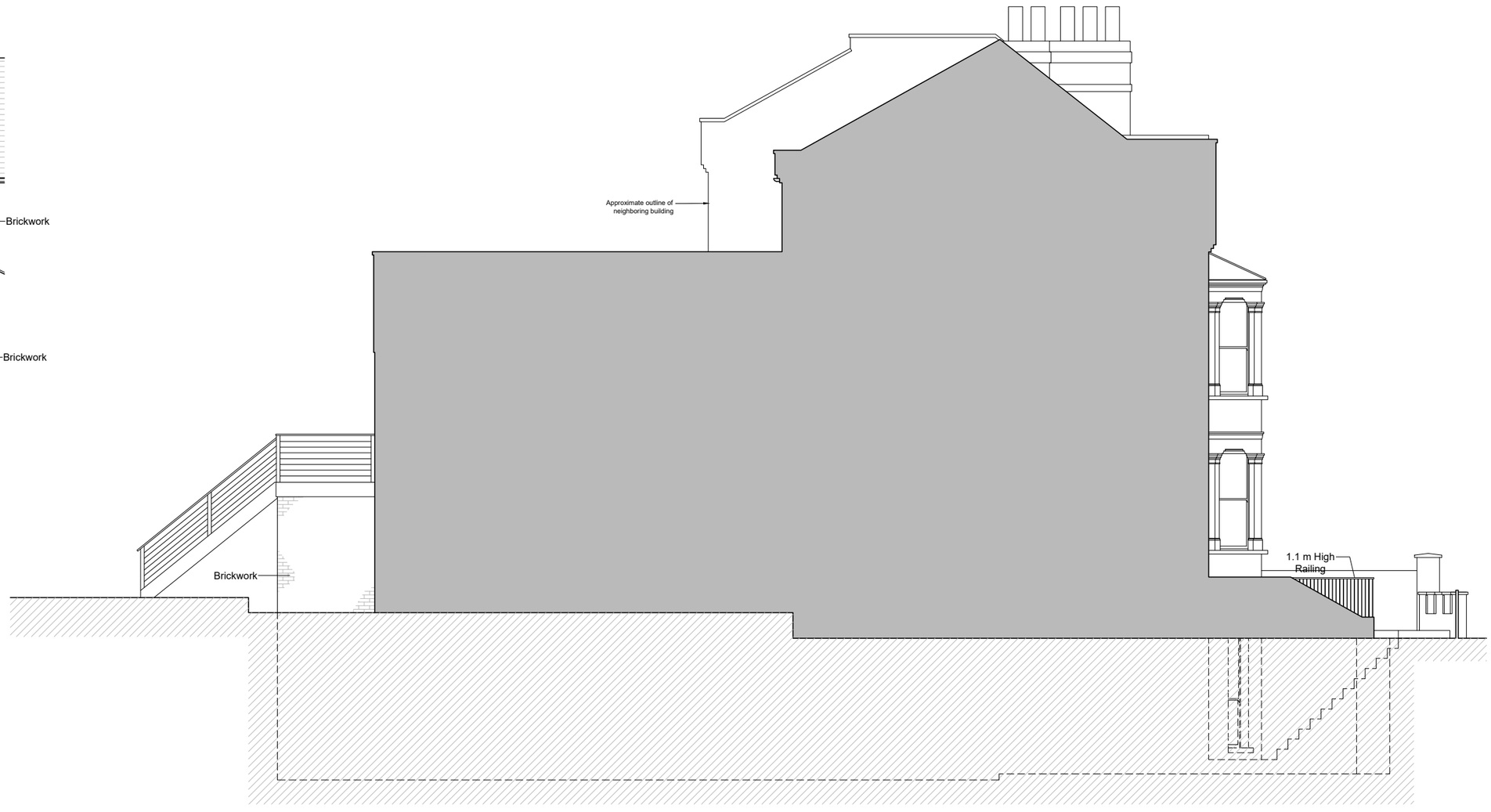
Scale 1:100



1 / Rear Elevation



2 / Side Elevation

Job Title:
Basement Extension

Drawing Title:
Proposed Elevations

Revision Notes:
-

CLIENT : Mr Richard Banks
SITE: 15 Lyncroft Gardens, London NW6 1LB
-
-

ADVANTAGE BASEMENTS
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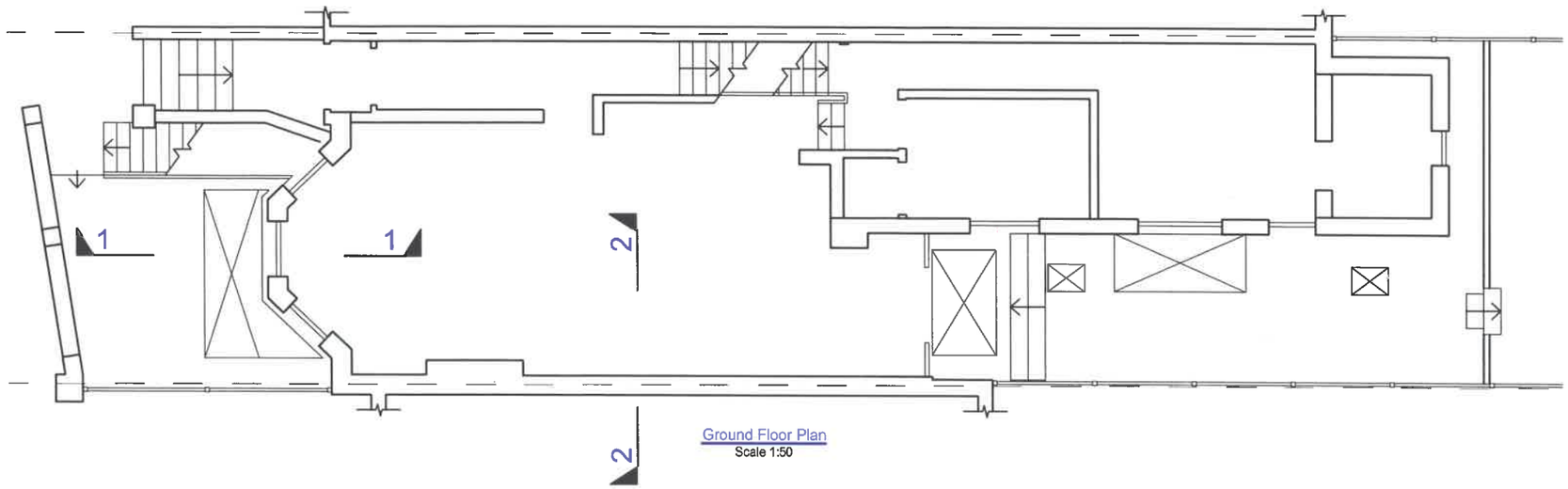
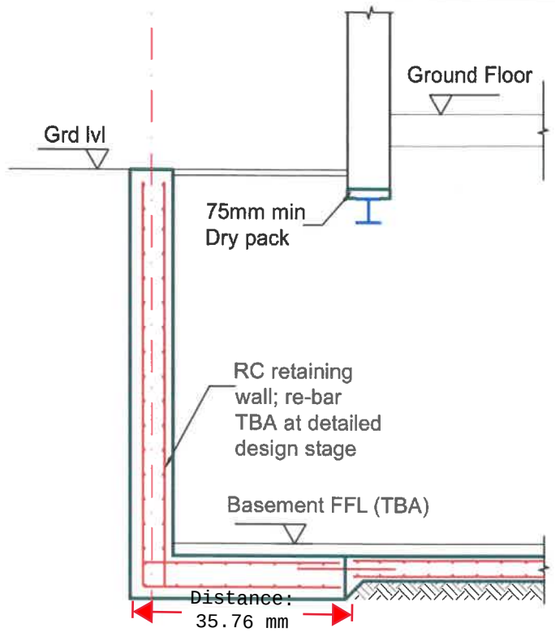
E-mail: info@advantagebasements.co.uk

Scale: 1:100 @ A3	Date: 04/09/2019
Drawn By: SS	Checked By: CG

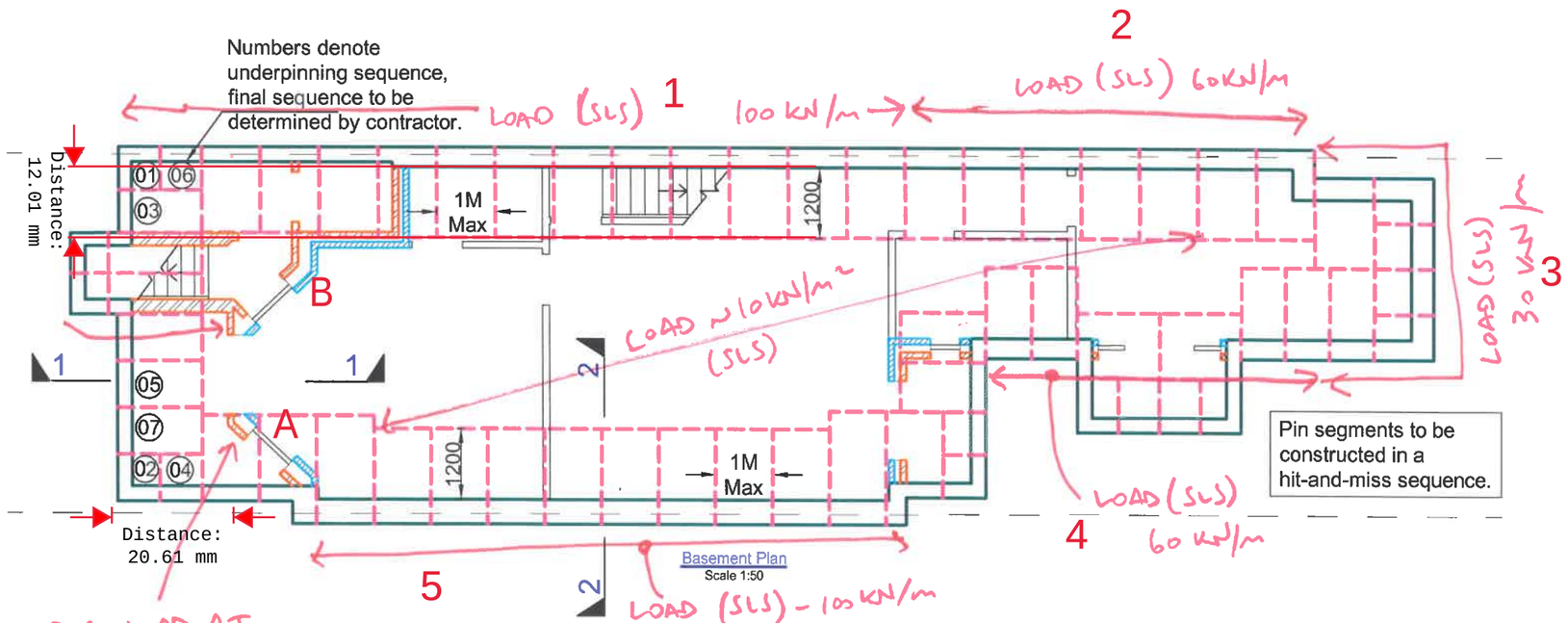
PROJECT	Drawing No	Rev
1492	08	-



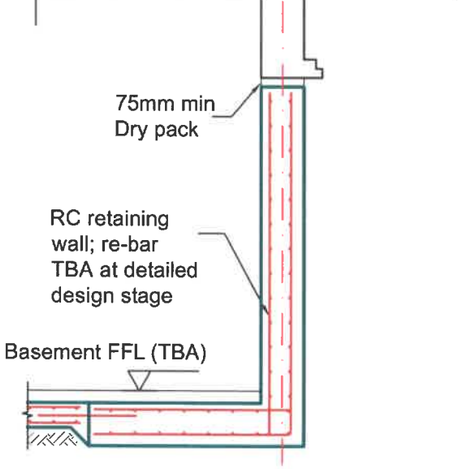
Ground Floor Plan
Scale 1:50



Section 1-1
Scale 1:50



Basement Plan
Scale 1:50



Section 2-2
Scale 1:50

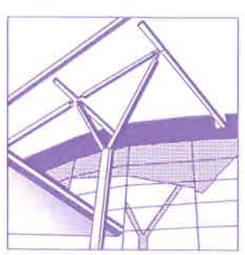
Job Number	Date
190906	Sept '19
Dwg Number	Rev
~~SL-10~~ 5k-01	-
Drawn	Ch'kd
~~CT~~ pdh	CT
Scale As shown @ A3	

Client: Advantage Basement & Cellar Company Ltd

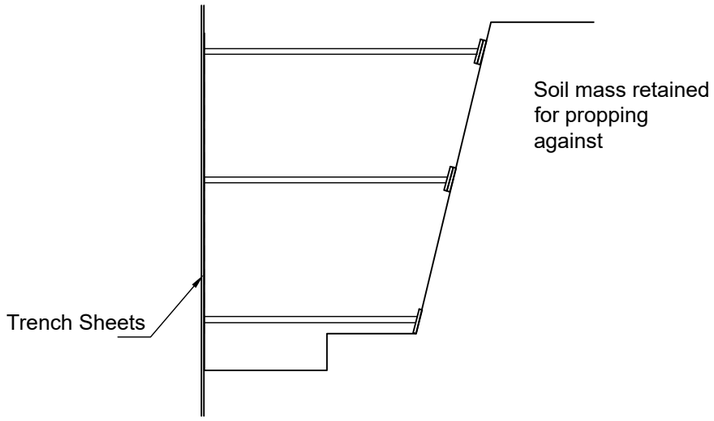
Project: 15 Lyncroft Gardens

Title : Plans and Sections BIA

Croft Structural Engineers
Clockshop Mews,
r/o 60 Saxon Rd,
London, SE25 5EH.
020 8684 4744
www.croftse.co.uk

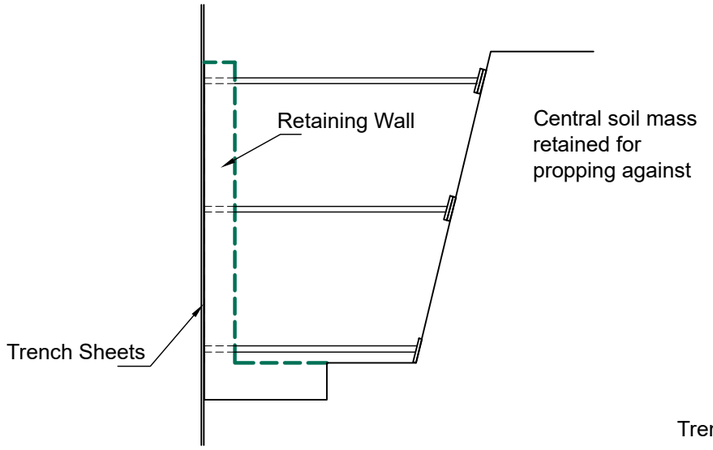


Rev	Date	Amendments
-	00/00/2019 11/11/2019	First issue for comment



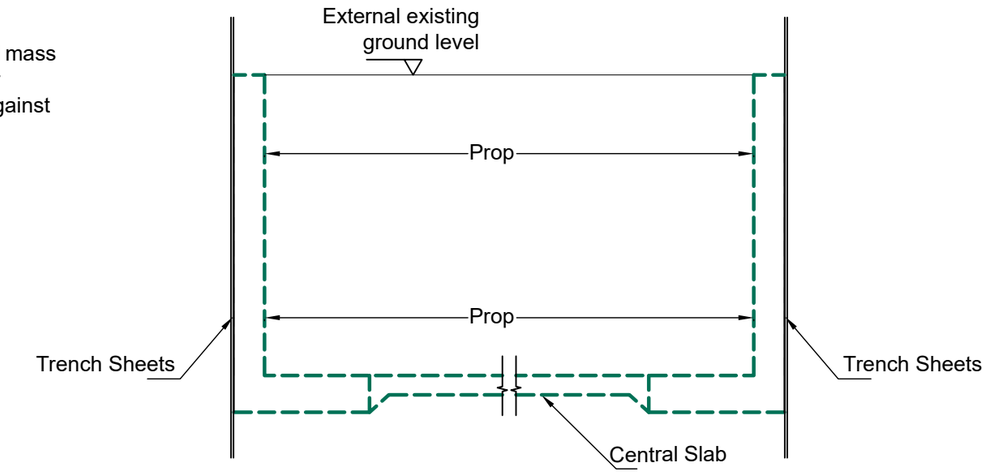
Phase 1

1. Excavate in 1m width maximum and install props and trench sheets and excavation progresses



Phase 2

1. Cast Retaining wall and Base.
2. Remove Props after concrete gain sufficient strength



Phase 3

1. Excavate and cast remainder of base slab. Install full length props while central soil mass is getting removed
2. Proceed with above ground construction

Job Number 190906	Date Nov '19
Dwg Number ST-30	Rev -
Drawn sb	Ch'kd pdh
Scale As shown @ A3	

Client: Advantage Basement & Cellar Company Ltd

Project: 15 Lyncroft Gardens

Title : Temporary works propping

Croft Structural Engineers
Clockshop Mews,
r/o 60 Saxon Rd,
London, SE25 5EH.
020 8684 4744
www.croftse.co.uk

Rev	Date	Amendments
-	27/11/2019	First issue for comment

Appendix B Groundsure Geo and Enviro Insight Reports

Maund Geo- Consulting Ltd

20, Mortlake Avenue,
Worcester, WR5 IQD

Groundsure Reference:	HMD-6410190
Your Reference:	MGC_19-29
Report Date	19 Oct 2019
Report Delivery Method:	Email - pdf

Enviro Insight

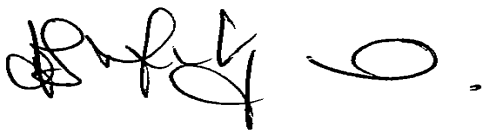
Address: 15, LYNCROFT GARDENS, LONDON, NW6 1LB

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



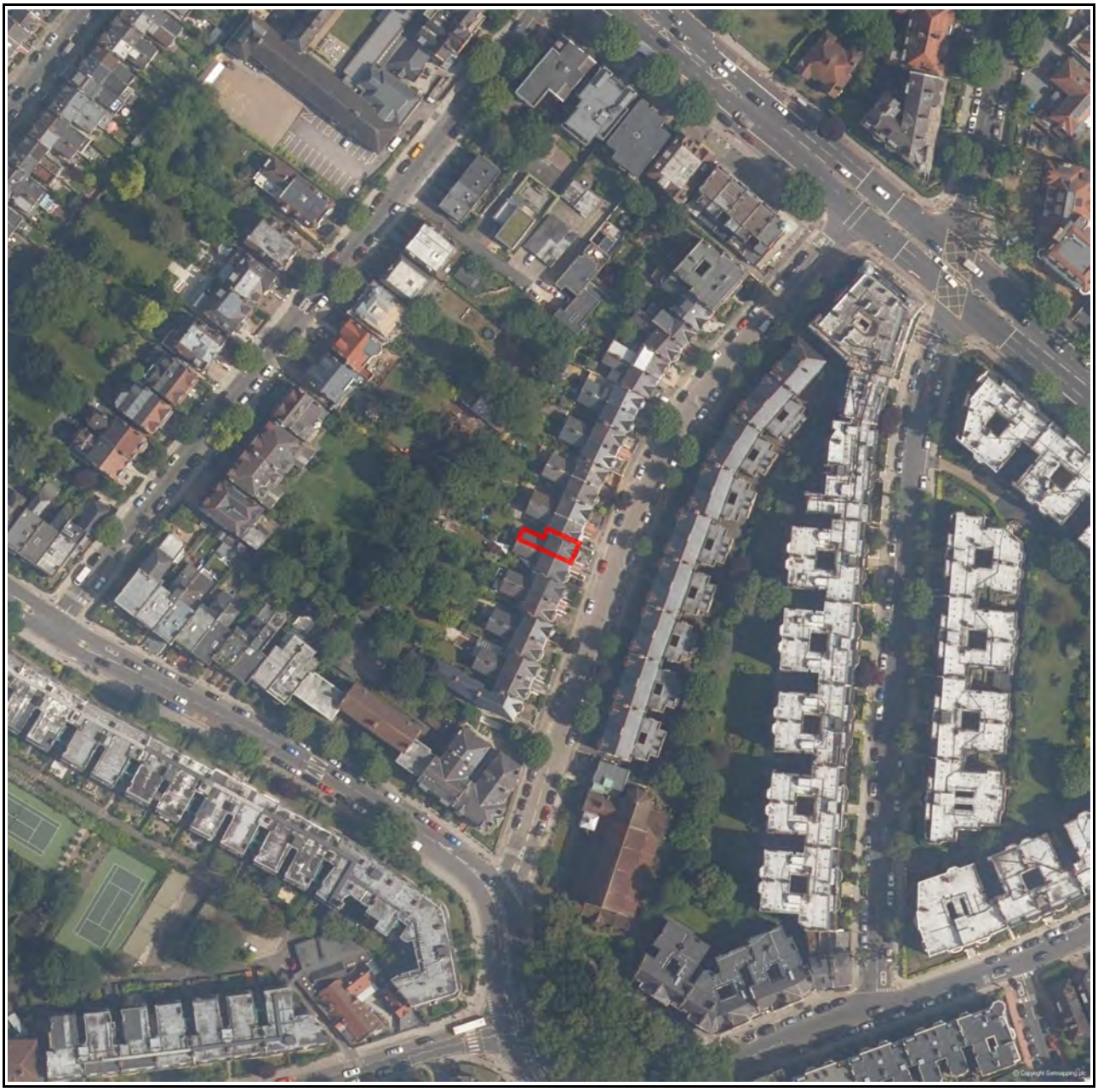
Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Enviro Insight

Address:	**15, LYNCROFT GARDENS, LONDON, NW6 1LB**
Date:	**19 Oct 2019**
Reference:	**HMD-6410190**
Client:	**Maund Geo- Consulting Ltd**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	12-Aug-2016
Grid Reference:	525391,185395
Site Size:	0.0087ha

Report Reference: HMD-6410190
Client Reference: MGC_19-29

Contents Page

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	8	13
1.2 Additional Information – Historical Tank Database	0	0	1	4
1.3 Additional Information – Historical Energy Features Database	0	4	18	27
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	27	20
1.6 Historical military sites	0	0	0	0
1.7 Potentially Infilled Land	0	0	3	30

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	8	5
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	0	1	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	0	0	0	0

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	1	14	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	2
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	None identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	None identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	None identified
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	4
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	0	1	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	No
6.10 Ordnance Survey MasterMap Water Network entries within 500m of the site	0	0	0	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	No	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Enviroment Agency Zone 2 floodplains within 250m of the study site	None identified
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low
7.4 Flood Defences within 250m of the study site	None identified
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified
7.6 Areas used for Flood Storage within 250m of the study site	None identified
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Not Prone
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	Not Applicable

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	1
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	2	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence	Moderate
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Moderate
9.1.2 Maximum Landslides hazard rating identified on the study site	Very Low
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Negligible
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Negligible
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Very Low
9.1.6 Maximum Running Sand hazard rating identified on the study site	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	None identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	None identified
10.3 Brine affected areas within 75m of the study site	None identified

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licences, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

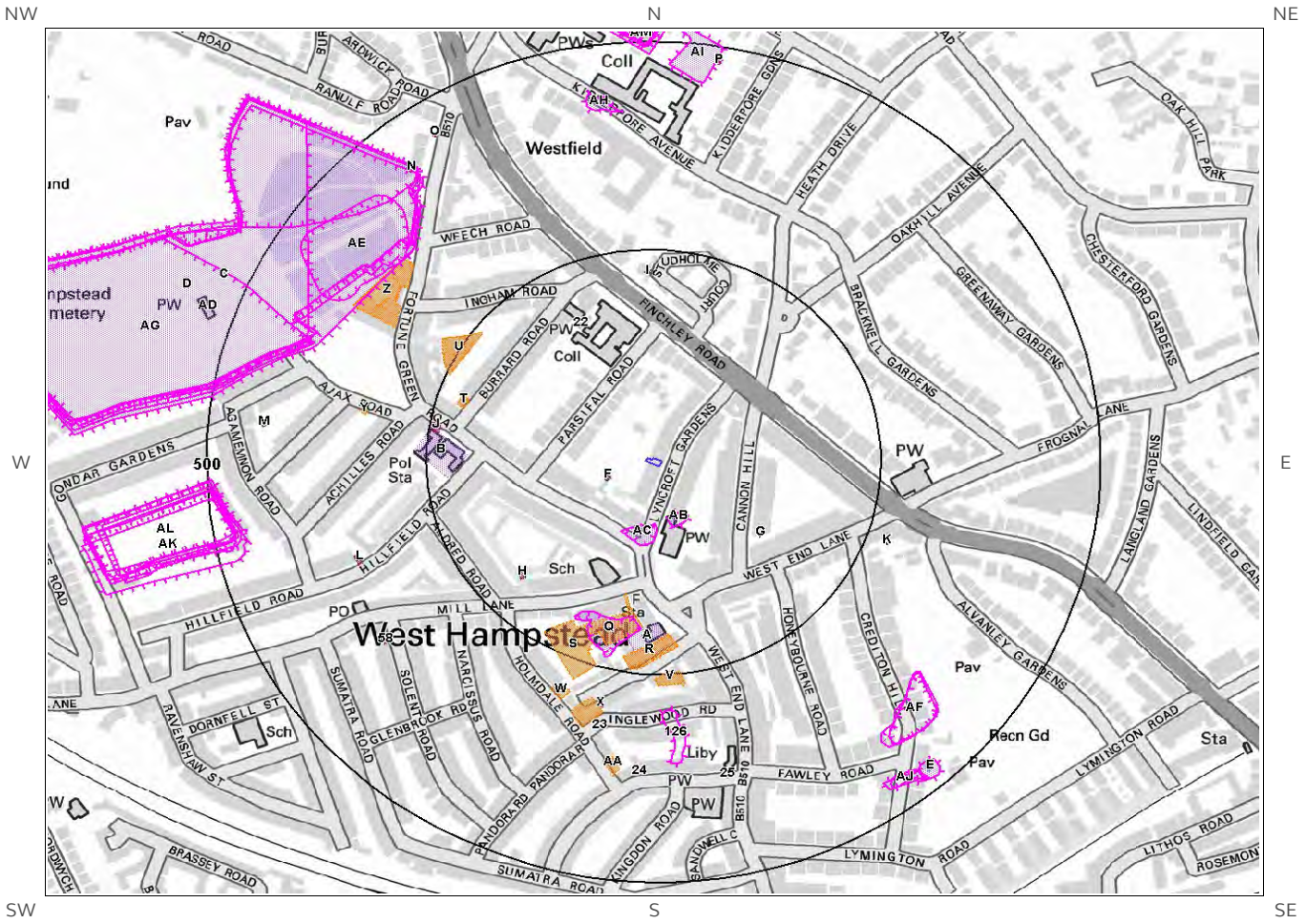
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



Historical 1:10,000 and 1:10,560 scale mapping

Site Outline

Industrial Land Use

Potentially Infilled Land

250
500
Search Buffers (m)

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Historical military sites

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 21

ID	Distance [m]	Direction	Use	Date
1AB	58	S	Gravel Pit	1873
2AC	69	S	Gravel Pits	1873
3Q	183	S	Gravel Pit	1873
4A	187	S	Fire Station	1974
5A	187	S	Fire Station	1996
6A	187	S	Fire Station	1965
7B	203	W	Police Station	1974
8B	203	W	Police Station	1996
9C	365	NW	Cemetery	1920
10AD	365	NW	Cemetery	1911
11AE	366	NW	Cemetery	1949
12C	371	NW	Cemetery	1938
13C	372	NW	Cemetery	1938
14AG	404	W	Cemetery	1894
15D	411	W	Cemetery	1949
16D	411	W	Cemetery	1966
17D	411	W	Cemetery	1976
18D	411	W	Cemetery	1993
19AH	418	N	Gravel Pit	1873
20AI	455	N	Unspecified Ground Workings	1938
21E	466	SE	Unspecified Heap	1894

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 5

ID	Distance (m)	Direction	Use	Date
22	173	NW	Unspecified Tank	1971
23	319	S	Unspecified Tank	1871

24	368	S	Unspecified Tank	1871
25	379	S	Unspecified Tank	1871
26E	474	SE	Unspecified Tank	1871

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 49

ID	Distance (m)	Direction	Use	Date
27F	45	SW	Electricity Substation	1973
28F	45	SW	Electricity Substation	1991
29F	46	SW	Electricity Substation	1992
30F	46	SW	Electricity Substation	1994
31G	140	SE	Electricity Substation	1995
32G	140	SE	Electricity Substation	1991
33G	140	SE	Electricity Substation	1979
34G	140	SE	Electricity Substation	1971
35H	191	SW	Electricity Substation	1991
36H	192	SW	Electricity Substation	1953
37H	192	SW	Electricity Substation	1953
38H	192	SW	Electricity Substation	1953
39H	192	SW	Electricity Substation	1973
40H	192	SW	Electricity Substation	1994
41H	192	SW	Electricity Substation	1992
42I	220	N	Electricity Substation	1994
43I	221	N	Electricity Substation	1991
44I	224	N	Electricity Substation	1979
45J	237	W	Electricity Substation	1991
46J	241	W	Electricity Substation	1992
47J	241	W	Electricity Substation	1994
48J	241	W	Electricity Substation	1973
49K	271	E	Electricity Substation	1995
50K	271	E	Electricity Substation	1971
51K	271	E	Electricity Substation	1979
52K	271	E	Electricity Substation	1991
53X	292	S	Electricity Substation	1973
54L	345	W	Electricity Substation	1973
55L	345	W	Electricity Substation	1992
56L	345	W	Electricity Substation	1994
57L	345	W	Electricity Substation	1991
58	365	SW	Electricity Substation	1973

59M	434	W	Electricity Substation	1953
60M	434	W	Electricity Substation	1991
61M	434	W	Electricity Substation	1991
62M	435	W	Electricity Substation	1974
63M	435	W	Electricity Substation	1953
64N	436	NW	Electricity Substation	1991
65N	437	NW	Electricity Substation	1994
66N	437	NW	Electricity Substation	1979
67N	437	NW	Electricity Substation	1971
68O	455	NW	Electricity Substation	1991
69O	455	NW	Electricity Substation	1994
70O	456	NW	Electricity Substation	1971
71O	456	NW	Electricity Substation	1979
72P	478	N	Electricity Substation	1991
73P	478	N	Electricity Substation	1979
74P	478	N	Electricity Substation	1971
75P	479	N	Electricity Substation	1994

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 47

ID	Distance (m)	Direction	Use	Date
76Q	157	S	Garage	1953
77Q	158	S	Garage	1953
78Q	158	S	Garage	1953
79R	201	S	Garage	1991
80R	201	S	Garage	1953
81R	201	S	Garage	1953
82R	201	S	Garage	1953
83R	201	S	Garage	1973
84R	202	S	Garage	1992

85R	202	S	Garage	1994
86S	209	SW	Post Office Garage	1953
87S	209	SW	Post Office Garage	1953
88S	209	SW	Post Office Garage	1953
89T	213	W	Garages	1953
90T	214	W	Garages	1953
91T	214	W	Garages	1953
92U	240	NW	Garage	1953
93U	240	NW	Garage	1953
94U	240	NW	Garage	1971
95U	240	NW	Garage	1953
96U	240	NW	Garage	1979
97U	240	NW	Garage	1962
98U	240	NW	Garage	1994
99U	242	NW	Garage	1991
100V	245	S	Garages	1953
101V	245	S	Garages	1953
102V	246	S	Garages	1953
103W	284	S	Garages	1953
104W	284	S	Garages	1953
105W	285	S	Garages	1953
106X	287	S	Garages	1953
107X	287	S	Garages	1953
108X	288	S	Garages	1953
109Y	322	W	Garages	1953
110Y	322	W	Garages	1953
111Y	322	W	Garages	1953
112Z	327	NW	Garage	1971
113Z	327	NW	Garage	1953
114Z	327	NW	Garage	1979
115Z	327	NW	Garage	1962
116Z	327	NW	Garage	1994
117Z	342	NW	Garage	1953
118Z	342	NW	Garage	1953
119Z	343	NW	Garage	1991
120AA	351	S	Garages	1953
121AA	351	S	Garages	1953
122AA	353	S	Garages	1953

1.6 Historical military sites

Certain military installations were not noted on historic mapping for security reasons. Whilst not all military land is necessarily of concern, Groundsure has researched and digitised a number of Ordnance Factories and other military industrial features (e.g. Ordnance Depots, Munitions Testing Grounds) which may be of contaminative concern. This research was drawn from a number of different sources, and should not be regarded as a definitive or exhaustive database of potentially contaminative military installations. The boundaries of sites within this database have been estimated from the best evidence available to Groundsure at the time of compilation.

Records of historical military sites within 500m of the search boundary: 0

Database searched and no data found.

1.7 Potentially Infilled Land

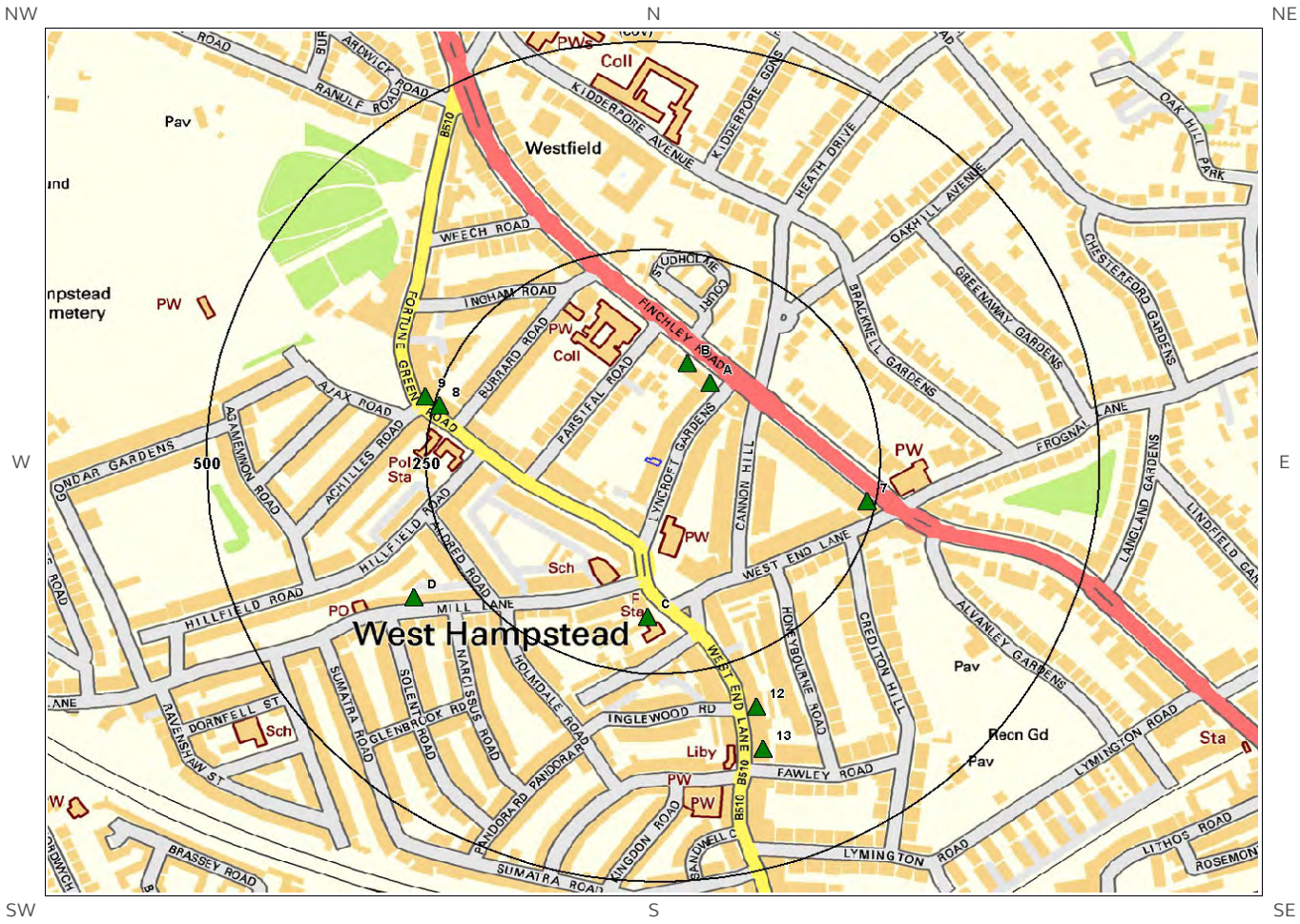
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 33

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
123AB	58	S	Gravel Pit	1873
124AC	69	S	Gravel Pits	1873
125Q	183	S	Gravel Pit	1873
126	293	S	Pond	1866
127C	365	NW	Cemetery	1920
128AD	365	NW	Cemetery	1911
129AE	366	NW	Cemetery	1949
130C	371	NW	Cemetery	1938
131C	372	NW	Cemetery	1938
132AF	381	SE	Pond	1866
133AF	384	SE	Pond	1894
134AG	404	W	Cemetery	1894
135D	411	W	Cemetery	1949
136D	411	W	Cemetery	1993
137D	411	W	Cemetery	1976
138D	411	W	Cemetery	1966
139AH	418	N	Gravel Pit	1873
140AI	455	N	Unspecified Ground Workings	1938
141AJ	458	SE	Pond	1894
142AJ	459	SE	Pond	1866
143AK	463	W	Reservoir	1911
144AJ	466	SE	Unspecified Heap	1894
145AL	466	W	Reservoir	1938
146AK	472	W	Covered Reservoir	1894
147AL	475	W	Reservoir	1938
148AL	476	W	Covered Reservoir	1993

149AL	476	W	Covered Reservoir	1976
150AK	476	W	Reservoir	1920
151AL	478	W	Reservoir	1949
152AM	485	N	Reservoir	1920
153AM	493	N	Reservoir	1938
154AM	494	N	Reservoir	1938
155AM	495	N	Reservoir	1949

2. Environmental Permits, Incidents and Registers Map



- Site Outline
- Search Buffers (m) — 250 — 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

13

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1A	108	NE	525457 185487	Address: Cottontail Cleaners, 509 Finchley Road, Hamstead, NW3 7BB Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
2A	108	NE	525457 185487	Address: Cottontail Cleaners, 509 Finchley Road, NW3 7BB Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: Enforcement Notified Date of Enforcement: 19/01/2009 Comment: Non - payment of the annual subsistence fee.
3B	118	N	525431 185510	Address: The London Dry Cleaning Company, 519A Finchley Road, NW3 7BB Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
4B	118	N	525431 185510	Address: The London Dry Cleaning Company, 519A Finchley Road, NW3 7BB Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
5C	184	S	525386 185205	Address: Sparkle Dry Cleaning , 329 West End Lane, NW6 1RS Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
6C	184	S	525386 185205	Address: Sparkle Dry Cleaning, 329 West End Lane, NW6 1RS Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
7	240	E	525636 185344	Address: J D Dry Cleaners, 469 Finchley Road, NW3 6HP Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
8	243	W	525149 185460	Address: Texaco 63 Fortune Green, London, NW6 1DR Process: Unloading of Petrol into Storage at Service Stations Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
9	262	W	525133 185471	Address: D&D Dry Cleaners, 68 Fortune Green Rd, NW6 1DS Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
10D	312	SW	525120 185229	Address: Cotton Club Dry Cleaners, 57 Mill Lane, NW6 1NB Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

ID	Distance (m)	Direction	NGR	Details	
11D	312	SW	525120 185229	Address: Cotton Club Dry Cleaners, 57 Mill Lane, NW6 1NB Process: Dry Cleaning Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
12	312	S	525510 185097	Address: Shamrock Express Cleaners, 210 West End Lane, NW6 1UU Process: Dry Cleaning Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
13	362	S	525518 185047	Address: Shamrock, 210 West End Lane, NW6 1UU Process: Dry Cleaning Status: Revoked Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

0

Database searched and no data found.

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

0

Database searched and no data found.

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

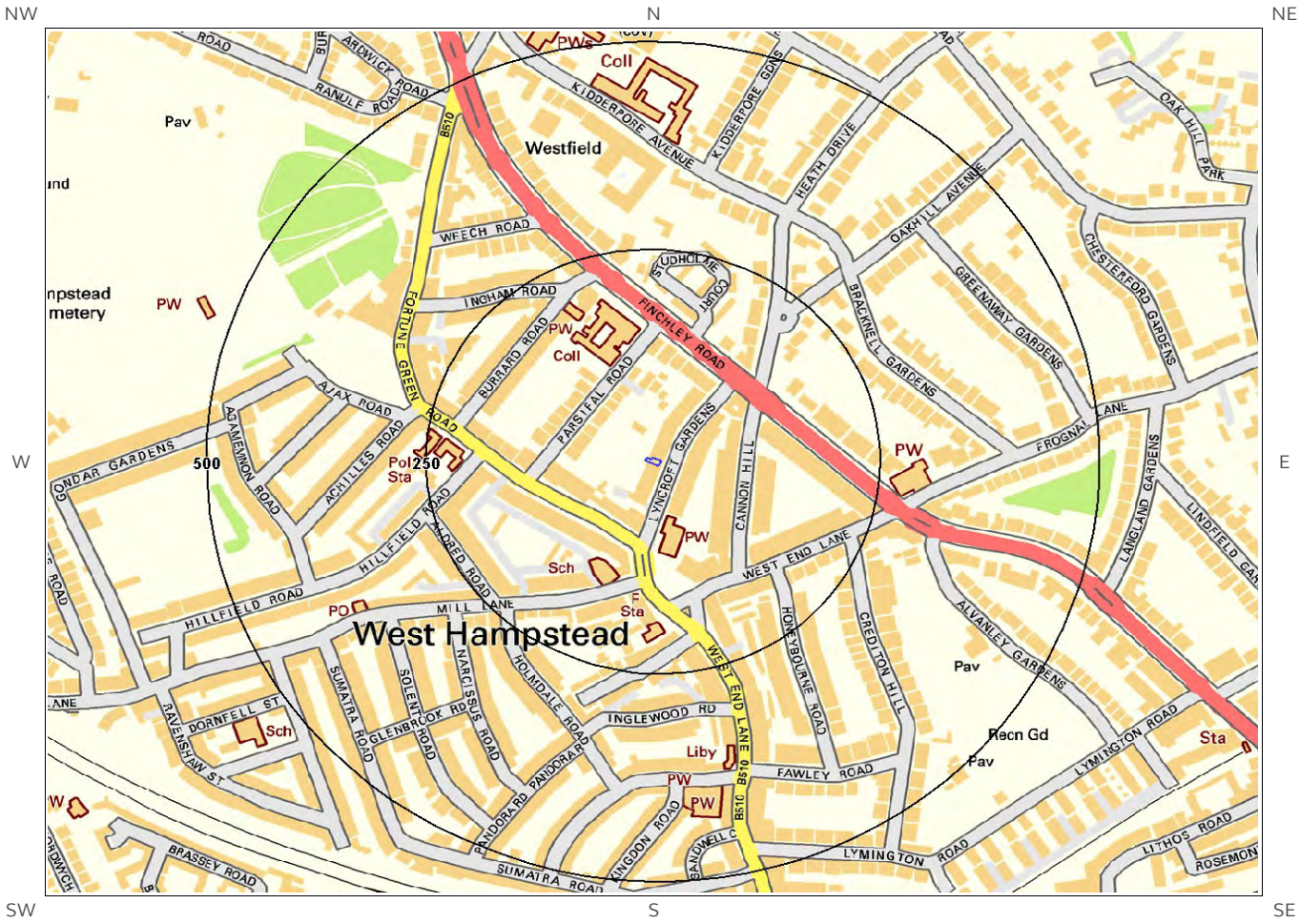
Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

Records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site 0

Database searched and no data found.

3. Landfill and Other Waste Sites Map



Site Outline

250
500
Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

1

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	857	SE		Site Address: Canfield Place, London NW6 Waste Licence: - Site Reference: DON009 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

0

Database searched and no data found.

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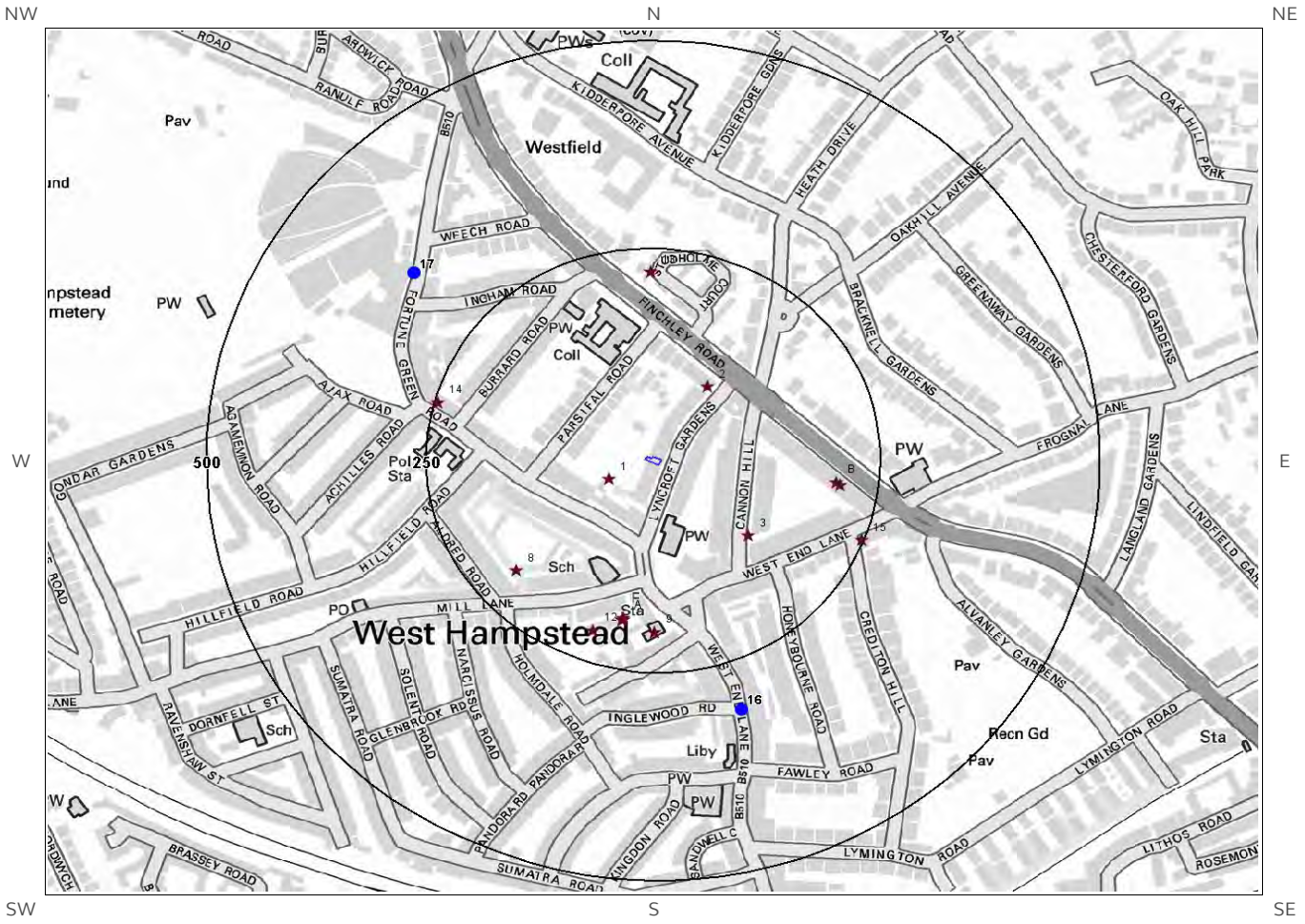
4. Current Land Use Map



Site Outline

Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 15

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	48	SW	Electricity Sub Station	525342 185373	Greater London, NW6	Electrical Features	Infrastructure and Facilities
2	103	NE	Curtains & Blinds	525454 185483	509, Finchley Road, Hampstead, London, Greater London, NW3 7BB	Curtains and Blinds	Consumer Products
3	132	SE	Electricity Sub Station	525501 185305	Greater London, NW6	Electrical Features	Infrastructure and Facilities
4A	188	S	First Aid Wheels	525358 185206	174, Mill Lane, West Hampstead, London, Greater London, NW6 1TB	Vehicle Repair, Testing and Servicing	Repair and Servicing
5A	190	S	Mac Daddy I T Ltd	525357 185204	West Heath Yard 174, Mill Lane, London, Greater London, NW6 1TB	Electrical Equipment Repair and Servicing	Repair and Servicing
6A	190	S	Woodstock Motors	525357 185204	West Heath Yard 174, Mill Lane, London, Greater London, NW6 1TB	Vehicle Repair, Testing and Servicing	Repair and Servicing
7A	190	S	First Aid Wheels	525358 185204	West Heath Yard, 174 Mill Lane, London, Greater London, NW6 1TB	Special Purpose Machinery and Equipment	Industrial Products
8	199	SW	Electricity Sub Station	525236 185263	Greater London, NW6	Electrical Features	Infrastructure and Facilities
9	200	S	West Hampstead Fire Station	525394 185189	West Hampstead Fire Station 325, West End Lane, London, Greater London, NW6 1RR	Fire Brigade Stations	Central and Local Government
10B	201	E	Stone of London	525601 185368	485, Finchley Road, London, Greater London, NW3 6HS	Stone Quarrying and Preparation	Extractive Industries
11B	206	E	Chessams Upholsterers	525605 185365	483a, Finchley Road, London, Greater London, NW3 6HS	Furniture	Consumer Products
12	212	S	Works	525324 185191	Greater London, NW6	Unspecified Works Or Factories	Industrial Features
13	223	N	Electricity Sub Station	525389 185622	Greater London, NW3	Electrical Features	Infrastructure and Facilities
14	246	W	Cromwell Security & Fire Services Ltd	525147 185465	64, Fortune Green Road, London, Greater London, NW6 1DT	Electronic Equipment	Industrial Products
15	248	SE	Carmel Garage	525630 185299	322, West End Lane, London, Greater London, NW6 1LN	Vehicle Repair, Testing and Servicing	Repair and Servicing

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 2

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
16	308	S	525493 185095	OBSOLETE	West End Lane, London, Inner London, NW6 1XF	Not Applicable	Obsolete
17	345	NW	525120 185620	TEXACO	63-65, Fortune Green Road, Fortune Green, London, Inner London, NW6 1DR	Not Applicable	Obsolete

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.3 Bedrock and Solid Geology

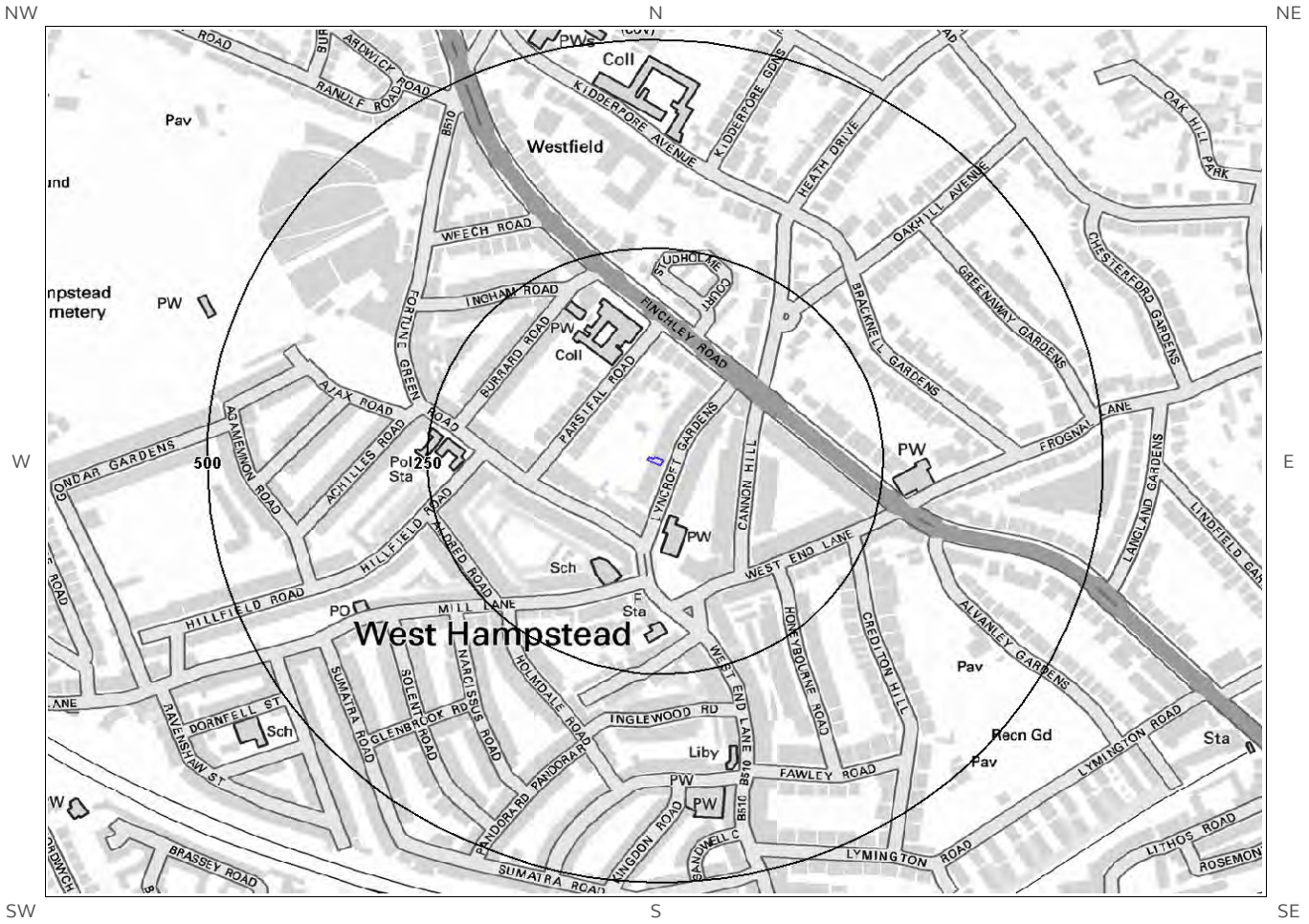
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
LC-XCZS	LONDON CLAY FORMATION	CLAY, SILT AND SAND

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



Site Outline

250 — 500 — Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

6b. Aquifer Within Bedrock Geology and Abstraction Licences

Site Outline

250 — 500 — Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

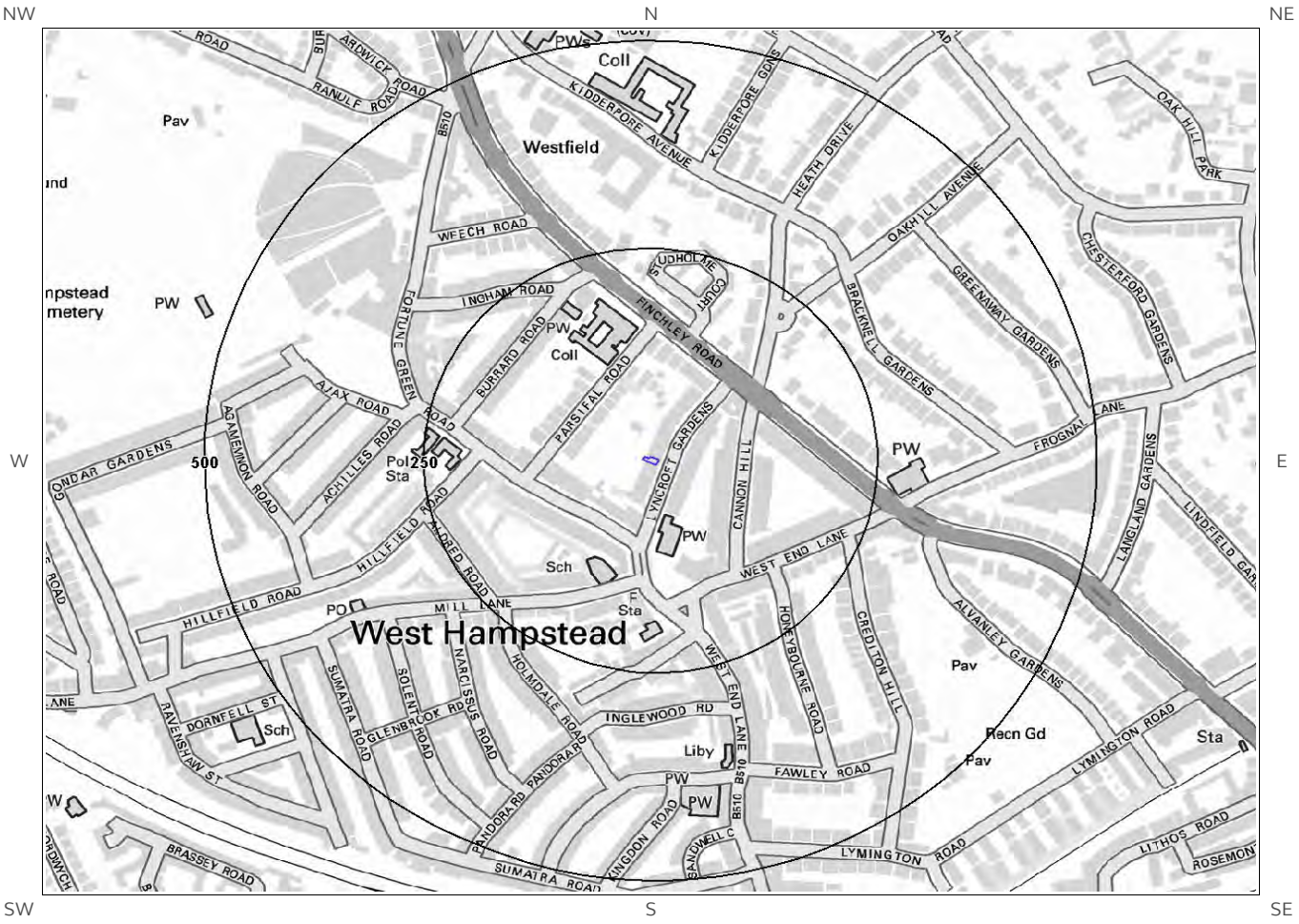
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licences



Site Outline

250 — 500 — Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

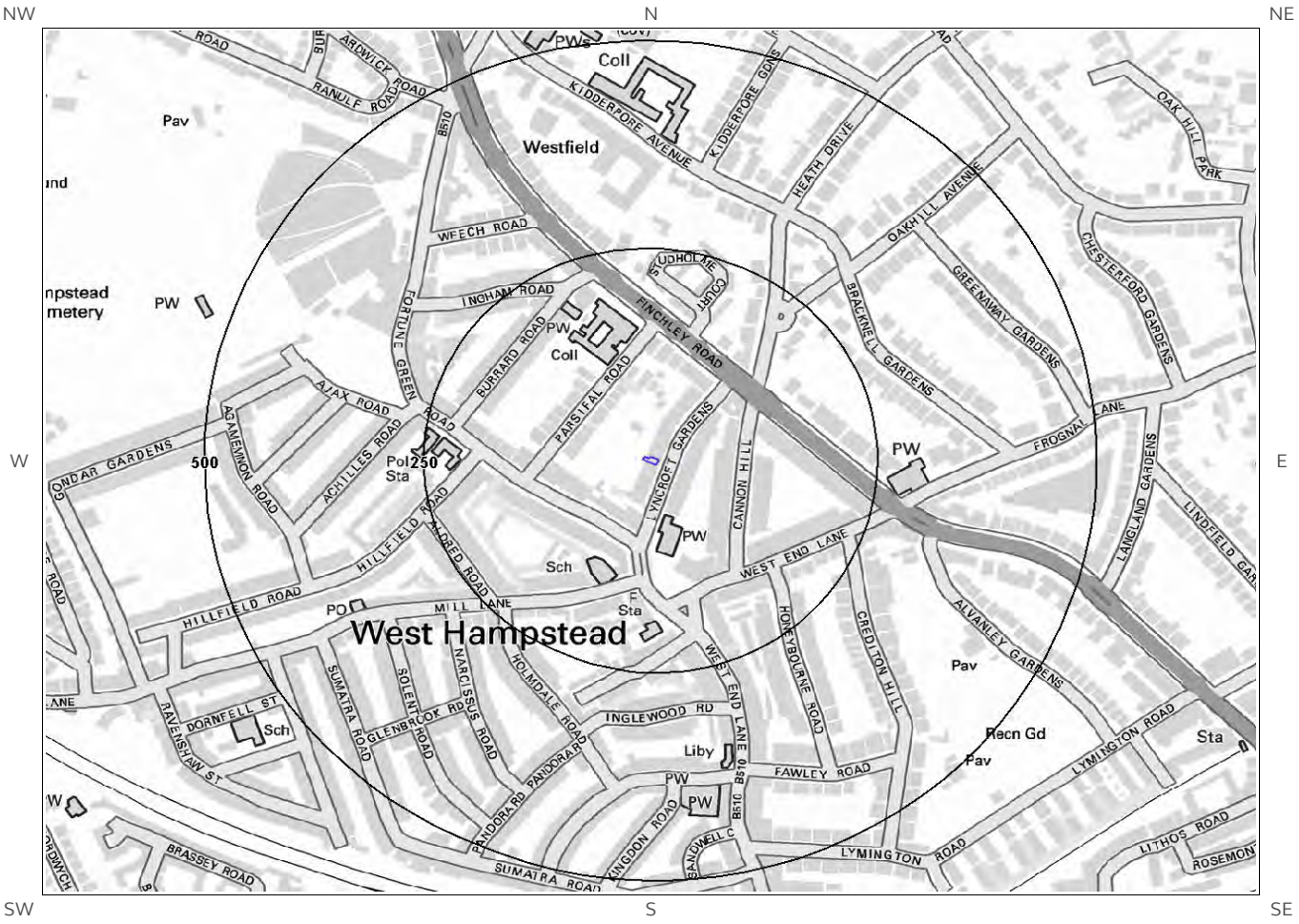
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

6d. Hydrogeology – Source Protection Zones within confined aquifer



Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Site Outline

250 500 Search Buffers (m)

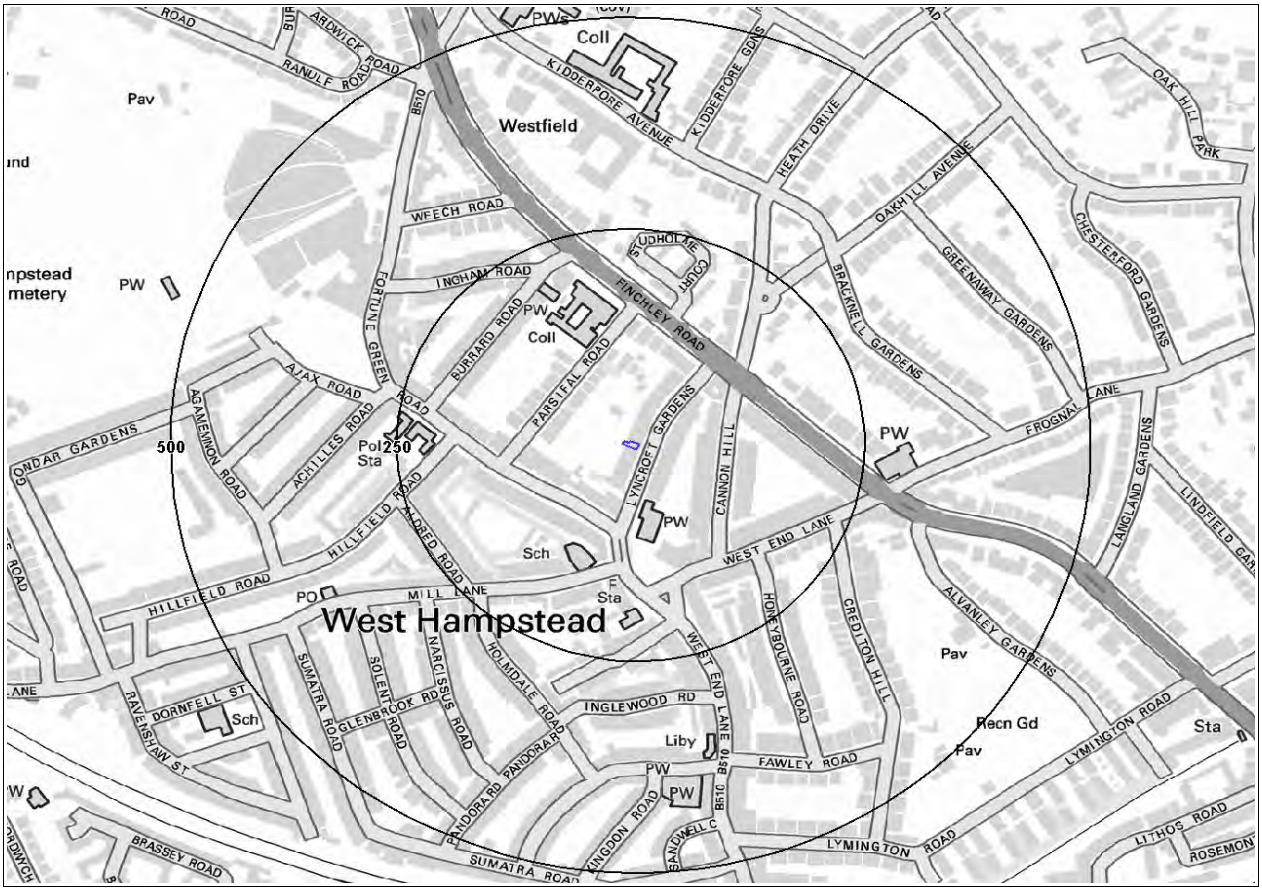
Potable Water Abstraction Licence

6e. Hydrology – Watercourse Network and River Quality

NW N NE

W E

SW S SE



Site Outline

250 Search Buffers (m)
500

Watercourse type

- Tidal River
- Inland River
- Canal
- Lock or Flight of Locks
- Lake, Reservoir, or Marsh
- Foreshore
- Drain or Transfer

Watercourse level

- On ground surface
- Underground or Elevated
- Level unknown

- General Quality Assessment: Biology
- General Quality Assessment: Chemistry

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property No

Database searched and no data found.

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

6.2 Aquifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
2	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
1	298	N	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
3	384	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
4	389	S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site — Identified

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1760	SE	526750 184261	Status: Active Licence No: TH/039/0039/087 Details: Spray Irrigation - Direct Direct Source: THAMES GROUNDWATER Point: SWISS COTTAGE OPEN SPACE-BOREHOLE Data Type: Point Name: LONDON BOROUGH OF CAMDEN	Annual Volume (m^3): 10,512 Max Daily Volume (m^3): 29 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 05/12/2013 Version End Date:
Not shown	1760	SE	526750 184261	Status: Active Licence No: TH/039/0039/087 Details: Lake & Pond Throughflow Direct Source: THAMES GROUNDWATER Point: SWISS COTTAGE OPEN SPACE-BOREHOLE Data Type: Point Name: LONDON BOROUGH OF CAMDEN	Annual Volume (m^3): 10,512 Max Daily Volume (m^3): 29 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 05/12/2013 Version End Date:
Not shown	1760	SE	526750 184261	Status: Active Licence No: TH/039/0039/087 Details: General Washing/Process Washing Direct Source: THAMES GROUNDWATER Point: SWISS COTTAGE OPEN SPACE-BOREHOLE Data Type: Point Name: LONDON BOROUGH OF CAMDEN	Annual Volume (m^3): 10,512 Max Daily Volume (m^3): 29 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 05/12/2013 Version End Date:
Not shown	1787	SE	526800 184280	Status: Historical Licence No: 28/39/39/0219 Details: Spray Irrigation - Direct Direct Source: THAMES GROUNDWATER Point: SWISS COTTAGE OPEN SPACE-BOREHOLE Data Type: Point Name: LONDON BOROUGH OF CAMDEN	Annual Volume (m^3): 10,512 Max Daily Volume (m^3): 29 Original Application No: - Original Start Date: Expiry Date: Issue No: Version Start Date: 01/04/2008 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site — None identified

Database searched and no data found.

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site — None identified

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site — None identified

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site — Identified

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
284	NE	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site — None identified

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Ordnance Survey MasterMap Water Network

Ordnance Survey MasterMap Water Network entries within 500m of the study site

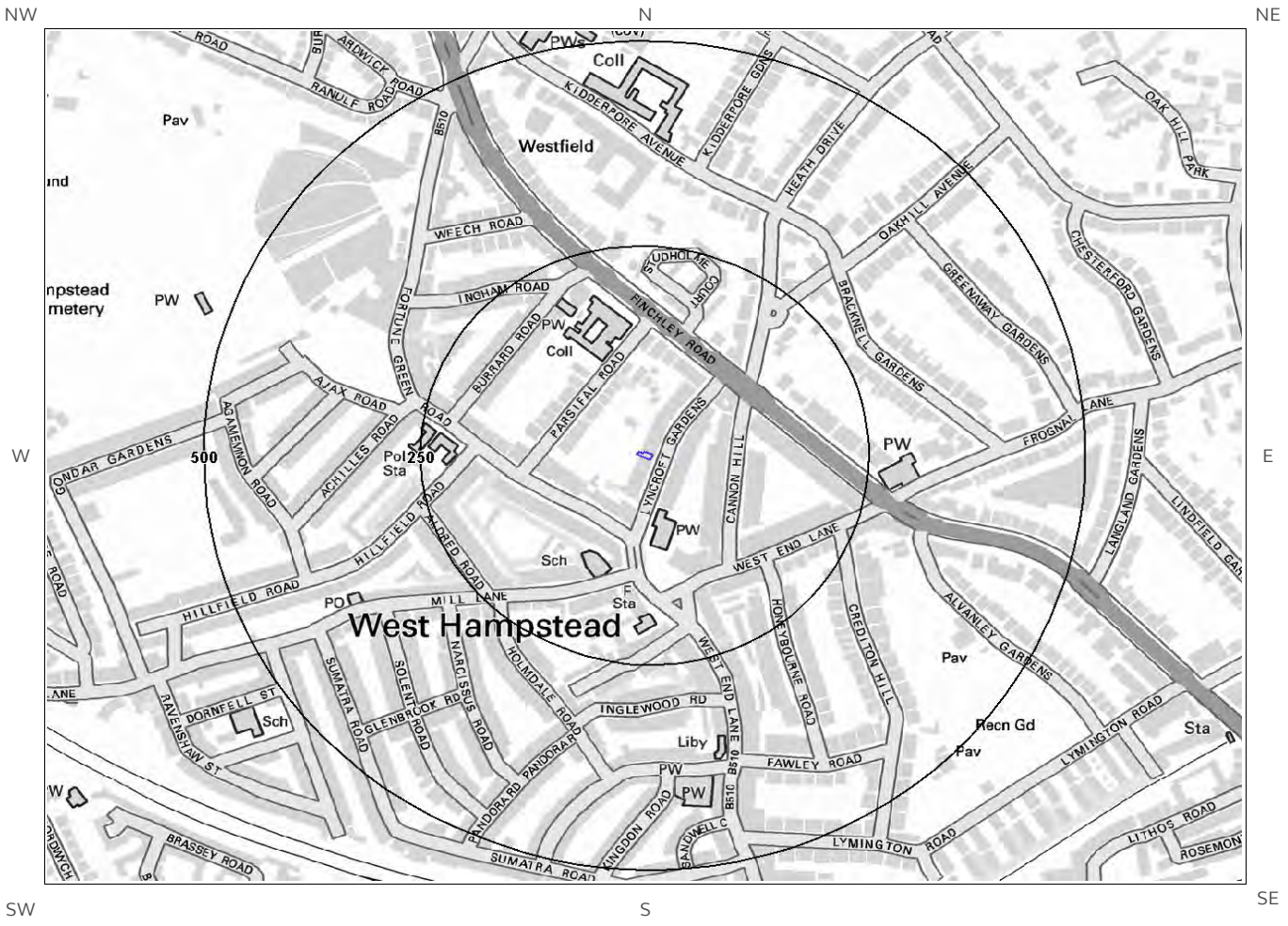
Database searched and no data found.

6.11 Surface Water Features

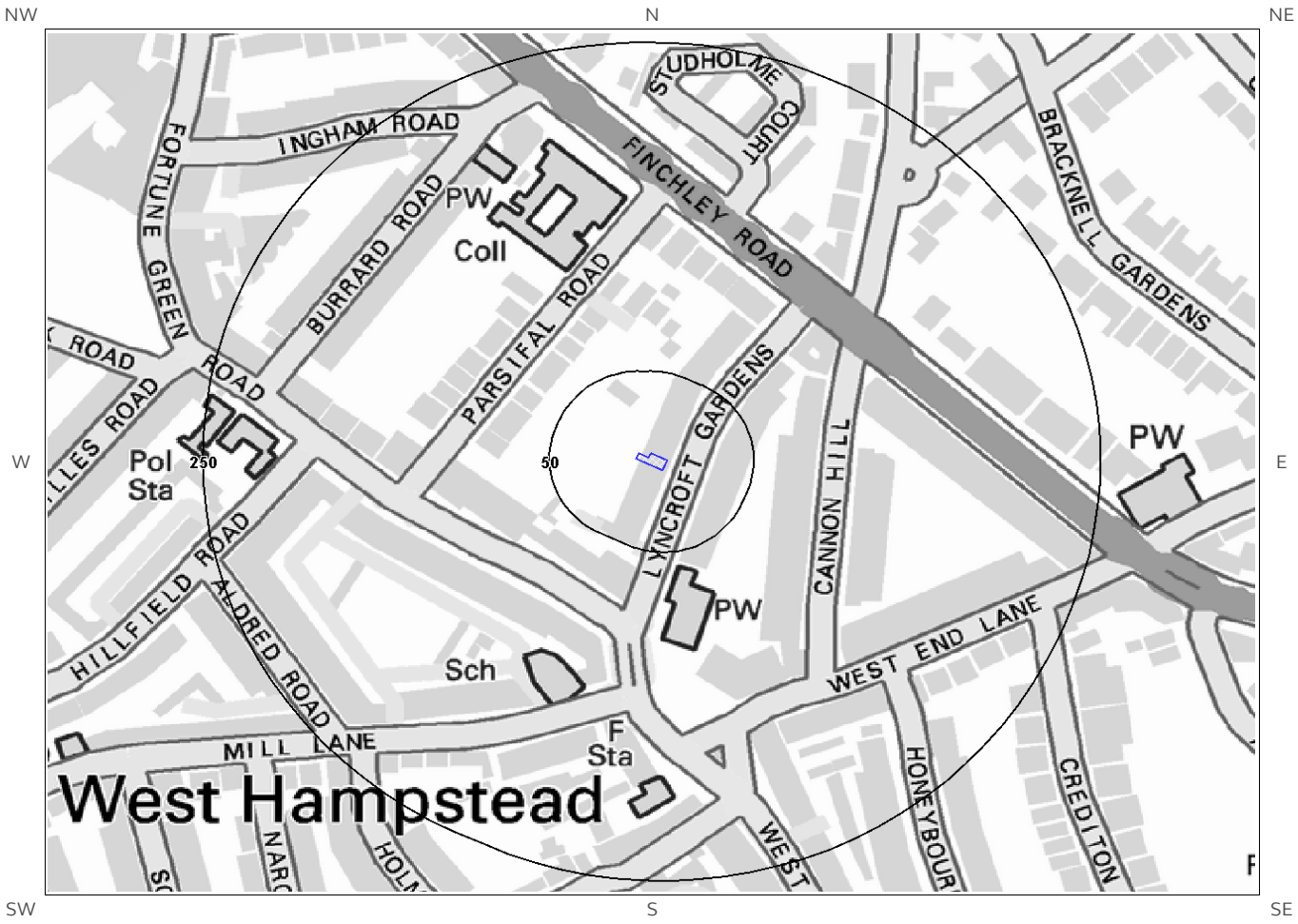
Surface water features within 250m of the study site — None identified

Database searched and no data found.

7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

Very Low

Low

Medium

High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m — None identified

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m — None identified

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

Highest risk of flooding onsite — Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Flood Defences within 250m of the study site — None identified

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site — None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site — None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site — None identified

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Not Prone

The area is not considered to be prone to groundwater flooding based on rock type.

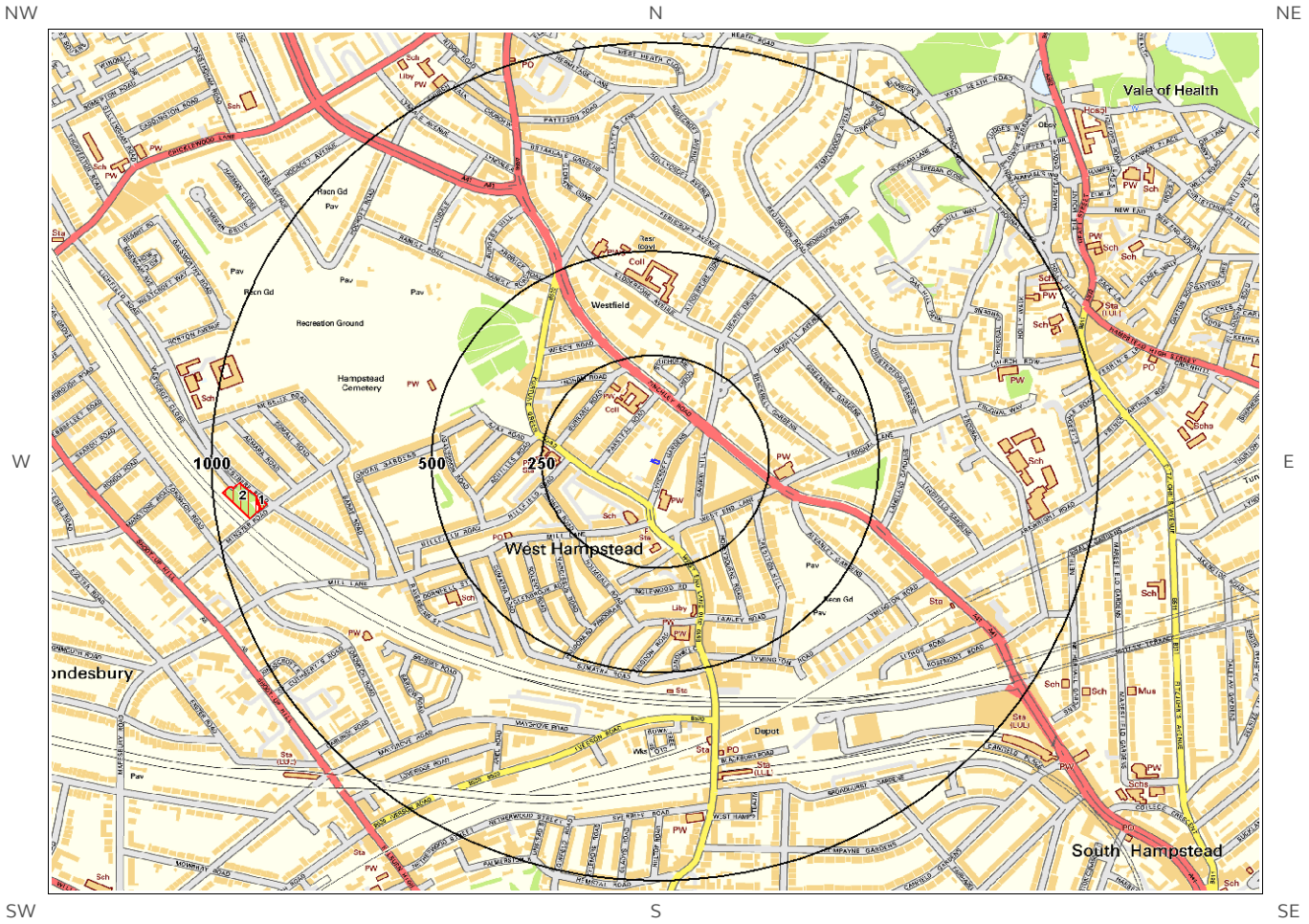
7.8 Groundwater Flooding Confidence Areas

British Geological Survey confidence rating in this result — Not Applicable

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



Site Outline

100
250
Search Buffers (m)

AONB
National Park
SSSI
Special Protection Areas
Nitrate Vulnerable Zones
Green Belt
Environmentally Sensitive Areas
Special Areas of Conservation
World Heritage Sites
Nitrate Sensitive Areas
Ancient Woodland
National Nature Reserve
Local Nature Reserves
Ramsar Sites

8. Designated Environmentally Sensitive Sites

Designated Environmentally Sensitive Sites within 2000m of the study site	Identified

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

1

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1481	NE	BISHOPS WOOD	Ancient & Semi-Natural Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

2

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
1	880	W	Westbere Copse	Natural England
2	899	W	Westbere Copse	Natural England

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure Geo Insight, available from our website. The following information has been found:

9.1.1 Shrink Swell

Maximum Shrink-Swell* hazard rating identified on the study site — Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly high plasticity. Do not plant or remove trees or shrubs near to buildings without expert advice about their effect and management. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a probable increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a probable increase in insurance risk during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

Maximum Soluble Rocks* hazard rating identified on the study site — Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site — Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

Maximum Collapsible Rocks* hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

Maximum Running Sand*[*] hazard rating identified on the study site — Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* This indicates an automatically generated 50m buffer and site.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The site is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site — None identified

Database searched and no data found.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary — None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site — None identified
Guidance: No Guidance Required.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 506 506
Web: **www.environment-agency.gov.uk**
Email: enquiries@environment-agency.gov.uk

Public Health England
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: London Borough of Camden
Phone: 020 7974 4444
Web: http://www.camden.gov.uk/
Address: Camden Town Hall, Judd Street, London, WC1H 9JE

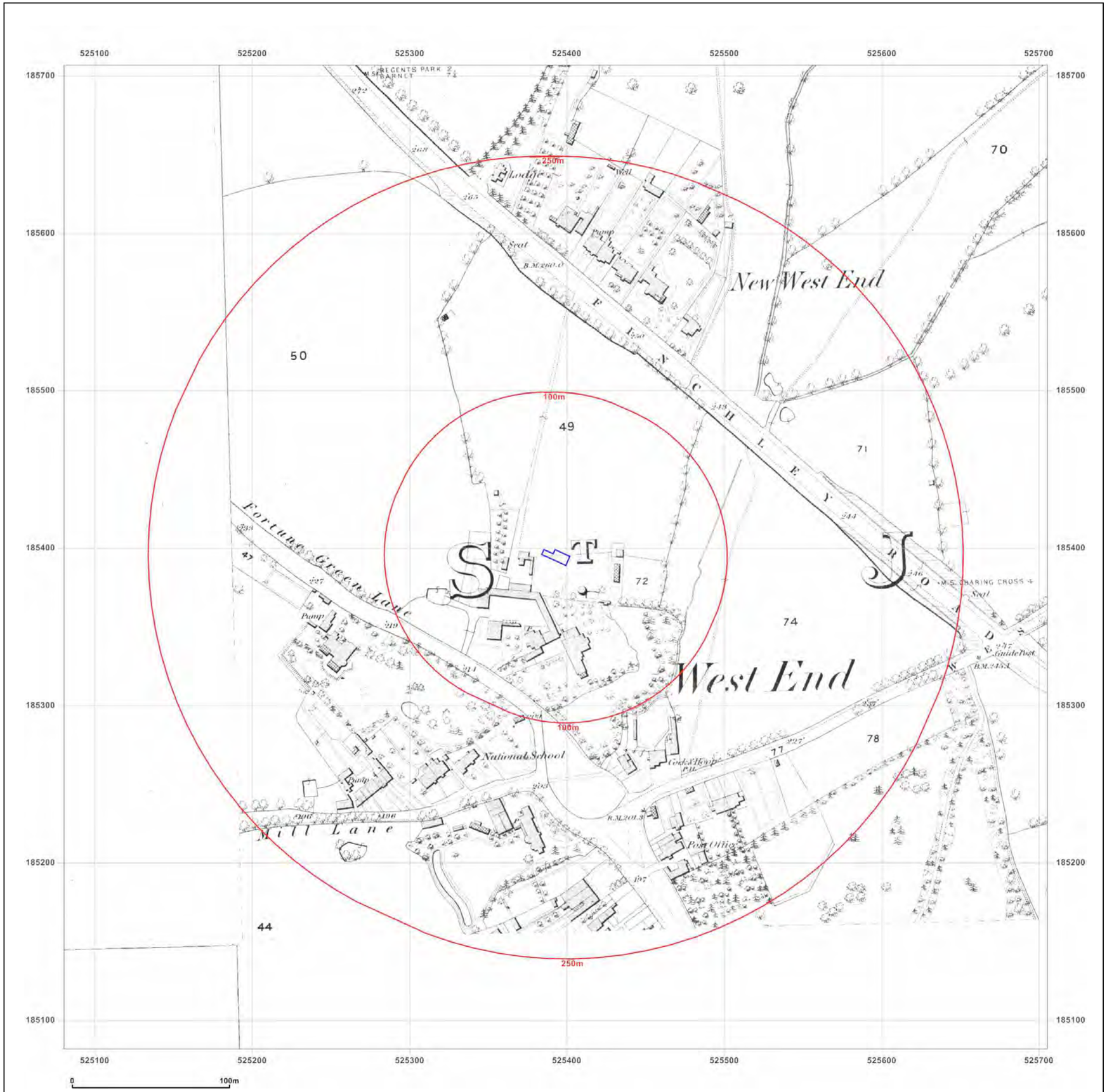
Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:

https://www.groundsure.com/terms-and-conditions-feb11-2019

Appendix C Historical Maps (Groundsure)



Groundsure INSIGHTS

Site Details:

15, LYNCROFT GARDENS,
LONDON, NW6 1LB

Client Ref: MGC_19-29
Report Ref: HMD-6410192
Grid Ref: 525393, 185394

Map Name: County Series

Map date: **1865-1870**

Scale: 1:2,500

Printed at: 1:2,500

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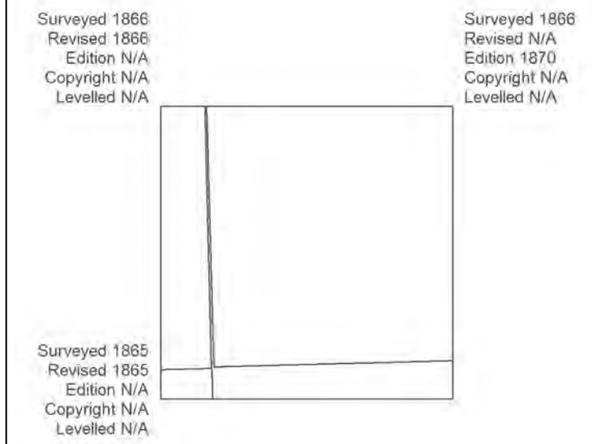
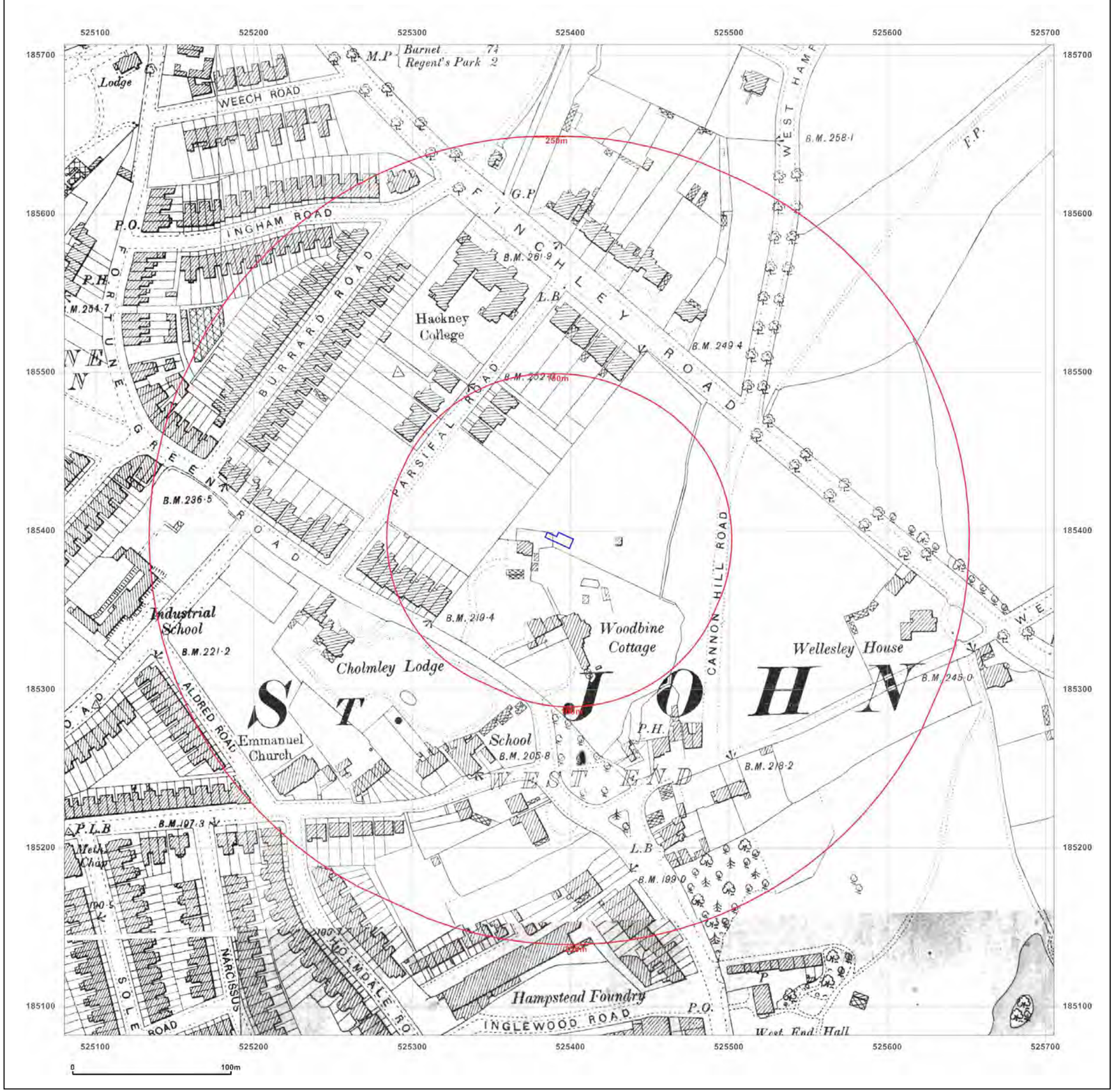


Powered by OS

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 19 October 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

15, LYNCROFT GARDENS,
LONDON, NW6 1LB

Client Ref: MGC_19-29
Report Ref: HMD-6410192
Grid Ref: 525393, 185394

Map Name: County Series

Map date: **1896**

Scale: 1:2,500

Printed at: 1:2,500

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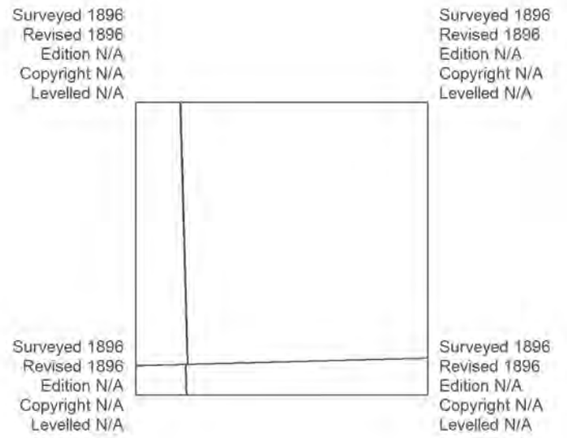

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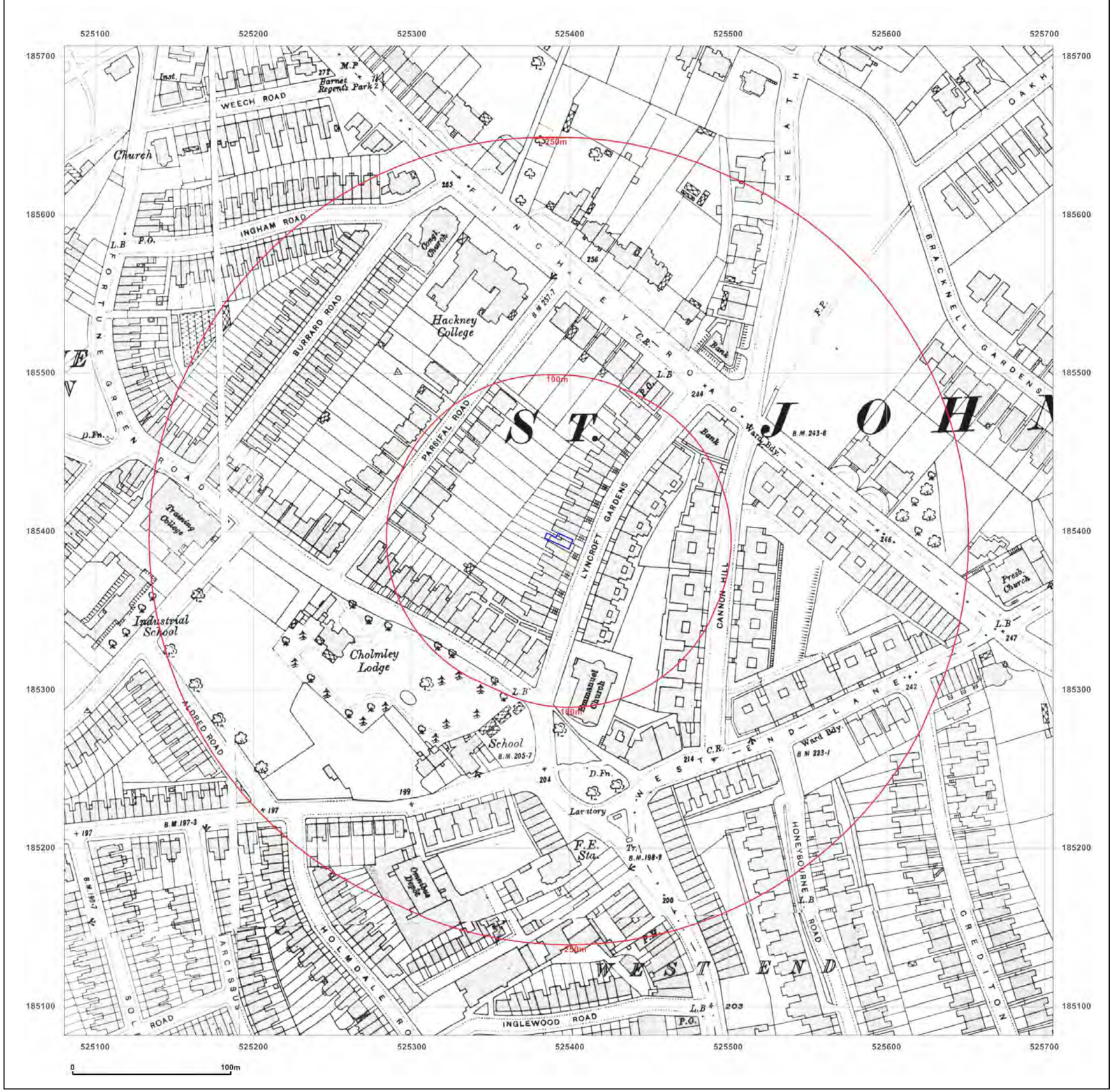
W: www.groundsure.com

Production date: 19 October 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

15, LYNCROFT GARDENS,
LONDON, NW6 1LB

Client Ref: MGC_19-29
Report Ref: HMD-6410192
Grid Ref: 525393, 185394

Map Name: County Series

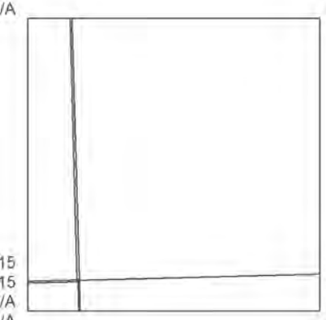
Map date: **1915**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1915
Revised 1915
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1915
Revised 1915
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1915
Revised 1915
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1915
Revised 1915
Edition N/A
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Levelled N/A

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W: www.groundsure.com

Production date: 19 October 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Groundsure INSIGHTS

Site Details:

15, LYNCROFT GARDENS,
LONDON, NW6 1LB

Client Ref: MGC_19-29
Report Ref: HMD-6410192
Grid Ref: 525393, 185394

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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Powered by

Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

Production date: 19 October 2019

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Appendix D Ground Investigation Report

Site Investigation

15 Lyncroft Gdns, London NW6 1LB

Geotechnical Factual Report

8 November 2019

MAUND GEO-CONSULTING

Produced for :

Richard Banks
15 Lyncroft Gardens
London NW6 1LB

Prepared by:

Julian Maund BSc PhD CEng MIMMM CGeol FGS
UK Registered Ground Engineering Adviser

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MGC-FR-19-29-V1

Report Title	Factual Report	**Site Address**	15 Lyncroft Gardens, London NW6 1LB
Work Stage	Site Investigation	**Report Date**	November 2019
Brief Description of the Report Contents	Factual report on a geotechnical site investigation undertaken in October 2019 as part of a Basement Impact Assessment for the London Borough of Camden		

Document Control Sheet

Project Title	Basement Impact Assessment
	15 Lyncroft Gardens NW6 1LB
Report Title	Ground Investigation Factual Report
Reference	MGC-FGR-19-29-V1
Revision	1
Status	Final
Control Date	8 November 2019

Record of Issue

Issue	Status	Date	Author	
A	Final	08/11/19	Julian Maund	

Distribution

Organisation	Contact	Copies	Date
	Richard Banks	1	08/11/19
Croft Structural Engineers	Philip Henry	1	08/11/19

Contents

1 Introduction

1.1 Terms of Reference

Maund Geo-Consulting Ltd (MGC) was instructed on 16 September 2019 by Croft Structural Engineers Ltd on behalf of Richard Banks to undertake a ground investigation at 15 Lyncroft Gardens to provide information on the ground conditions to support a Basement Impact Assessment to satisfy planning requirements for a basement extension.

1.2 Limitations

Notwithstanding anything to the contrary contained in the report, Maund Geo Consulting Limited (MGC) has exercised reasonable skill, care and diligence in the performance of the services required by Richard Banks and MGC shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence and this report shall be read and construed accordingly. Information provided by third parties has been used in good faith and is taken at face value; however, MGC cannot guarantee its accuracy or completeness. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths at the time of the investigation. At intermediate locations, conditions can only be inferred.

2 The Site

2.1 Location

The property is located at 15 Lyncroft Gardens NW6 1LB, National Grid Reference TQ253853, which is within the London Borough of Camden, shown in Figure 2.1

.

2.2 Geology

Information obtained from the British Geological Survey website viewer http://mapapps.bgs.ac.uk/geologyofbritain/home.html indicates that the site is located on The London Clay Formation.

3 Ground Investigation

3.1 General

A ground investigation was undertaken on 18 October 2019. The investigation was carried out by PM Sampling Ltd which comprised one borehole and two hand dug trial pits to expose party wall footings. The borehole was undertaken using a specialist Archway Trent rig suitable for areas of limited space. The sample was recovered in plastic tubular liners with 95+% recovery. The location of the exploratory holes is shown in Drawing MGC-19-29-001 in Appendix A. The exploratory hole records are also included in Appendix A

3.1 Service Clearance and survey

The borehole and trial pit locations were checked for service clearance by available drawings and an inspection pit for the borehole. The location of the borehole and trial pits was referenced to existing features.

3.2 Drilling depths

Borehole BH01 was drilled to 7.95 m. The trial pits were excavated to approximately 0.5 to 0.75 m depth.

3.3 Insitu Testing

Insitu Standard Penetration Tests were undertaken at regular intervals as shown on borehole records included in Appendix B.

3.4 Sampling

Disturbed samples were taken in the borehole from the split sampler at all SPT depths from the borehole. A bulk sample was taken from made ground in the borehole inspection pit.

3.5 Installation

A groundwater monitoring standpipe was installed in BH01 to a depth of 6 m. Details of the installation are included in the borehole records in Appendix B.

4 Laboratory Testing

4.1 General

Selected samples were sent to i2 Laboratories Ltd for geotechnical testing.

4.2 Geotechnical Testing on soil

The following tests were undertaken in accordance with BS1377:1990. The test results with methodologies are included in Appendix B.

Test type	No. of tests	Test Method
Moisture Content	5	BS1377:1990
Plasticity Index - 1 point Liquid Limit	5	BS1377:1990
pH, and water-soluble sulphate,	2	BRE SD1

5 Groundwater Monitoring

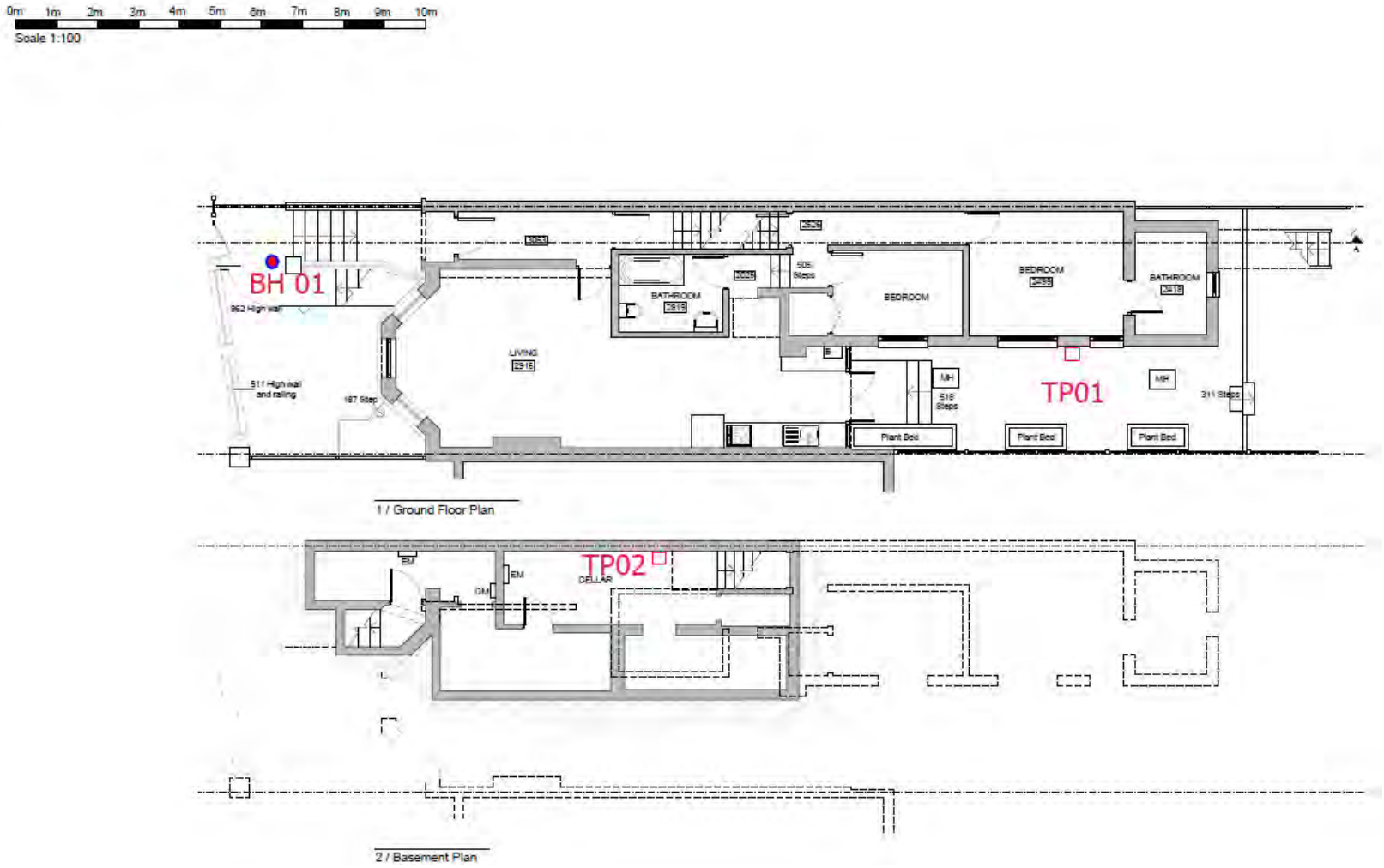
Groundwater levels in the borehole installation in BH01 was monitored while on site on 18/10/19 and then on 28/10/19 and 08/11/19. The results are provided in Table 5.1.

Table 5.1

Date of Monitoring	Groundwater (depth metres below ground level)
18/10/19	Dry
28/10/19	4.02
08/11/19	3.90

Appendix A

Exploratory Location Plan and Exploratory Hole Records



Client: **Richard Banks**	Date: **November 2019**	Project: **15 Lyncroft Gardens, NW6 1BL**
Title: **Exploratory Hole Location Plan**	**MAUND GEO-CONSULTING** **Julian Maund BSc PhD MIMMM CEng FGS** **Registered Ground Engineering Adviser**	Drawing Number: **MGC-19-29-001**

P D X Q G#J HR CFR Q VX OWLQ J

Mxddq#P dxqg#EVf#SkG#P IP P P #PHqj#JV#FJ hro
Uhjlwhuhg#Jurxqg#Hqjlqhhulqj#Dgylvhu#

Maund Geo-Consulting Ltd
3 Coopers Square
Chipping Norton
OX7 5DG
julian.maund@gmail.com

Borehole No.

BH01

Sheet 1 of 1

Project Name:	15 Lyncroft Gardens NW6 1LB	Project No:	19-29	Co -ords	525404, 185388
Location:	Bottom of front steps, 15 Lyncroft Gardens NW6 1LB			Level: (m AOD)	70.00 (Approx.)
Client:	Richard Banks			Date Drilled: 18/10/19	

Hole Type: PM Trent lined

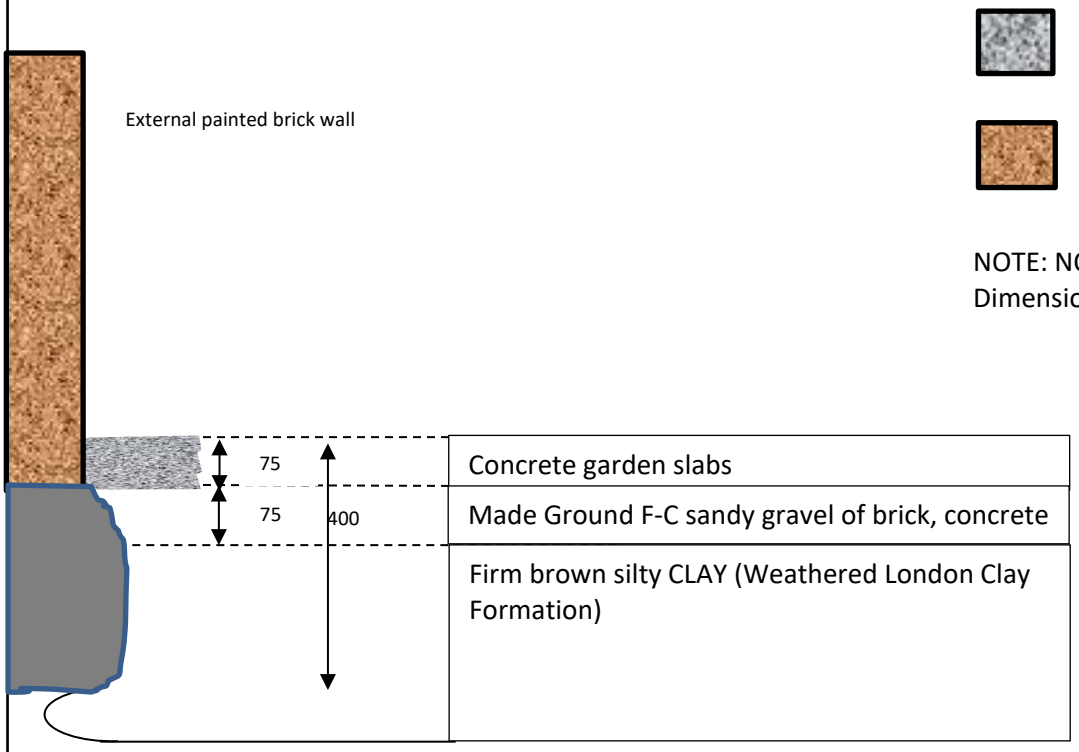
Hole Diameter: 100 mm

Logged By: JGM

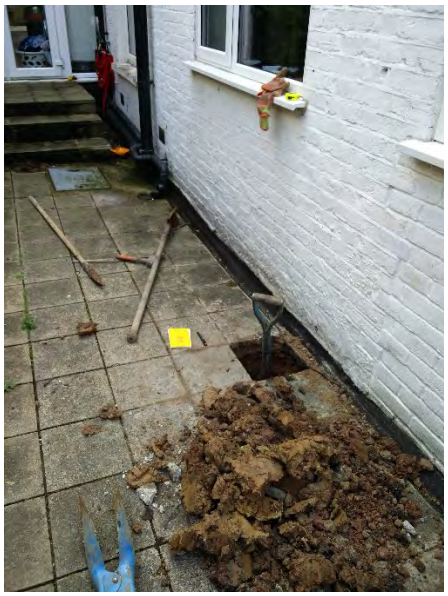
Well	Water Strikes	Sampling and Insitu Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.07	69.93		Made Ground: Terracotta tile over concrete
					0.17	69.83		Made Ground: Sandy, clayey, red brown fine to coarse GRAVEL of brick, and chert
		0.4-0.6	D1		0.80	69.2		Made Ground: Soft to firm brown grey CLAY with fine to medium gravel sized gragments of red brick
		1.00		N=9 (1/1,2,2,2,3)				Firm yellow-brown silty CLAY with a trace of fine brown sand (London Clay Formation)
		1.80	D2					… rootlets noted at 1.80
		2.00		N=10 (2/1,2,3,2,3)				
		3.00	D3	N= 16 (2/2,4,3,5,4)				… becoming firm to stiff mottled brown and grey with fine sandy partings and coarse sand sized selenite crystals
	3.50					66.50		…cobble sized claystone at 3.50 with groundwater
		3.90	D4					
		4.00		N= 15 (2/2,3,4,3,5)				… becoming firm to stiff mottled brown and grey with fine sandy partings and coarse sand sized selenite crystals moist at 4.0 m
		5.00		N= 20 (3/4,4,5,5,6)				
		5.75	D5					… yellow sandy, posibly fine gravelly partings at 5.75
		6.00		N= 20 (4/4,5,4,5,6)				
		6.95	D6					
		7.50		N=26 (4,4,5,6,7,8)				
					7.95	62.05		Borehole complete at 7.95 m

Remarks

Terracota tile cored. Inspection pit to 0.8 m.
Borehole dry on completion.
Standpipe Piezomter installed to depth of 5 m. Bentonite seal from 1.0 to 0.3 m. Gas bung and flat cover

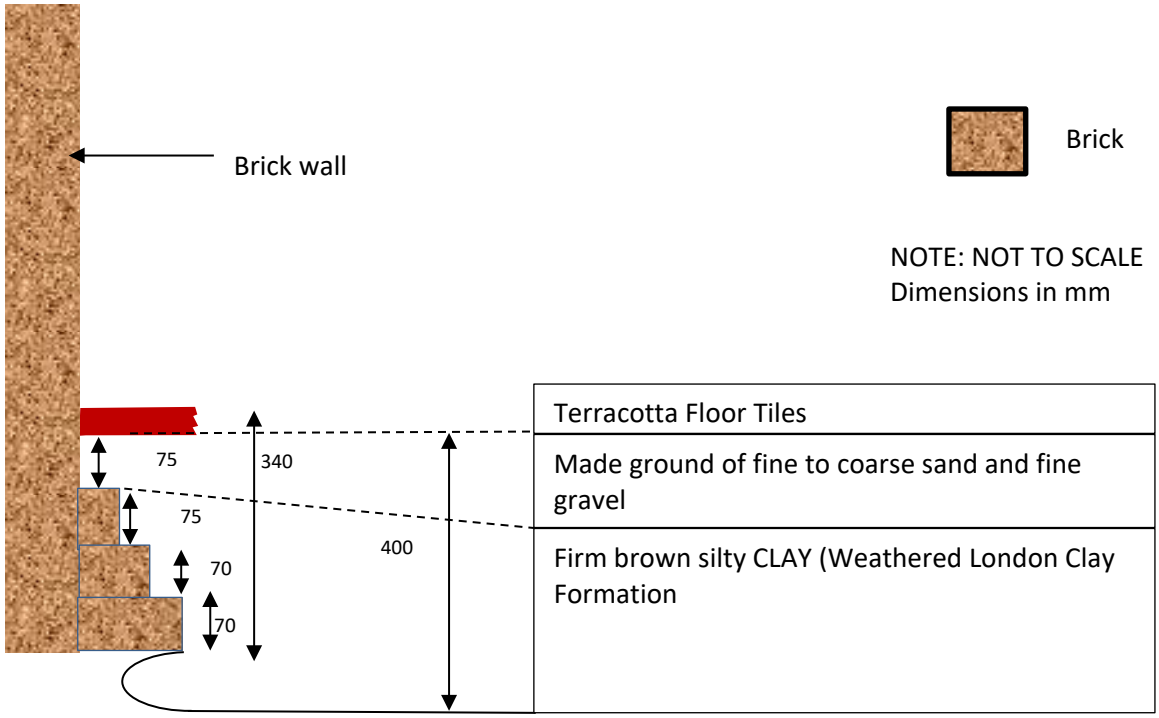


NOTE: NOT TO SCALE
Dimensions in mm



The foundation comprises a rubble of brick and clinker to a depth of 400mm below top of slab.

Client: **Richard Banks**	Date: **November 2019**	Project: **15 Lyncroft Gardens, NW6 1BL**
Title: **Foundation Exposure TP01**	**MAUND GEO-CONSULTING** **Julian Maund BSc PhD MIMMM CEng FGS** **Registered Ground Engineering Adviser**	Drawing Number: **MGC-19-29-002**



The foundation comprises brick corbels extending 150mm from the wall to a depth of 340mm below top of tiles.

Client: **Richard Banks**	Date: **November 2019**	Project: **15 Lyncroft Gardens NW6 1LB**
Title: **Foundation Exposure TP02**	**MAUND GEO-CONSULTING** Julian Maund BSc PhD MIMMM CEng FGS Registered Ground Engineering Adviser	Drawing Number: **MGC 19-29-003**

Appendix C Geotechnical Laboratory Test Report

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

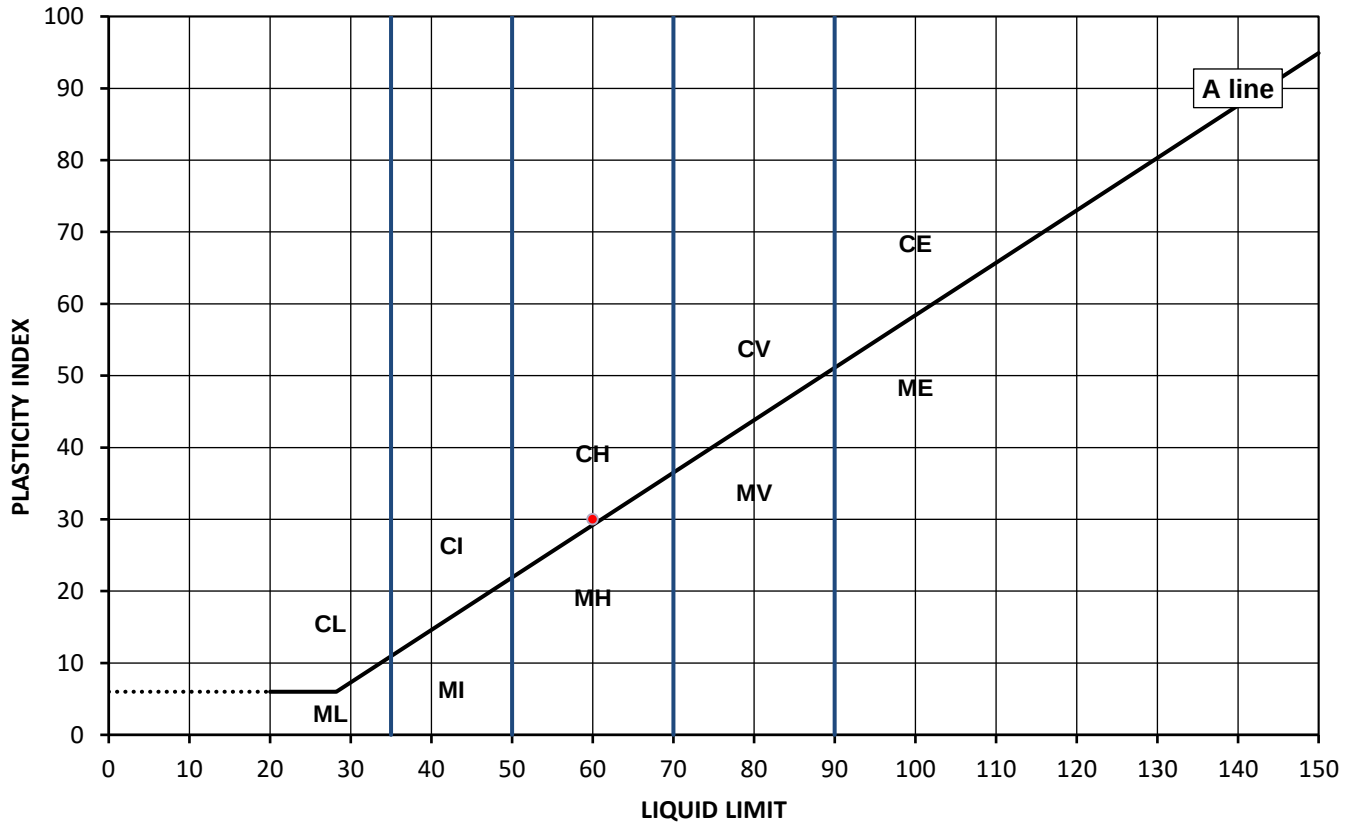
Client:	Maund GeoConsulting Ltd	Client Reference:	19-67613
Client Address:	20 Mortlake Avenue, Worcester, WR5 1QT	Job Number:	19-67613
		Date Sampled:	18/10/2019
		Date Received:	21/10/2019
Contact:	Julian Maund	Date Tested:	28/10/2019
Site Name:	15 Lyndcroft Gardens, London NW6 1LB	Sampled By:	Not Given
Site Address:	Not Given		

Test Results:

Laboratory Reference:	1339838	Depth Top [m]:	0.40
Hole No.:	BH01-DO1	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown slightly gravelly CLAY		

Sample Preparation: Tested after >425um removed by hand

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
34	60	30	30	97



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 04/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 232.5

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

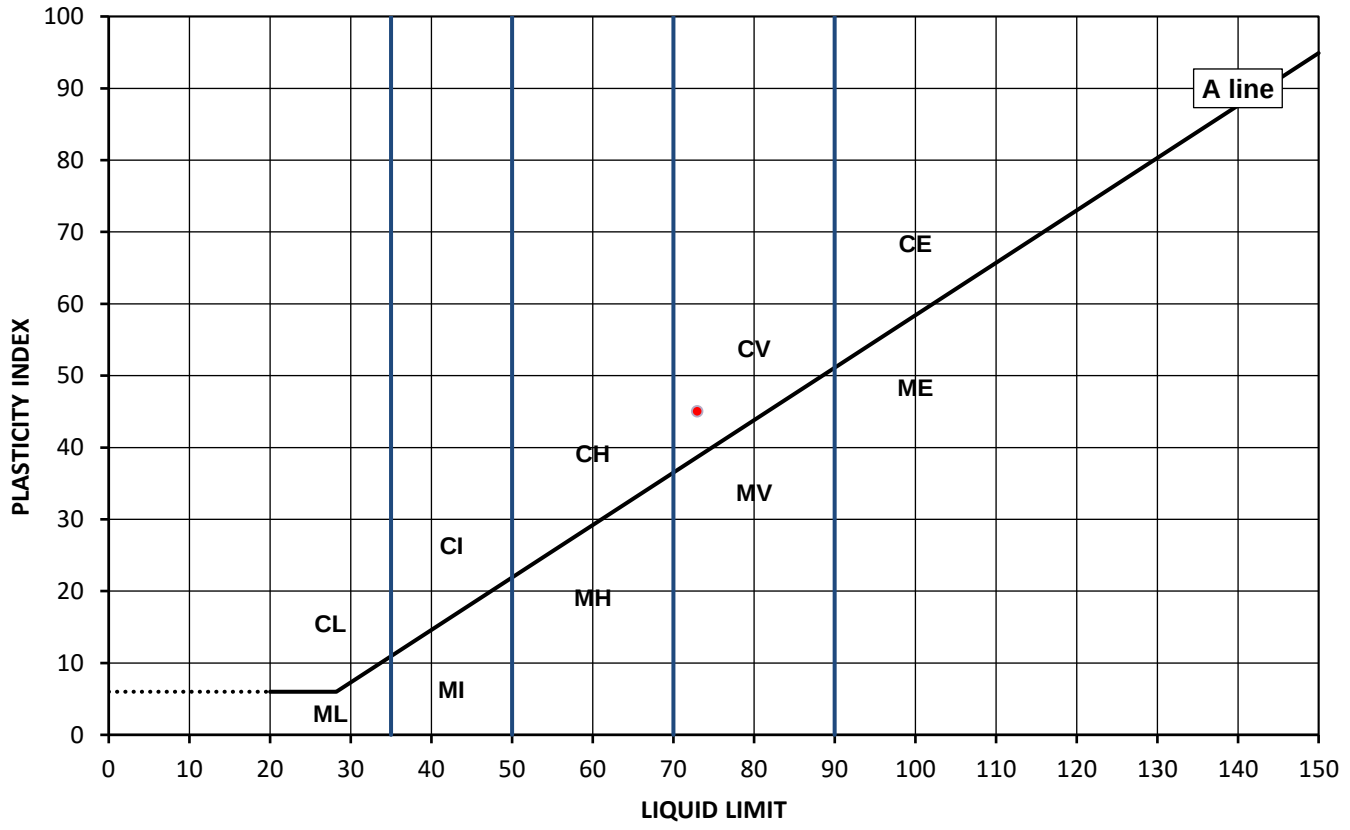
Client:	Maund GeoConsulting Ltd	Client Reference:	19-67613
Client Address:	20 Mortlake Avenue, Worcester, WR5 1QT	Job Number:	19-67613
		Date Sampled:	18/10/2019
		Date Received:	21/10/2019
Contact:	Julian Maund	Date Tested:	28/10/2019
Site Name:	15 Lyndcroft Gardens, London NW6 1LB	Sampled By:	Not Given
Site Address:	Not Given		

Test Results:

Laboratory Reference:	1339839	Depth Top [m]:	1.80
Hole No.:	BH01-DO2	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown mottled grey CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
31	73	28	45	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 04/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 232.5

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

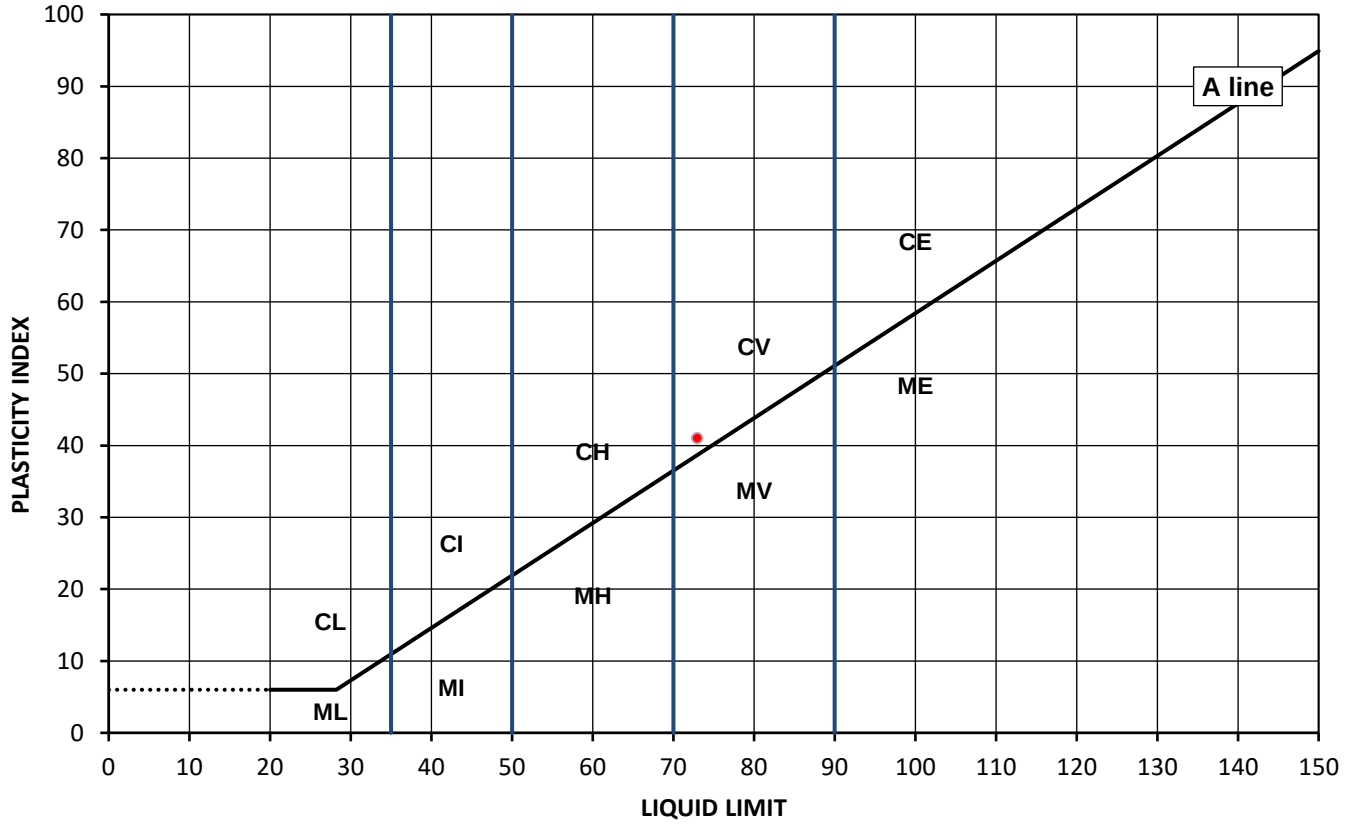
Client:	Maund GeoConsulting Ltd	Client Reference:	19-67613
Client Address:	20 Mortlake Avenue, Worcester, WR5 1QT	Job Number:	19-67613
		Date Sampled:	18/10/2019
		Date Received:	21/10/2019
Contact:	Julian Maund	Date Tested:	28/10/2019
Site Name:	15 Lyndcroft Gardens, London NW6 1LB	Sampled By:	Not Given
Site Address:	Not Given		

Test Results:

Laboratory Reference:	1339840	Depth Top [m]:	3.00
Hole No.:	BH01-DO3	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
28	73	32	41	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 04/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 232.5

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

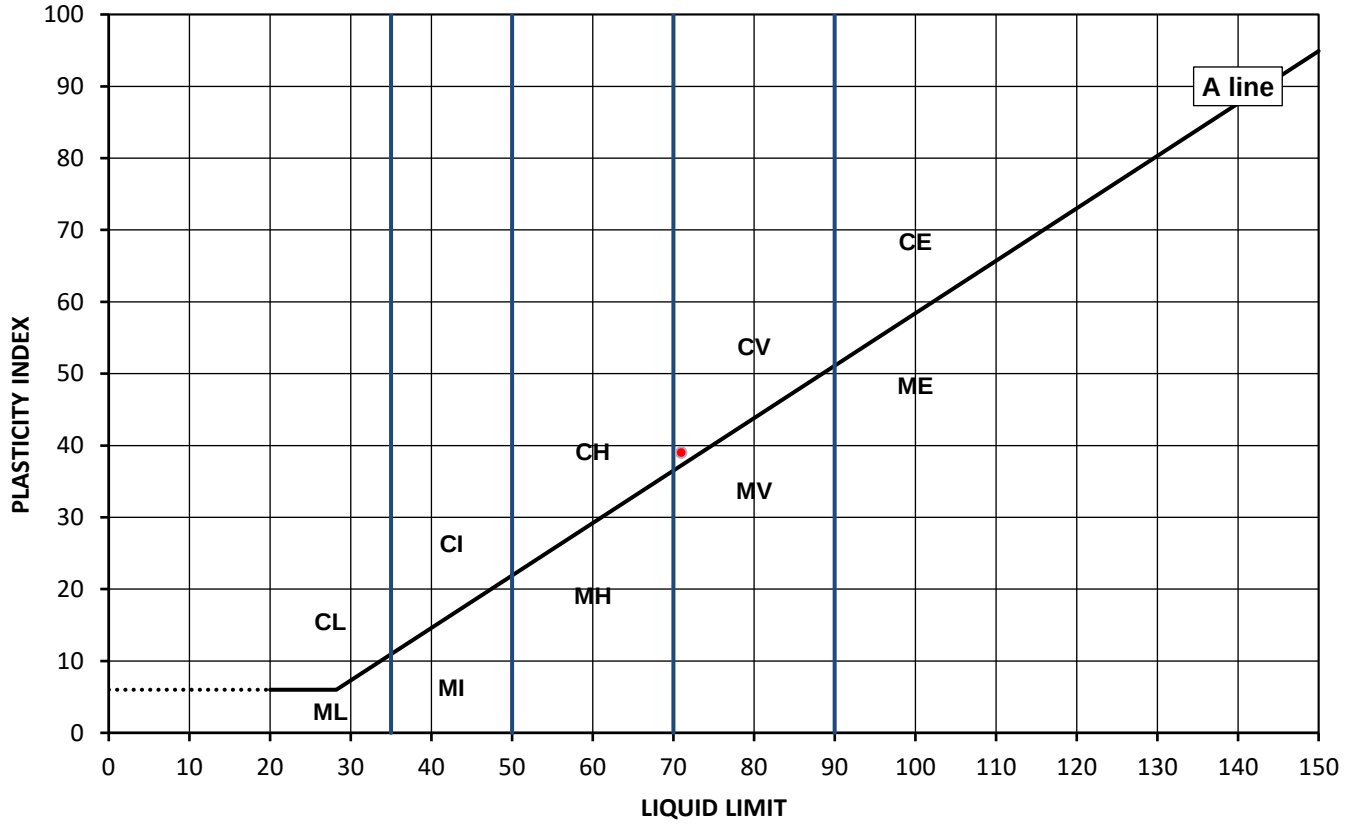
Client:	Maund GeoConsulting Ltd	Client Reference:	19-67613
Client Address:	20 Mortlake Avenue, Worcester, WR5 1QT	Job Number:	19-67613
		Date Sampled:	18/10/2019
		Date Received:	21/10/2019
Contact:	Julian Maund	Date Tested:	28/10/2019
Site Name:	15 Lyndcroft Gardens, London NW6 1LB	Sampled By:	Not Given
Site Address:	Not Given		

Test Results:

Laboratory Reference:	1339841	Depth Top [m]:	3.90
Hole No.:	BH01-DO4	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	71	32	39	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 04/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 232.5

TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

UKAS TESTING 4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.4 and 5

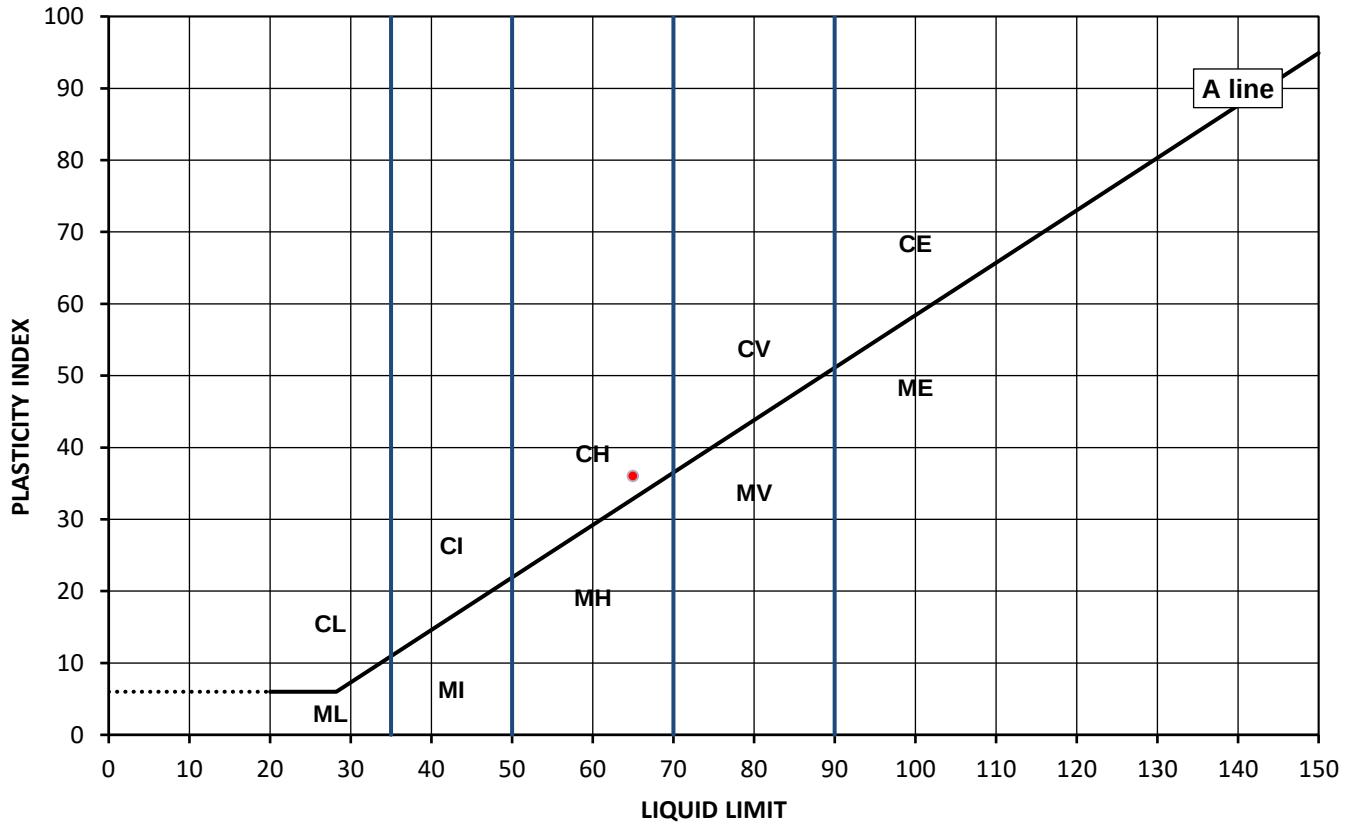
Client:	Maund GeoConsulting Ltd	Client Reference:	19-67613
Client Address:	20 Mortlake Avenue, Worcester, WR5 1QT	Job Number:	19-67613
		Date Sampled:	18/10/2019
		Date Received:	21/10/2019
Contact:	Julian Maund	Date Tested:	28/10/2019
Site Name:	15 Lyndcroft Gardens, London NW6 1LB	Sampled By:	Not Given
Site Address:	Not Given		

Test Results:

Laboratory Reference:	1339842	Depth Top [m]:	5.75
Hole No.:	BH01-DO5	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	D
Soil Description:	Brown CLAY		

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
29	65	29	36	100



Legend, based on BS 5930:2015 Code of practice for site investigations

		Plasticity		Liquid Limit
C	Clay	L	Low	below 35
M	Silt	I	Medium	35 to 50
		H	High	50 to 70
		V	Very high	70 to 90
		E	Extremely high	exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 04/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 232.5

SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990: Clause 8.2

Client: Maund GeoConsulting Ltd

Client Address: 20 Mortlake Avenue, Worcester, WR5 1QT

Contact: Julian Maund

Site Name: 15 Lyndcroft Gardens, London NW6 1LB

Site Address: Not Given

Client Reference: 19-67613
Job Number: 19-67613
Date Sampled: 18/10/2019
Date Received: 21/10/2019
Date Tested: 28/10/2019
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC	WC	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	LL	PL	PI	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
1339838	BH01-DO1	Not Given	0.40	Not Given	D	Brown slightly gravelly CLAY	Atterberg 1 Point	34		97	60	30	30						
1339839	BH01-DO2	Not Given	1.80	Not Given	D	Brown mottled grey CLAY	Atterberg 1 Point	31		100	73	28	45						
1339840	BH01-DO3	Not Given	3.00	Not Given	D	Brown CLAY	Atterberg 1 Point	28		100	73	32	41						
1339841	BH01-DO4	Not Given	3.90	Not Given	D	Brown CLAY	Atterberg 1 Point	27		100	71	32	39						
1339842	BH01-DO5	Not Given	5.75	Not Given	D	Brown CLAY	Atterberg 1 Point	29		100	65	29	36						

Note: # Non accredited; NP - Non plastic

Comments:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 04/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd **GF 234.7**

Julian Maund
Maund GeoConsulting Ltd
20 Mortlake Avenue
Worcester
WR5 1QT

e: julian.maund@gmail.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 19-67616

Project / Site name:	15 Lyndcroft Gardens, London NW6 1LB	**Samples received on:**	21/10/2019
Your job number:		**Samples instructed on:**	21/10/2019
Your order number:		**Analysis completed by:**	04/11/2019
Report Issue Number:	1	**Report issued on:**	04/11/2019
Samples Analysed:	2 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist

For & on behalf of i2 Analytical Ltd.

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

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

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

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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

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

Analytical Report Number: 19-67616

Project / Site name: 15 Lyndcroft Gardens, London NW6 1LB

Lab Sample Number				1339846	1339847			
Sample Reference				BH01-DO1	BH01-DO2			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.40	1.80			
Date Sampled				18/10/2019	18/10/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	23	20			
Total mass of sample received	kg	0.001	NONE	0.50	0.24			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.8	8.0			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.044	0.096			

Analytical Report Number : 19-67616

Project / Site name: 15 Lyndcroft Gardens, London NW6 1LB

* 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 *
1339846	BH01-DO1	None Supplied	0.40	Light brown clay with brick.
1339847	BH01-DO2	None Supplied	1.80	Brown clay.

The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 19-67616

Project / Site name: 15 Lyndcroft Gardens, London NW6 1LB

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In-house method based on BS1377 Part 2, 1990, Classification tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Appendix E PDisp Output

Oasys

15 Lyncroft Gardens
Excavation

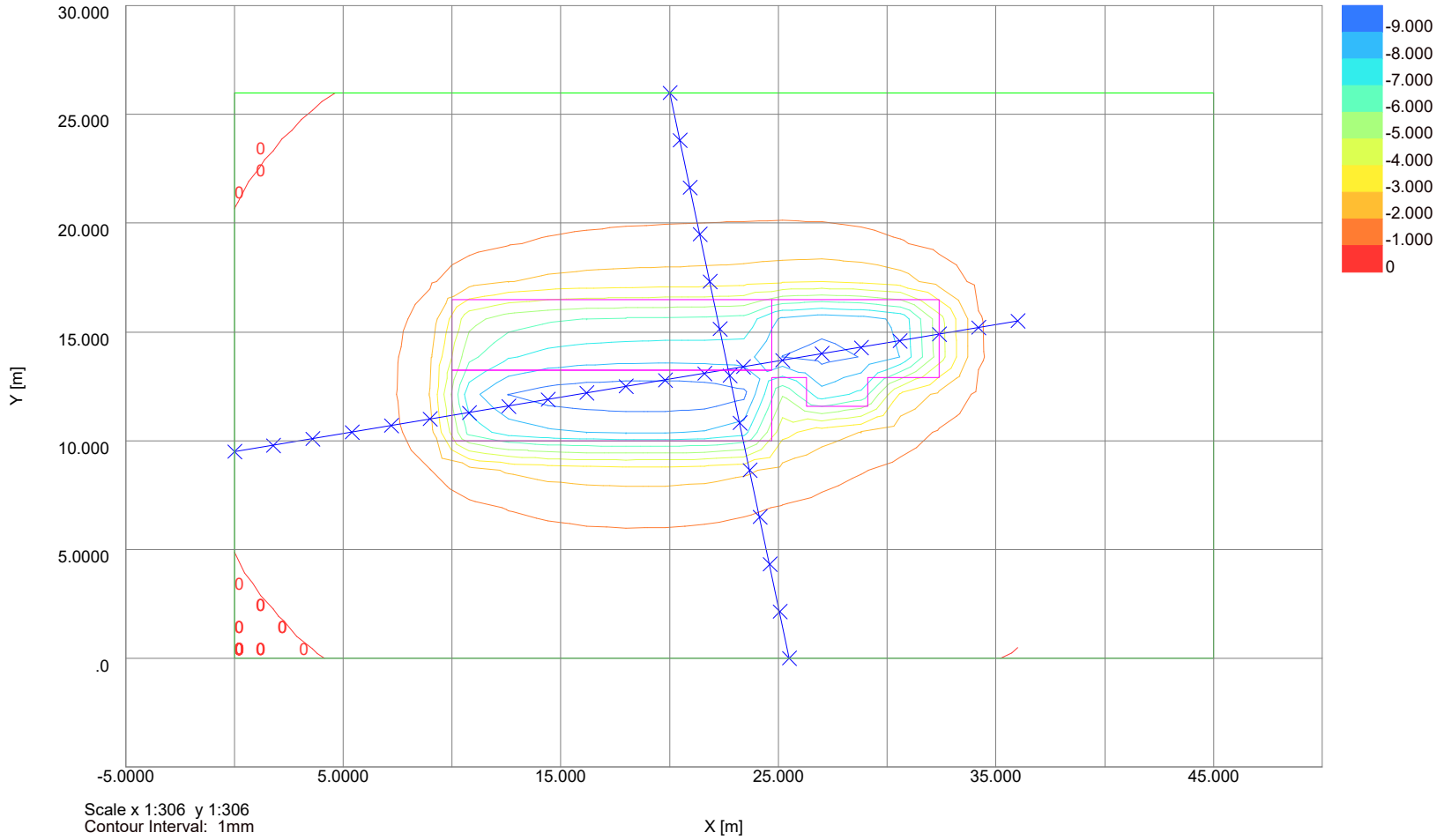
MAUND
GEO-CONSULTING LTD

Job No.	Sheet No.	Rev.
MGC 29		

Drg. Ref.

Made by	Date	Checked
JGM	22 Nov 2019	

Settlement Contours : Grid 1 at 70.0000m



Scale x 1:306 y 1:306
Contour Interval: 1mm

Titles

Job No.: MGC 29
Job Title: 15 Lyncroft Gardens
Sub-title: Excavation
Calculation Heading:
Initials: JGM
Checker: jm
Date Saved: 22 Nov 2019
Date Checked: 23 Nov 2019
Notes:
File Name: Lyncoft excavation.pdd
File Path: F:\OneDrive\Documents\Croft Structural Engineers\15 Lyncroft Gardens NW6 1LB\07-GIR Lyncroft\PDISP

History

Date	Time	By	Notes
19-Jul-2019	13:04	Maund Geo Consulting	New
19-Jul-2019	14:55	Maund Geo Consulting	
19-Jul-2019	15:12	Maund Geo Consulting	
19-Jul-2019	15:37	Maund Geo Consulting	
25-Jul-2019	13:07	Maund Geo Consulting	
25-Jul-2019	13:53	Maund Geo Consulting	
25-Jul-2019	14:21	Maund Geo Consulting	
02-Aug-2019	11:01	Maund Geo Consulting	
20-Nov-2019	21:02	Maund Geo Consulting	
20-Nov-2019	21:56	Maund Geo Consulting	
21-Nov-2019	20:35	Maund Geo Consulting	
22-Nov-2019	11:50	Maund Geo Consulting	
23-Nov-2019	14:25	Maund Geo Consulting	
23-Nov-2019	16:46	Maund Geo Consulting	Open

Analysis Options

General
Global Poisson's ratio: 0.20
Maximum allowable ratio between values of E: 1.5
Horizontal rigid boundary level: 45.00 [m OD]
Displacements at load centroids: Yes
GSA piled raft data : No

Elastic
Elastic : Yes
Analysis: Boussinesq
Stiffness for horizontal displacement calculations: Weighted average
Using legacy heave correction factor: No

Consolidation
Consolidation : No

Soil ProfilesSoil Profile 1

Layer ref.	Name	Level at top [mOD]	Number of intermediate displacement levels	Youngs Modulus : Top [kN/m²]	Youngs Modulus : Btm. [kN/m²]	Poissons ratio	Non-linear curve
1	london clay	70.000	25	15000.	140000.	0.50000	None

Non-linear Curve Coordinates - Non-linear Curve 1

Point	Strain [%]	Factor

Soil Zones

Zone	Name	X min [m]	X max [m]	Y min [m]	Y max [m]	Profile
1	zone 1	0.0	45.000	0.0	26.000	Soil Profile 1

Polygonal Load Data

Load ref.	Name	Position : Level [m]	Position : Polygon : Coords. [m]	Position : Polygon : Rect. tolerance [%]	No. of Rectangles	Value : Normal (local z) [kN/m²]
1	excavation full	70.00000	(10,10) (24.7,10) (24.7,12.9) (26.3,12.9) (26.3,11.6) (29.1,11.6) (29.1,12.9) (32.4,12.9) (32.4,16.5) (24.7,16.5) (24.7,13.3) (10,13.3) (10,10)	10.000	4	-60.000
2	excavation below cellar	70.00000	(10,13.3) (24.7,13.3) (24.7,16.5) (10,16.5) (10,13.3)	10.000	1	-34.000

Polygonal Loads' Rectangles

No.	Centre : x [m]	Centre : y [m]	Angle of local x from global X [Degrees]	Width x [m]	Depth y [m]
Load 1 : excavation full					
(Edge 1 optimal)					
1	17.35000	11.62500	0.0	14.700	3.2500
2	25.50000	14.70000	0.0	1.6000	3.6000
3	27.70000	14.05000	0.0	2.8000	4.9000
4	30.75000	14.70000	0.0	3.3000	3.6000
Load 2 : excavation below cellar					
(Edge 1 optimal)					
1	17.35000	14.87500	0.0	14.700	3.2500

Displacement Lines

Name	X1 [m]	Y1 [m]	Z1 [m]	X2 [m]	Y2 [m]	Z2 [m]	Intervals [No.]	Calculate	Detailed Results
Long section	0.00000	9.50000	70.00000	36.00000	15.50000	70.00000	20	Yes	Yes
Cross Secton	25.50000	0.00000	70.00000	20.00000	26.00000	70.00000	12	Yes	Yes

Displacement Grids

Name	Extrusion:	X1	Y1	Z1	X2	Y2	Z2	Intervals	Extrusion:	Extrusion:	Calculate	Detailed

	Direction							Along Line [No.]	Distance [m]	Intervals Along [No.]		Results
Grid	Global X	0.00000	0.00000	70.00000	-	26.00000	70.00000	15	36.00000	20	Yes	Yes

Results : Immediate : Load Centres : Polygonal

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	excavation full	21.74929	12.73088	70.00000	-9.49667	69.710	-59.286	-126.38	-0.0015686
2	excavation below cellar	17.35000	14.87500	70.00000	-6.76119	69.710	-33.988	-77.411	-748.20E-6

Results : Consolidation : Load Centres : Polygonal

None

Results : Total : Load Centres : Polygonal

None

Results : Immediate : Displacement Data : Lines

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Long section	0.00000	9.50000	70.00000	-0.03138	69.710	-72.081E-6	-0.13594	4.1360E-6
1	Long section	1.80000	9.80000	70.00000	-0.08792	69.710	-154.00E-6	-0.20382	6.1970E-6
1	Long section	3.60000	10.10000	70.00000	-0.18662	69.710	-391.32E-6	-0.33238	10.093E-6
1	Long section	5.40000	10.40000	70.00000	-0.36958	69.710	-0.0013215	-0.61994	18.771E-6
1	Long section	7.20000	10.70000	70.00000	-0.75448	69.710	-0.0078339	-1.4933	44.788E-6
1	Long section	9.00000	11.00000	70.00000	-1.86057	69.710	-0.24382	-7.4232	203.92E-6
1	Long section	10.80000	11.30000	70.00000	-7.41763	69.710	-59.359	-119.04	-0.0017989
1	Long section	12.60000	11.60000	70.00000	-8.91285	69.710	-59.885	-128.83	-0.0015489
1	Long section	14.40000	11.90000	70.00000	-9.45885	69.710	-59.900	-130.37	-0.0015034
1	Long section	16.20000	12.20000	70.00000	-9.67713	69.710	-59.862	-130.37	-0.0014997
1	Long section	18.00000	12.50000	70.00000	-9.69537	69.710	-59.707	-129.10	-0.0015245
1	Long section	19.80000	12.80000	70.00000	-9.53339	69.710	-59.012	-125.47	-0.0015716
1	Long section	21.60000	13.10000	70.00000	-9.07375	69.710	-54.310	-115.25	-0.0014529
1	Long section	23.40000	13.40000	70.00000	-8.09772	69.710	-39.655	-96.125	-696.07E-6
1	Long section	25.20000	13.70000	70.00000	-8.96480	69.710	-58.971	-122.42	-0.0016606
1	Long section	27.00000	14.00000	70.00000	-9.37962	69.710	-59.914	-130.49	-0.0015008
1	Long section	28.80000	14.30000	70.00000	-9.08245	69.710	-59.916	-129.99	-0.0015162
1	Long section	30.60000	14.60000	70.00000	-8.26742	69.710	-59.861	-126.90	-0.0016055
1	Long section	32.40000	14.90000	70.00000	-4.64505	69.710	-29.945	-64.787	-763.33E-6
1	Long section	34.20000	15.20000	70.00000	-1.09877	69.710	-0.038442	-3.0331	88.913E-6
1	Long section	36.00000	15.50000	70.00000	-0.47803	69.710	-0.0031720	-0.88826	26.778E-6
2	Cross Secton	25.50000	0.00000	70.00000	-0.10203	69.710	-124.00E-6	-0.22412	6.8184E-6
2	Cross Secton	25.04167	2.16667	70.00000	-0.22688	69.710	-296.63E-6	-0.36477	11.089E-6
2	Cross Secton	24.58333	4.33333	70.00000	-0.45615	69.710	-898.54E-6	-0.66140	20.073E-6
2	Cross Secton	24.12500	6.50000	70.00000	-0.91697	69.710	-0.0044317	-1.4655	44.255E-6
2	Cross Secton	23.66667	8.66667	70.00000	-2.11729	69.710	-0.10392	-5.9058	170.47E-6
2	Cross Secton	23.20833	10.83333	70.00000	-8.36372	69.710	-59.462	-122.04	-0.0017171
2	Cross Secton	22.75000	13.00000	70.00000	-9.13787	69.710	-56.955	-119.38	-0.0015689
2	Cross Secton	22.29167	15.16667	70.00000	-6.62193	69.710	-33.950	-76.396	-775.67E-6
2	Cross Secton	21.83333	17.33333	70.00000	-2.48919	69.710	-0.26749	-8.1977	225.36E-6
2	Cross Secton	21.37500	19.50000	70.00000	-1.12681	69.710	-0.0068106	-1.8634	56.163E-6
2	Cross Secton	20.91667	21.66667	70.00000	-0.58309	69.710	-0.0013104	-0.83348	25.279E-6
2	Cross Secton	20.45833	23.83333	70.00000	-0.30486	69.710	-422.43E-6	-0.45515	13.831E-6
2	Cross Secton	20.00000	26.00000	70.00000	-0.14989	69.710	-173.23E-6	-0.27638	8.4064E-6

Results : Consolidation : Displacement Data : Lines

None

Results : Total : Displacement Data : Lines

None

Results : Immediate : Displacement Data : Grids

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Grid	0.00000	0.00000	70.00000	0.02856	69.710	-17.018E-6	-0.063715	1.9401E-6
1	Grid	1.80000	0.00000	70.00000	0.01879	69.710	-24.321E-6	-0.078185	2.3804E-6
1	Grid	3.60000	0.00000	70.00000	0.00538	69.710	-34.743E-6	-0.096049	2.9238E-6
1	Grid	5.40000	0.00000	70.00000	0.01188	69.710	-49.094E-6	-0.11756	3.5778E-6
1	Grid	7.20000	0.00000	70.00000	-0.03264	69.710	-67.687E-6	-0.14241	4.3336E-6
1	Grid	9.00000	0.00000	70.00000	-0.05578	69.710	-89.694E-6	-0.16948	5.1565E-6
1	Grid	10.80000	0.00000	70.00000	-0.07944	69.710	-112.86E-6	-0.19675	5.9854E-6
1	Grid	12.60000	0.00000	70.00000	-0.10139	69.710	-134.13E-6	-0.22175	6.7451E-6
1	Grid	14.40000	0.00000	70.00000	-0.11952	69.710	-150.91E-6	-0.24221	7.3672E-6
1	Grid	16.20000	0.00000	70.00000	-0.13231	69.710	-161.81E-6	-0.25659	7.8044E-6
1	Grid	18.00000	0.00000	70.00000	-0.13889	69.710	-166.41E-6	-0.26407	8.0321E-6
1	Grid	19.80000	0.00000	70.00000	-0.13898	69.710	-164.72E-6	-0.26443	8.0430E-6
1	Grid	21.60000	0.00000	70.00000	-0.13282	69.710	-156.98E-6	-0.25787	7.8439E-6
1	Grid	23.40000	0.00000	70.00000	-0.12112	69.710	-143.92E-6	-0.24513	7.4567E-6
1	Grid	25.20000	0.00000	70.00000	-0.10504	69.710	-127.04E-6	-0.22744	6.9192E-6
1	Grid	27.00000	0.00000	70.00000	-0.08605	69.710	-108.41E-6	-0.20642	6.2804E-6
1	Grid	28.80000	0.00000	70.00000	-0.06566	69.710	-89.875E-6	-0.18368	5.5891E-6
1	Grid	30.60000	0.00000	70.00000	-0.04522	69.710	-72.613E-6	-0.16058	4.8869E-6
1	Grid	32.40000	0.00000	70.00000	-0.02585	69.710	-57.242E-6	-0.13821	4.2064E-6
1	Grid	34.20000	0.00000	70.00000	-0.00841	69.710	-44.085E-6	-0.11737	3.5726E-6
1	Grid	36.00000	0.00000	70.00000	0.00652	69.710	-33.265E-6	-0.098637	3.0028E-6
1	Grid	0.00000	1.73333	70.00000	0.02021	69.710	-23.078E-6	-0.074939	2.2815E-6
1	Grid	1.80000	1.73333	70.00000	0.00543	69.710	-34.831E-6	-0.094543	2.8779E-6
1	Grid	3.60000	1.73333	70.00000	-0.01519	69.710	-53.039E-6	-0.11997	3.6512E-6
1	Grid	5.40000	1.73333	70.00000	-0.04239	69.710	-80.480E-6	-0.15229	4.6333E-6
1	Grid	7.20000	1.73333	70.00000	-0.07599	69.710	-119.32E-6	-0.19167	5.8300E-6
1	Grid	9.00000	1.73333	70.00000	-0.11430	69.710	-168.64E-6	-0.23647	7.1906E-6
1	Grid	10.80000	1.73333	70.00000	-0.15396	69.710	-222.31E-6	-0.28270	8.5946E-6
1	Grid	12.60000	1.73333	70.00000	-0.19069	69.710	-271.07E-6	-0.32509	9.8819E-6
1	Grid	14.40000	1.73333	70.00000	-0.22067	69.710	-307.84E-6	-0.35914	10.916E-6
1	Grid	16.20000	1.73333	70.00000	-0.24143	69.710	-330.29E-6	-0.38230	11.620E-6
1	Grid	18.00000	1.73333	70.00000	-0.25182	69.710	-338.78E-6	-0.39365	11.965E-6
1	Grid	19.80000	1.73333	70.00000	-0.25158	69.710	-333.80E-6	-0.39307	11.948E-6
1	Grid	21.60000	1.73333	70.00000	-0.24107	69.710	-315.26E-6	-0.38086	11.577E-6
1	Grid	23.40000	1.73333	70.00000	-0.22142	69.710	-284.00E-6	-0.35815	10.888E-6
1	Grid	25.20000	1.73333	70.00000	-0.19466	69.710	-243.92E-6	-0.32734	9.9529E-6
1	Grid	27.00000	1.73333	70.00000	-0.16344	69.710	-201.32E-6	-0.29177	8.8728E-6
1	Grid	28.80000	1.73333	70.00000	-0.13039	69.710	-161.29E-6	-0.25452	7.7413E-6

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Grid	30.60000	1.73333	70.00000	-0.09763	69.710	-125.92E-6	-0.21779	6.6254E-6
1	Grid	32.40000	1.73333	70.00000	-0.06683	69.710	-95.698E-6	-0.18312	5.5717E-6
1	Grid	34.20000	1.73333	70.00000	-0.03929	69.710	-70.767E-6	-0.15166	4.6152E-6
1	Grid	36.00000	1.73333	70.00000	-0.01589	69.710	-51.091E-6	-0.12418	3.7796E-6
1	Grid	0.00000	3.46667	70.00000	0.00985	69.710	-31.182E-6	-0.087820	2.6733E-6
1	Grid	1.80000	3.46667	70.00000	-0.01156	69.710	-50.195E-6	-0.11440	3.4817E-6
1	Grid	3.60000	3.46667	70.00000	-0.04234	69.710	-82.867E-6	-0.15108	4.5962E-6
1	Grid	5.40000	3.46667	70.00000	-0.08454	69.710	-138.60E-6	-0.20116	6.1175E-6
1	Grid	7.20000	3.46667	70.00000	-0.13899	69.710	-228.75E-6	-0.26711	8.1188E-6
1	Grid	9.00000	3.46667	70.00000	-0.20350	69.710	-357.08E-6	-0.34729	10.550E-6
1	Grid	10.80000	3.46667	70.00000	-0.27160	69.710	-504.37E-6	-0.43296	13.148E-6
1	Grid	12.60000	3.46667	70.00000	-0.33432	69.710	-634.24E-6	-0.51084	15.509E-6
1	Grid	14.40000	3.46667	70.00000	-0.38428	69.710	-723.84E-6	-0.57087	17.330E-6
1	Grid	16.20000	3.46667	70.00000	-0.41783	69.710	-773.12E-6	-0.60956	18.505E-6
1	Grid	18.00000	3.46667	70.00000	-0.43398	69.710	-789.34E-6	-0.62711	19.038E-6
1	Grid	19.80000	3.46667	70.00000	-0.43274	69.710	-775.14E-6	-0.62398	18.944E-6
1	Grid	21.60000	3.46667	70.00000	-0.41447	69.710	-726.56E-6	-0.60003	18.218E-6
1	Grid	23.40000	3.46667	70.00000	-0.38061	69.710	-640.04E-6	-0.55624	16.892E-6
1	Grid	25.20000	3.46667	70.00000	-0.33484	69.710	-526.76E-6	-0.49761	15.116E-6
1	Grid	27.00000	3.46667	70.00000	-0.28252	69.710	-412.82E-6	-0.43254	13.143E-6
1	Grid	28.80000	3.46667	70.00000	-0.22843	69.710	-315.64E-6	-0.36778	11.179E-6
1	Grid	30.60000	3.46667	70.00000	-0.17574	69.710	-236.15E-6	-0.30645	9.3171E-6
1	Grid	32.40000	3.46667	70.00000	-0.12676	69.710	-171.37E-6	-0.25025	7.6103E-6
1	Grid	34.20000	3.46667	70.00000	-0.08343	69.710	-120.19E-6	-0.20073	6.1060E-6
1	Grid	36.00000	3.46667	70.00000	-0.04712	69.710	-81.857E-6	-0.15898	4.8372E-6
1	Grid	0.00000	5.20000	70.00000	-0.00211	69.710	-41.547E-6	-0.10203	3.1054E-6
1	Grid	1.80000	5.20000	70.00000	-0.03186	69.710	-71.959E-6	-0.13777	4.1918E-6
1	Grid	3.60000	5.20000	70.00000	-0.07639	69.710	-131.23E-6	-0.19087	5.8044E-6
1	Grid	5.40000	5.20000	70.00000	-0.14096	69.710	-250.92E-6	-0.27075	8.2278E-6
1	Grid	7.20000	5.20000	70.00000	-0.23015	69.710	-489.79E-6	-0.38901	11.810E-6
1	Grid	9.00000	5.20000	70.00000	-0.34299	69.710	-908.38E-6	-0.55031	16.687E-6
1	Grid	10.80000	5.20000	70.00000	-0.46626	69.710	-0.0014405	-0.73327	22.214E-6
1	Grid	12.60000	5.20000	70.00000	-0.57791	69.710	-0.0018762	-0.89446	27.086E-6
1	Grid	14.40000	5.20000	70.00000	-0.66251	69.710	-0.0021259	-1.0081	30.526E-6
1	Grid	16.20000	5.20000	70.00000	-0.71640	69.710	-0.0022405	-1.0748	32.549E-6
1	Grid	18.00000	5.20000	70.00000	-0.74104	69.710	-0.0022722	-1.1023	33.382E-6
1	Grid	19.80000	5.20000	70.00000	-0.73753	69.710	-0.0022330	-1.0931	33.108E-6
1	Grid	21.60000	5.20000	70.00000	-0.70520	69.710	-0.0020919	-1.0436	31.610E-6
1	Grid	23.40000	5.20000	70.00000	-0.64420	69.710	-0.0017941	-0.94873	28.747E-6
1	Grid	25.20000	5.20000	70.00000	-0.56133	69.710	-0.0013664	-0.81936	24.844E-6
1	Grid	27.00000	5.20000	70.00000	-0.46994	69.710	-974.53E-6	-0.68481	20.780E-6
1	Grid	28.80000	5.20000	70.00000	-0.37967	69.710	-697.95E-6	-0.56293	17.091E-6
1	Grid	30.60000	5.20000	70.00000	-0.29383	69.710	-495.28E-6	-0.45371	13.781E-6
1	Grid	32.40000	5.20000	70.00000	-0.21495	69.710	-337.98E-6	-0.35667	10.838E-6
1	Grid	34.20000	5.20000	70.00000	-0.14619	69.710	-220.21E-6	-0.27409	8.3323E-6
1	Grid	36.00000	5.20000	70.00000	-0.08983	69.710	-138.24E-6	-0.20762	6.3143E-6
1	Grid	0.00000	6.93333	70.00000	-0.01474	69.710	-53.801E-6	-0.11672	3.5518E-6
1	Grid	1.80000	6.93333	70.00000	-0.05417	69.710	-100.64E-6	-0.16364	4.9776E-6
1	Grid	3.60000	6.93333	70.00000	-0.11610	69.710	-205.76E-6	-0.23942	7.2771E-6
1	Grid	5.40000	6.93333	70.00000	-0.21266	69.710	-469.14E-6	-0.36836	11.182E-6
1	Grid	7.20000	6.93333	70.00000	-0.36056	69.710	-0.0012014	-0.59706	18.085E-6
1	Grid	9.00000	6.93333	70.00000	-0.57229	69.710	-0.0031751	-0.98840	29.830E-6
1	Grid	10.80000	6.93333	70.00000	-0.82114	69.710	-0.0064115	-1.4976	45.051E-6
1	Grid	12.60000	6.93333	70.00000	-1.03563	69.710	-0.0085701	-1.9036	57.227E-6
1	Grid	14.40000	6.93333	70.00000	-1.18137	69.710	-0.0093840	-2.1363	64.242E-6
1	Grid	16.20000	6.93333	70.00000	-1.26633	69.710	-0.0096563	-2.2527	67.766E-6
1	Grid	18.00000	6.93333	70.00000	-1.30294	69.710	-0.0097181	-2.2954	69.061E-6
1	Grid	19.80000	6.93333	70.00000	-1.29548	69.710	-0.0096173	-2.2744	68.431E-6
1	Grid	21.60000	6.93333	70.00000	-1.23822	69.710	-0.0091676	-2.1677	65.218E-6
1	Grid	23.40000	6.93333	70.00000	-1.11994	69.710	-0.0077316	-1.9217	57.853E-6
1	Grid	25.20000	6.93333	70.00000	-0.95033	69.710	-0.0049498	-1.5404	46.487E-6
1	Grid	27.00000	6.93333	70.00000	-0.77729	69.710	-0.0028428	-1.1938	36.119E-6
1	Grid	28.80000	6.93333	70.00000	-0.62242	69.710	-0.0018744	-0.93974	28.466E-6
1	Grid	30.60000	6.93333	70.00000	-0.47876	69.710	-0.0012393	-0.72577	22.003E-6
1	Grid	32.40000	6.93333	70.00000	-0.34769	69.710	-770.04E-6	-0.54070	16.407E-6
1	Grid	34.20000	6.93333	70.00000	-0.23574	69.710	-448.74E-6	-0.39048	11.858E-6
1	Grid	36.00000	6.93333	70.00000	-0.14720	69.710	-249.27E-6	-0.27760	8.4365E-6
1	Grid	0.00000	8.66667	70.00000	-0.02655	69.710	-66.523E-6	-0.13035	3.9662E-6
1	Grid	1.80000	8.66667	70.00000	-0.07586	69.710	-133.59E-6	-0.18930	5.7564E-6
1	Grid	3.60000	8.66667	70.00000	-0.15721	69.710	-305.81E-6	-0.29258	8.8879E-6
1	Grid	5.40000	8.66667	70.00000	-0.29464	69.710	-850.08E-6	-0.49383	14.971E-6
1	Grid	7.20000	8.66667	70.00000	-0.53688	69.710	-0.0032460	-0.95245	28.728E-6
1	Grid	9.00000	8.66667	70.00000	-0.98131	69.710	-0.020967	-2.2490	66.619E-6
1	Grid	10.80000	8.66667	70.00000	-1.63673	69.710	-0.095748	-5.0137	144.03E-6
1	Grid	12.60000	8.66667	70.00000	-2.10676	69.710	-0.11838	-6.4752	186.50E-6
1	Grid	14.40000	8.66667	70.00000	-2.35564	69.710	-0.12128	-6.9718	201.37E-6
1	Grid	16.20000	8.66667	70.00000	-2.48294	69.710	-0.12188	-7.1666	207.25E-6
1	Grid	18.00000	8.66667	70.00000	-2.53499	69.710	-0.12199	-7.2308	209.19E-6
1	Grid	19.80000	8.66667	70.00000	-2.52340	69.710	-0.12178	-7.1932	208.07E-6
1	Grid	21.60000	8.66667	70.00000	-2.42808	69.710	-0.12037	-6.9720	201.46E-6
1	Grid	23.40000	8.66667	70.00000	-2.17558	69.710	-0.10907	-6.1485	177.39E-6
1	Grid	25.20000	8.66667	70.00000	-1.70138	69.710	-0.041102	-3.8437	113.37E-6
1	Grid	27.00000	8.66667	70.00000	-1.31651	69.710	-0.011704	-2.4264	72.871E-6
1	Grid	28.80000	8.66667	70.00000	-1.04717	69.710	-0.0075387	-1.8429	55.472E-6
1	Grid	30.60000	8.66667	70.00000	-0.79008	69.710	-0.0042190	-1.3263	40.032E-6
1	Grid	32.40000	8.66667	70.00000	-0.55709	69.710	-0.0022156	-0.90518	27.381E-6
1	Grid	34.20000	8.66667	70.00000	-0.36510	69.710	-0.0010716	-0.59126	17.920E-6
1	Grid	36.00000	8.66667	70.00000	-0.22239	69.710	-485.69E-6	-0.38093	11.564E-6
1	Grid	0.00000	10.40000	70.00000	-0.03565	69.710	-77.154E-6	-0.14090	4.2865E-6
1	Grid	1.80000	10.40000	70.00000	-0.09315	69.710	-163.26E-6	-0.21017	6.3896E-6
1	Grid	3.60000	10.40000	70.00000	-0.19168	69.710	-407.00E-6	-0.33935	10.304E-6
1	Grid	5.40000	10.40000	70.00000	-0.36958	69.710	-0.0013215	-0.61994	18.771E-6
1	Grid	7.20000	10.40000	70.00000	-0.72705	69.710	-0.0071934	-1.4220	42.676E-6
1	Grid	9.00000	10.40000	70.00000	-1.66240	69.710	-0.19548	-6.2366	172.18E-6
1	Grid	10.80000	10.40000	70.00000	-6.37238	69.710	-56.703	-103.62	-0.0020262
1	Grid	12.60000	10.40000	70.00000	-7.44939	69.710	-57.078	-110.30	-0.0018568
1	Grid	14.40000	10.40000	70.00000	-7.82994	69.710	-57.085	-111.22	-0.0018296
1	Grid	16.20000	10.40000	70.00000	-8.00170	69.710	-57.086	-111.50	-0.0018210
1	Grid	18.00000	10.40000	70.00000	-8.07076	69.710	-57.087	-111.59	-0.0018183
1	Grid	19.80000	10.40000	70.00000	-8.06083	69.710	-57.086	-111.55	-0.0018196
1	Grid	21.60000	10.40000	70.00000	-7.93471	69.710	-57.083	-111.20	-0.0018300
1	Grid	23.40000	10.40000	70.00000	-7.44794	69.710	-57.006	-108.64	-0.0019008
1	Grid	25.20000	10.40000	70.00000	-3.32795	69.710	-1.4530	-16.921	382.80E-6
1	Grid	27.00000	10.40000	70.00000	-2.42778	69.710	-0.14222	-7.2508	207.96E-6
1	Grid	28.80000	10.40000	70.00000	-1.98061	69.710	-0.11094	-5.7656	165.55E-6
1	Grid	30.60000	10.40000	70.00000	-1.38841	69.710	-0.024886	-3.1217	92.853E-6
1	Grid	32.40000	10.40000	70.00000	-0.92045	69.710	-0.010259	-1.8331	54.923E-6
1	Grid	34.20000	10.40000	70.00000	-0.55541	69.710	-0.0033064	-0.98195	29.621E-6
1	Grid	36.00000	10.40000	70.00000	-0.31593	69.710	-0.0010146	-0.53342	16.162E-6
1	Grid	0.00000	12.13333	70.00000	-0.04032	69.710	-82.826E-6	-0.14635	4.4523E-6
1	Grid	1.80000	12.13333	70.00000	-0.10216	69.710	-179.58E-6	-0.22121	6.7245E-6
1	Grid	3.60000	12.13333	70.00000	-0.21008	69.710	-464.55E-6	-0.36485	11.076E-6
1	Grid	5.40000	12.13333	70.00000	-0.41079	69.710	-0.0015964	-0.69111	20.915E-6
1	Grid	7.20000	12.13333	70.00000	-0.83454	69.710	-0.0094156	-1.6910	50.670E-6
1	Grid	9.00000	12.13333	70.00000	-2.03021	69.710	-0.26025	-8.1485	224.52E-6
1	Grid	10.80000	12.13333	70.00000	-7.63486	69.710	-59.381	-120.10	-0.0017689
1	Grid	12.60000	12.13333	70.00000	-9.02355	69.710	-59.865	-129.02	-0.0015411
1	Grid	14.40000	12.13333	70.00000	-9.48071	69.710	-59.875	-130.18	-0.0015068
1	Grid	16.20000	12.13333	70.00000	-9.67972	69.710	-59.877	-130.52	-0.0014965
1	Grid	18.00000	12.13333	70.00000	-9.76309	69.710	-59.877	-130.63	-0.0014931
1	Grid	19.80000	12.13333	70.00000	-9.76730	69.710	-59.877	-130.61	-0.0014937
1	Grid	21.60000	12.13333	70.00000	-9.66739	69.710	-59.874	-130.32	-0.0015023
1	Grid	23.40000	12.13333	70.00000	-9.23513	69.710	-59.791	-127.85	-0.0015702
1	Grid	25.20000	12.13333	70.00000	-5.09235	69.710	-2.2902	-30.156	709.59E-6
1	Grid	27.00000	12.13333	70.00000	-7.61962	69.710	-57.971	-111.21	-0.0019106
1	Grid	28.80000	12.13333	70.00000	-6.73593	69.710	-53.915	-97.339	-0.0019627
1	Grid	30.60000	12.13333	70.00000	-2.85886	69.710	-0.60757	-13.506	356.02E-6
1	Grid	32.40000	12.13333	70.00000	-1.75021	69.710	-0.29343	-7.0996	189.53E-6
1	Grid	34.20000	12.13333	70.00000	-0.82872	69.710	-0.013899	-1.8265	54.390E-6
1	Grid	36.00000	12.13333	70.00000	-0.41642	69.710	-0.0020586	-0.73372	22.171E-6

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Grid	0.00000	13.86667	70.00000	-0.03957	69.710	-81.840E-6	-0.14559	4.4292E-6
1	Grid	1.80000	13.86667	70.00000	-0.10068	69.710	-176.35E-6	-0.21945	6.6712E-6
1	Grid	3.60000	13.86667	70.00000	-0.20680	69.710	-450.74E-6	-0.36002	10.930E-6
1	Grid	5.40000	13.86667	70.00000	-0.40216	69.710	-0.0015073	-0.67375	20.394E-6
1	Grid	7.20000	13.86667	70.00000	-0.80410	69.710	-0.0082554	-1.5918	47.752E-6
1	Grid	9.00000	13.86667	70.00000	-1.84605	69.710	-0.18157	-6.6640	186.48E-6
1	Grid	10.80000	13.86667	70.00000	-5.71185	69.710	-34.105	-75.402	-820.17E-6
1	Grid	12.60000	13.86667	70.00000	-6.89928	69.710	-34.426	-82.171	-643.20E-6
1	Grid	14.40000	13.86667	70.00000	-7.33187	69.710	-34.435	-83.223	-611.93E-6
1	Grid	16.20000	13.86667	70.00000	-7.52836	69.710	-34.436	-83.553	-601.98E-6
1	Grid	18.00000	13.86667	70.00000	-7.61820	69.710	-34.436	-83.675	-598.28E-6
1	Grid	19.80000	13.86667	70.00000	-7.64439	69.710	-34.436	-83.702	-597.48E-6
1	Grid	21.60000	13.86667	70.00000	-7.62184	69.710	-34.436	-83.663	-598.66E-6
1	Grid	23.40000	13.86667	70.00000	-7.59684	69.710	-34.457	-83.973	-591.10E-6
1	Grid	25.20000	13.86667	70.00000	-9.02426	69.710	-59.095	-123.50	-0.0016391
1	Grid	27.00000	13.86667	70.00000	-9.35027	69.710	-59.902	-130.23	-0.0015077
1	Grid	28.80000	13.86667	70.00000	-8.97055	69.710	-59.857	-128.94	-0.0015429
1	Grid	30.60000	13.86667	70.00000	-7.98034	69.710	-59.649	-123.70	-0.0016836
1	Grid	32.40000	13.86667	70.00000	-4.48125	69.710	-29.838	-63.069	-805.86E-6
1	Grid	34.20000	13.86667	70.00000	-1.08699	69.710	-0.036347	-2.9426	86.349E-6
1	Grid	36.00000	13.86667	70.00000	-0.48521	69.710	-0.0031785	-0.89680	27.038E-6
1	Grid	0.00000	15.60000	70.00000	-0.03359	69.710	-74.616E-6	-0.13884	4.2242E-6
1	Grid	1.80000	15.60000	70.00000	-0.08919	69.710	-155.46E-6	-0.20562	6.2518E-6
1	Grid	3.60000	15.60000	70.00000	-0.18338	69.710	-377.13E-6	-0.32777	9.9538E-6
1	Grid	5.40000	15.60000	70.00000	-0.34977	69.710	-0.0011635	-0.58371	17.681E-6
1	Grid	7.20000	15.60000	70.00000	-0.66992	69.710	-0.0057675	-1.2658	38.047E-6
1	Grid	9.00000	15.60000	70.00000	-1.43700	69.710	-0.13928	-4.8945	136.42E-6
1	Grid	10.80000	15.60000	70.00000	-4.63746	69.710	-33.526	-67.128	-0.0010194
1	Grid	12.60000	15.60000	70.00000	-5.50928	69.710	-33.787	-72.076	-892.39E-6
1	Grid	14.40000	15.60000	70.00000	-5.85099	69.710	-33.793	-72.848	-869.38E-6
1	Grid	16.20000	15.60000	70.00000	-6.01937	69.710	-33.793	-73.117	-861.28E-6
1	Grid	18.00000	15.60000	70.00000	-6.10507	69.710	-33.794	-73.232	-857.80E-6
1	Grid	19.80000	15.60000	70.00000	-6.14652	69.710	-33.794	-73.291	-856.01E-6
1	Grid	21.60000	15.60000	70.00000	-6.17884	69.710	-33.795	-73.406	-852.62E-6
1	Grid	23.40000	15.60000	70.00000	-6.33714	69.710	-33.835	-74.592	-820.16E-6
1	Grid	25.20000	15.60000	70.00000	-8.23698	69.710	-58.898	-118.93	-0.0017604
1	Grid	27.00000	15.60000	70.00000	-8.61146	69.710	-59.606	-124.80	-0.0016462
1	Grid	28.80000	15.60000	70.00000	-8.40579	69.710	-59.608	-124.55	-0.0016540
1	Grid	30.60000	15.60000	70.00000	-7.76124	69.710	-59.572	-122.33	-0.0017183
1	Grid	32.40000	15.60000	70.00000	-4.39711	69.710	-29.803	-62.559	-818.26E-6
1	Grid	34.20000	15.60000	70.00000	-1.06177	69.710	-0.035679	-2.8840	84.624E-6
1	Grid	36.00000	15.60000	70.00000	-0.47504	69.710	-0.0031285	-0.88165	26.581E-6
1	Grid	0.00000	17.33333	70.00000	-0.02364	69.710	-63.348E-6	-0.12756	3.8814E-6
1	Grid	1.80000	17.33333	70.00000	-0.07056	69.710	-124.85E-6	-0.18354	5.5817E-6
1	Grid	3.60000	17.33333	70.00000	-0.14697	69.710	-278.03E-6	-0.27956	8.4938E-6
1	Grid	5.40000	17.33333	70.00000	-0.27360	69.710	-745.95E-6	-0.46111	13.984E-6
1	Grid	7.20000	17.33333	70.00000	-0.49140	69.710	-0.0028328	-0.86352	26.055E-6
1	Grid	9.00000	17.33333	70.00000	-0.89313	69.710	-0.025460	-2.1124	62.044E-6
1	Grid	10.80000	17.33333	70.00000	-1.54000	69.710	-0.23070	-5.8184	156.22E-6
1	Grid	12.60000	17.33333	70.00000	-1.97021	69.710	-0.26295	-7.2806	197.83E-6
1	Grid	14.40000	17.33333	70.00000	-2.19850	69.710	-0.26551	-7.7214	211.02E-6
1	Grid	16.20000	17.33333	70.00000	-2.32652	69.710	-0.26605	-7.9095	216.71E-6
1	Grid	18.00000	17.33333	70.00000	-2.39925	69.710	-0.26624	-8.0032	219.55E-6
1	Grid	19.80000	17.33333	70.00000	-2.44229	69.710	-0.26641	-8.0648	221.41E-6
1	Grid	21.60000	17.33333	70.00000	-2.48200	69.710	-0.26720	-8.1708	224.57E-6
1	Grid	23.40000	17.33333	70.00000	-2.57722	69.710	-0.27687	-8.6587	238.55E-6
1	Grid	25.20000	17.33333	70.00000	-2.82205	69.710	-0.42091	-10.976	296.00E-6
1	Grid	27.00000	17.33333	70.00000	-2.91410	69.710	-0.46232	-11.993	323.21E-6
1	Grid	28.80000	17.33333	70.00000	-2.77485	69.710	-0.46295	-11.842	318.55E-6
1	Grid	30.60000	17.33333	70.00000	-2.39602	69.710	-0.45197	-10.832	288.77E-6
1	Grid	32.40000	17.33333	70.00000	-1.57992	69.710	-0.23240	-6.2641	169.64E-6
1	Grid	34.20000	17.33333	70.00000	-0.76848	69.710	-0.012919	-1.7083	50.876E-6
1	Grid	36.00000	17.33333	70.00000	-0.38975	69.710	-0.0019574	-0.69623	21.038E-6
1	Grid	0.00000	19.06667	70.00000	-0.01151	69.710	-50.782E-6	-0.11375	3.4618E-6
1	Grid	1.80000	19.06667	70.00000	-0.04861	69.710	-93.350E-6	-0.15802	4.8070E-6
1	Grid	3.60000	19.06667	70.00000	-0.10632	69.710	-186.84E-6	-0.22825	6.9384E-6
1	Grid	5.40000	19.06667	70.00000	-0.19515	69.710	-418.34E-6	-0.34545	10.489E-6
1	Grid	7.20000	19.06667	70.00000	-0.32979	69.710	-0.0010851	-0.55152	16.708E-6
1	Grid	9.00000	19.06667	70.00000	-0.52313	69.710	-0.0031514	-0.91474	27.587E-6
1	Grid	10.80000	19.06667	70.00000	-0.75334	69.710	-0.0069887	-1.4074	42.249E-6
1	Grid	12.60000	19.06667	70.00000	-0.95183	69.710	-0.0092980	-1.7889	53.664E-6
1	Grid	14.40000	19.06667	70.00000	-1.09007	69.710	-0.010054	-2.0045	60.165E-6
1	Grid	16.20000	19.06667	70.00000	-1.17942	69.710	-0.010314	-2.1230	63.751E-6
1	Grid	18.00000	19.06667	70.00000	-1.23545	69.710	-0.010430	-2.1913	65.824E-6
1	Grid	19.80000	19.06667	70.00000	-1.27117	69.710	-0.010534	-2.2388	67.261E-6
1	Grid	21.60000	19.06667	70.00000	-1.29917	69.710	-0.010816	-2.2964	68.992E-6
1	Grid	23.40000	19.06667	70.00000	-1.33234	69.710	-0.011887	-2.4150	72.506E-6
1	Grid	25.20000	19.06667	70.00000	-1.36566	69.710	-0.014388	-2.6053	78.079E-6
1	Grid	27.00000	19.06667	70.00000	-1.35230	69.710	-0.015993	-2.6961	80.696E-6
1	Grid	28.80000	19.06667	70.00000	-1.25511	69.710	-0.015902	-2.5797	77.159E-6
1	Grid	30.60000	19.06667	70.00000	-1.05951	69.710	-0.013977	-2.2128	66.154E-6
1	Grid	32.40000	19.06667	70.00000	-0.77305	69.710	-0.0084571	-1.5451	46.312E-6
1	Grid	34.20000	19.06667	70.00000	-0.48536	69.710	-0.0029341	-0.87499	26.396E-6
1	Grid	36.00000	19.06667	70.00000	-0.28080	69.710	-926.36E-6	-0.48783	14.781E-6
1	Grid	0.00000	20.80000	70.00000	0.00105	69.710	-39.076E-6	-0.099294	3.0223E-6
1	Grid	1.80000	20.80000	70.00000	-0.02675	69.710	-66.699E-6	-0.13299	4.0466E-6
1	Grid	3.60000	20.80000	70.00000	-0.06811	69.710	-119.77E-6	-0.18237	5.5466E-6
1	Grid	5.40000	20.80000	70.00000	-0.12766	69.710	-226.47E-6	-0.25575	7.7728E-6
1	Grid	7.20000	20.80000	70.00000	-0.20955	69.710	-443.60E-6	-0.36375	11.044E-6
1	Grid	9.00000	20.80000	70.00000	-0.31333	69.710	-841.96E-6	-0.51199	15.525E-6
1	Grid	10.80000	20.80000	70.00000	-0.42755	69.710	-0.0013648	-0.68187	20.654E-6
1	Grid	12.60000	20.80000	70.00000	-0.53257	69.710	-0.0017840	-0.83236	25.202E-6
1	Grid	14.40000	20.80000	70.00000	-0.61554	69.710	-0.0020182	-0.94137	28.502E-6
1	Grid	16.20000	20.80000	70.00000	-0.67510	69.710	-0.0021352	-1.0133	30.682E-6
1	Grid	18.00000	20.80000	70.00000	-0.71539	69.710	-0.0021995	-1.0597	32.091E-6
1	Grid	19.80000	20.80000	70.00000	-0.74170	69.710	-0.0022541	-1.0918	33.065E-6
1	Grid	21.60000	20.80000	70.00000	-0.75886	69.710	-0.0023442	-1.1199	33.914E-6
1	Grid	23.40000	20.80000	70.00000	-0.76909	69.710	-0.0025264	-1.1514	34.856E-6
1	Grid	25.20000	20.80000	70.00000	-0.76738	69.710	-0.0027840	-1.1777	35.635E-6
1	Grid	27.00000	20.80000	70.00000	-0.74043	69.710	-0.0029375	-1.1677	35.315E-6
1	Grid	28.80000	20.80000	70.00000	-0.67599	69.710	-0.0028387	-1.0922	33.025E-6
1	Grid	30.60000	20.80000	70.00000	-0.57078	69.710	-0.0024112	-0.93928	28.403E-6
1	Grid	32.40000	20.80000	70.00000	-0.43574	69.710	-0.0016549	-0.72334	21.891E-6
1	Grid	34.20000	20.80000	70.00000	-0.29871	69.710	-890.79E-6	-0.50379	15.271E-6
1	Grid	36.00000	20.80000	70.00000	-0.18582	69.710	-422.85E-6	-0.33634	10.211E-6
1	Grid	0.00000	22.53333	70.00000	0.01270	69.710	-29.328E-6	-0.085503	2.6029E-6
1	Grid	1.80000	22.53333	70.00000	-0.00721	69.710	-46.657E-6	-0.11064	3.3673E-6
1	Grid	3.60000	22.53333	70.00000	-0.03576	69.710	-76.137E-6	-0.14497	4.4108E-6
1	Grid	5.40000	22.53333	70.00000	-0.07480	69.710	-126.25E-6	-0.19148	5.8234E-6
1	Grid	7.20000	22.53333	70.00000	-0.12516	69.710	-207.92E-6	-0.25245	7.6740E-6
1	Grid	9.00000	22.53333	70.00000	-0.18507	69.710	-326.05E-6	-0.32674	9.9271E-6
1	Grid	10.80000	22.53333	70.00000	-0.24899	69.710	-463.32E-6	-0.40676	12.353E-6
1	Grid	12.60000	22.53333	70.00000	-0.30926	69.710	-584.80E-6	-0.48078	14.598E-6
1	Grid	14.40000	22.53333	70.00000	-0.35996	69.710	-670.48E-6	-0.54054	16.411E-6
1	Grid	16.20000	22.53333	70.00000	-0.39887	69.710	-724.23E-6	-0.58444	17.744E-6
1	Grid	18.00000	22.53333	70.00000	-0.42657	69.710	-758.57E-6	-0.61494	18.670E-6
1	Grid	19.80000	22.53333	70.00000	-0.44479	69.710	-785.86E-6	-0.63565	19.299E-6
1	Grid	21.60000	22.53333	70.00000	-0.45506	69.710	-817.13E-6	-0.64970	19.724E-6
1	Grid	23.40000	22.53333	70.00000	-0.45748	69.710	-858.50E-6	-0.65790	19.970E-6
1	Grid	25.20000	22.53333	70.00000	-0.44957	69.710	-899.42E-6	-0.65624	19.916E-6
1	Grid	27.00000	22.53333	70.00000	-0.42675	69.710	-909.12E-6	-0.63608	19.301E-6
1	Grid	28.80000	22.53333	70.00000	-0.38525	69.710	-857.01E-6	-0.58945	17.884E-6
1	Grid	30.60000	22.53333	70.00000	-0.32525	69.710	-729.39E-6	-0.51453	15.613E-6
1	Grid	32.40000	22.53333	70.00000	-0.25279	69.710	-542.61E-6	-0.41946	12.733E-6
1	Grid	34.20000	22.53333	70.00000	-0.17876	69.710	-351.36E-6	-0.32174	9.7723E-6
1	Grid	36.00000	22.53333	70.00000	-0.11354	69.710	-206.89E-6	-0.23792	7.2314E-6
1	Grid	0.00000	24.26667	70.00000	0.02266	69.710	-21.755E-6	-0.073089	2.2253E-6
1	Grid	1.80000	24.26667	70.00000	0.00897	69.710	-32.526E-6	-0.091721	2.7921E-6
1	Grid	3.60000	24.26667	70.00000	-0.01015	69.710	-49.088E-6	-0.11573	3.5221E-6
1	Grid	5.40000	24.26667	70.00000	-0.03539	69.710	-73.964E-6	-0.14607	4.4445E-6

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Grid	7.20000	24.26667	70.00000	-0.06667	69.710	-109.26E-6	-0.18299	5.5663E-6
1	Grid	9.00000	24.26667	70.00000	-0.10263	69.710	-154.41E-6	-0.22512	6.8462E-6
1	Grid	10.80000	24.26667	70.00000	-0.14045	69.710	-204.04E-6	-0.26910	8.1818E-6
1	Grid	12.60000	24.26667	70.00000	-0.17658	69.710	-249.92E-6	-0.31045	9.4378E-6
1	Grid	14.40000	24.26667	70.00000	-0.20804	69.710	-286.26E-6	-0.34562	10.506E-6
1	Grid	16.20000	24.26667	70.00000	-0.23321	69.710	-312.30E-6	-0.37306	11.340E-6
1	Grid	18.00000	24.26667	70.00000	-0.25172	69.710	-330.53E-6	-0.39293	11.944E-6
1	Grid	19.80000	24.26667	70.00000	-0.26392	69.710	-344.31E-6	-0.40616	12.346E-6
1	Grid	21.60000	24.26667	70.00000	-0.27011	69.710	-356.39E-6	-0.41353	12.569E-6
1	Grid	23.40000	24.26667	70.00000	-0.27006	69.710	-367.23E-6	-0.41489	12.610E-6
1	Grid	25.20000	24.26667	70.00000	-0.26263	69.710	-373.13E-6	-0.40860	12.417E-6
1	Grid	27.00000	24.26667	70.00000	-0.24621	69.710	-366.65E-6	-0.39195	11.910E-6
1	Grid	28.80000	24.26667	70.00000	-0.21979	69.710	-340.67E-6	-0.36281	11.025E-6
1	Grid	30.60000	24.26667	70.00000	-0.18421	69.710	-293.09E-6	-0.32154	9.7717E-6
1	Grid	32.40000	24.26667	70.00000	-0.14266	69.710	-230.05E-6	-0.27199	8.2675E-6
1	Grid	34.20000	24.26667	70.00000	-0.10006	69.710	-164.83E-6	-0.22067	6.7096E-6
1	Grid	36.00000	24.26667	70.00000	-0.06119	69.710	-110.07E-6	-0.17387	5.2884E-6
1	Grid	0.00000	26.00000	70.00000	0.03059	69.710	-16.101E-6	-0.062302	1.8971E-6
1	Grid	1.80000	26.00000	70.00000	0.02160	69.710	-22.840E-6	-0.076144	2.3183E-6
1	Grid	3.60000	26.00000	70.00000	0.00918	69.710	-32.403E-6	-0.093160	2.8360E-6
1	Grid	5.40000	26.00000	70.00000	-0.00688	69.710	-45.539E-6	-0.11360	3.4575E-6
1	Grid	7.20000	26.00000	70.00000	-0.02633	69.710	-62.585E-6	-0.13724	4.1764E-6
1	Grid	9.00000	26.00000	70.00000	-0.04829	69.710	-82.892E-6	-0.16315	4.9642E-6
1	Grid	10.80000	26.00000	70.00000	-0.07123	69.710	-104.55E-6	-0.18966	5.7699E-6
1	Grid	12.60000	26.00000	70.00000	-0.09333	69.710	-125.00E-6	-0.21471	6.5316E-6
1	Grid	14.40000	26.00000	70.00000	-0.11299	69.710	-142.24E-6	-0.23657	7.1961E-6
1	Grid	16.20000	26.00000	70.00000	-0.12914	69.710	-155.58E-6	-0.25418	7.7315E-6
1	Grid	18.00000	26.00000	70.00000	-0.14126	69.710	-165.41E-6	-0.26721	8.1276E-6
1	Grid	19.80000	26.00000	70.00000	-0.14925	69.710	-172.57E-6	-0.27571	8.3860E-6
1	Grid	21.60000	26.00000	70.00000	-0.15304	69.710	-177.69E-6	-0.27977	8.5093E-6
1	Grid	23.40000	26.00000	70.00000	-0.15239	69.710	-180.63E-6	-0.27916	8.4906E-6
1	Grid	25.20000	26.00000	70.00000	-0.14679	69.710	-180.11E-6	-0.27324	8.3100E-6
1	Grid	27.00000	26.00000	70.00000	-0.13572	69.710	-174.05E-6	-0.26114	7.9420E-6
1	Grid	28.80000	26.00000	70.00000	-0.11906	69.710	-160.68E-6	-0.24246	7.3738E-6
1	Grid	30.60000	26.00000	70.00000	-0.09753	69.710	-139.91E-6	-0.21779	6.6240E-6
1	Grid	32.40000	26.00000	70.00000	-0.07291	69.710	-114.02E-6	-0.18908	5.7515E-6
1	Grid	34.20000	26.00000	70.00000	-0.04764	69.710	-87.078E-6	-0.15918	4.8428E-6
1	Grid	36.00000	26.00000	70.00000	-0.02412	69.710	-63.026E-6	-0.13089	3.9828E-6

Results : Consolidation : Displacement Data : Grids

None

Results : Total : Displacement Data : Grids

None

Oasys

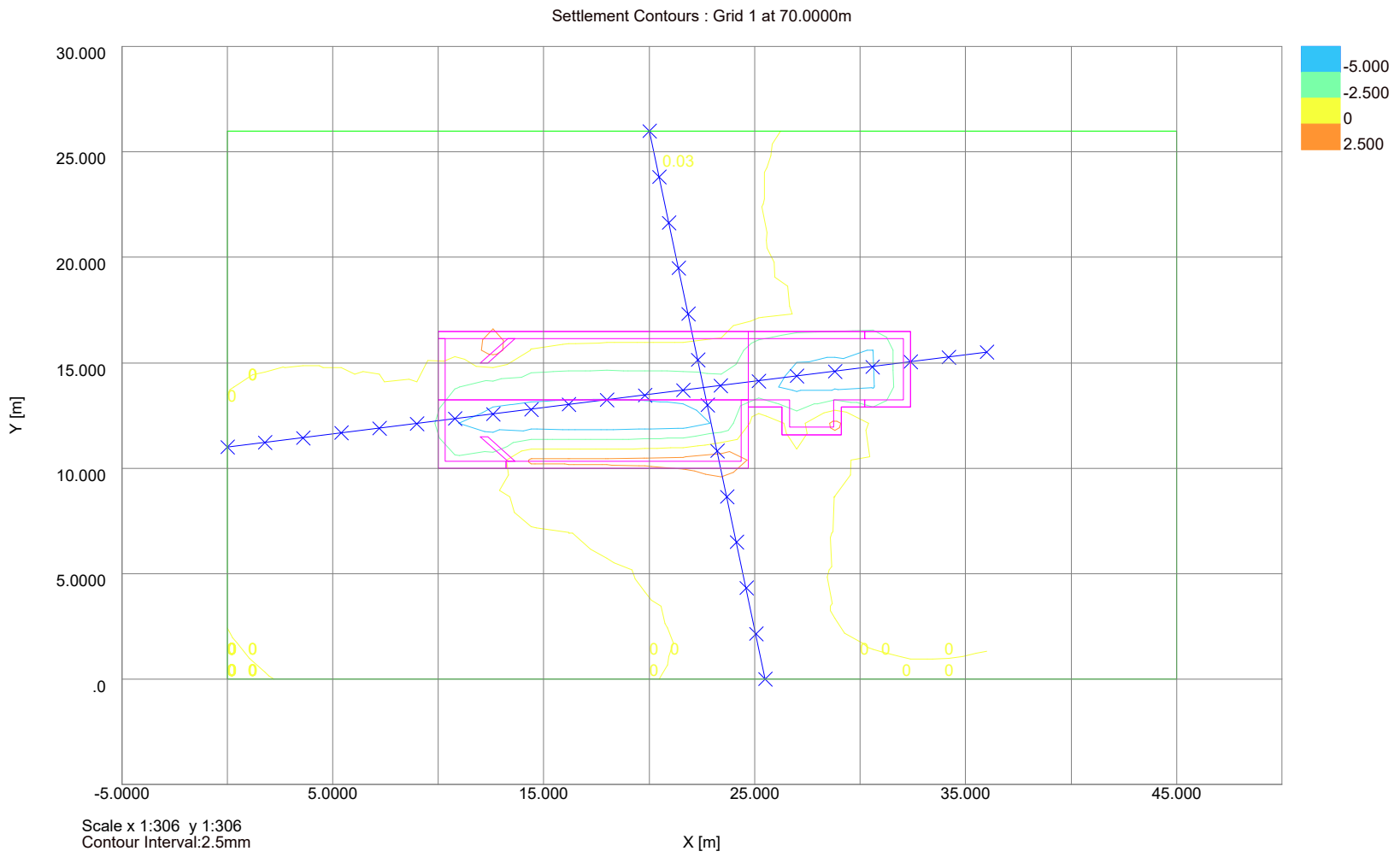
MAUND
GEO-CONSULTING LTD

Job No.	Sheet No.	Rev.
MGC 29		

Drg. Ref.

Made by	Date	Checked
JGM	21 Nov 2019	

15 Lyncroft Gardens
Excavation and wall loads combined long term



Titles

Job No.: MGC 29
Job Title: 15 Lyncroft Gardens
Sub-title: Excavation and wall loads combined long term
Calculation Heading:
Initials: JGM
Checker: jm
Date Saved: 21 Nov 2019
Date Checked: 23 Nov 2019
Notes:
File Name: Lyncoft excavation and wall loads.pdd
File Path: F:\OneDrive\Documents\Croft Structural Engineers\15 Lyncroft Gardens NW6 1LB\07-GIR Lyncroft\PDISP

History

Date	Time	By	Notes
19-Jul-2019	13:04	Maund Geo Consulting	New
19-Jul-2019	14:55	Maund Geo Consulting	
19-Jul-2019	15:12	Maund Geo Consulting	
19-Jul-2019	15:37	Maund Geo Consulting	
25-Jul-2019	13:07	Maund Geo Consulting	
25-Jul-2019	13:53	Maund Geo Consulting	
25-Jul-2019	14:21	Maund Geo Consulting	
02-Aug-2019	11:01	Maund Geo Consulting	
20-Nov-2019	21:02	Maund Geo Consulting	
20-Nov-2019	21:56	Maund Geo Consulting	
21-Nov-2019	09:46	Maund Geo Consulting	
21-Nov-2019	20:37	Maund Geo Consulting	
22-Nov-2019	11:47	Maund Geo Consulting	
22-Nov-2019	12:10	Maund Geo Consulting	
23-Nov-2019	14:21	Maund Geo Consulting	
23-Nov-2019	16:51	Maund Geo Consulting	

Analysis Options

General
Global Poisson's ratio: 0.20
Maximum allowable ratio between values of E: 1.5
Horizontal rigid boundary level: 45.00 [m OD]
Displacements at load centroids: Yes
GSA piled raft data : No

Elastic
Elastic : Yes
Analysis: Boussinesq
Stiffness for horizontal displacement calculations: Weighted average
Using legacy heave correction factor: No

Consolidation
Consolidation : No

Soil ProfilesSoil Profile 1

Layer ref.	Name	Level at top [mOD]	Number of intermediate displacement levels	Youngs Modulus : Top [kN/m²]	Youngs Modulus : Btm. [kN/m²]	Poissons ratio	Non-linear curve
1	london clay	70.000	25	11250.	140000.	0.50000	None

Non-linear Curve Coordinates - Non-linear Curve 1

Point	Strain [%]	Factor

Soil Zones

Zone	Name	X min [m]	X max [m]	Y min [m]	Y max [m]	Profile
1	zone 1	0.0	45.000	0.0	26.000	Soil Profile 1

Polygonal Load Data

Load ref.	Name	Position : Level [m]	Position : Polygon : Coords. [m]	Position : Polygon : Rect. tolerance [%]	No. of Rectangles	Value : Normal (local z) [kN/m²]
1	excavation full	70.00000	(10,10) (24.7,10) (24.7,12.9) (26.3,12.9) (26.3,11.6) (29.1,11.6) (29.1,12.9) (32.4,12.9) (32.4,16.5) (24.7,16.5) (24.7,13.3) (10,13.3) (10,10)	10.000	4	-50.000
2	wall2 60 kN/m	70.00000	(30.2,16.1) (30.2,16.5) (24.7,16.5) (24.7,16.1) (30.2,16.1)	10.000	1	176.00
3	wall3 30 kN/m	70.00000	(30.2,16.1) (30.2,16.5) (32.4,16.5) (32.4,12.9) (30.2,12.9) (30.2,13.3) (32,13.3) (32,16.1) (30.2,16.1)	10.000	3	86.000
4	wall4 60 kN/m	70.00000	(30.2,12.9) (29.1,12.9) (29.1,11.6) (26.3,11.6) (26.3,12.9) (24.7,12.9) (24.7,13.3) (26.6,13.3) (26.6,11.9) (28.8,11.9) (28.8,13.3) (30.2,13.3) (30.2,12.9)	10.000	5	176.00
5	bay A 60 kN/m	70.00000	(13.3,10.3) (13.7,10.3) (12.3,11.5) (12,11.5) (13.3,10.3)	10.000	11	176.00
6	bay b 60 kN/m	70.00000	(13.3,16.1) (13.7,16.1) (12.3,15) (12,15) (13.3,16.1)	10.000	11	176.00
7	wall 6 30kN/m	70.00000	(10,16.1) (10.3,16.1) (10.3,10.3) (13.2,10.3) (13.2,10) (10,10) (10,16.1)	10.000	2	86.000
8	wall 5 100 kN/m	70.00000	(13.2,10) (24.7,10) (24.7,13.3) (24.4,13.3) (24.4,10.3) (13.2,10.3) (13.2,10)	10.000	2	296.00
9	wall 1 100kN/m	70.00000	(10,16.5) (24.7,16.5) (24.7,16.1) (10,16.1) (10,16.5)	10.000	1	296.00
10	excavation cellar	70.00000	(10,13.3) (24.7,13.3) (24.7,16.5) (10,16.5) (10,13.3)	10.000	1	-24.000

15 Lyncroft Gardens

Excavation and wall loads combined long term

Load ref.	Name	Position : Level	Position : Polygon : Coords.	Position : Polygon : Rect. tolerance	No. of Rectangles	Value : Normal (local z)

Polygonal Loads' Rectangles

No.	Centre : x [m]	Centre : y [m]	Angle of local x from global X [Degrees]	Width x [m]	Depth y [m]
Load 1 : excavation full					
(Edge 1 optimal)					
1	17.35000	11.62500	0.0	14.700	3.2500
2	25.50000	14.70000	0.0	1.6000	3.6000
3	27.70000	14.05000	0.0	2.8000	4.9000
4	30.75000	14.70000	0.0	3.3000	3.6000
Load 2 : wall2 60 kN/m					
(Edge 1 optimal)					
1	27.45000	16.32500	90.000	0.35000	5.5000
Load 3 : wall3 30 kN/m					
(Edge 2 optimal)					
1	32.22500	14.70000	-90.000	2.9000	0.35000
2	31.30000	13.07500	-90.000	0.35000	2.2000
3	31.30000	16.32500	-90.000	0.35000	2.2000
Load 4 : wall4 60 kN/m					
(Edge 2 optimal)					
1	29.65000	13.07500	-180.00	1.1000	0.35000
2	28.92500	12.42500	-180.00	0.35000	1.6500
3	27.70000	11.77500	-180.00	2.1000	0.35000
4	26.47500	12.42500	-180.00	0.35000	1.6500
5	25.50000	13.07500	-180.00	1.6000	0.35000
Load 5 : bay A 60 kN/m					
(Edge 2 optimal)					
1	13.62268	10.35868	138.50	0.052430	0.023190
2	13.56805	10.37605	138.50	0.052430	0.069570
3	13.51341	10.39342	138.50	0.052430	0.11595
4	13.45878	10.41079	138.50	0.052430	0.16233
5	13.40414	10.42816	138.50	0.052430	0.20871
6	12.82500	10.92500	138.50	1.4735	0.23190
7	12.24586	11.42184	138.50	0.052430	0.20871
8	12.19122	11.43921	138.50	0.052430	0.16233
9	12.13659	11.45658	138.50	0.052430	0.11595
10	12.08195	11.47395	138.50	0.052430	0.069570
11	12.02732	11.49132	138.50	0.052430	0.023190
Load 6 : bay b 60 kN/m					
(Edge 1 optimal)					
1	12.02732	15.00868	41.496	0.052430	0.023190
2	12.08195	15.02605	41.496	0.052430	0.069570
3	12.13659	15.04342	41.496	0.052430	0.11595
4	12.19122	15.06079	41.496	0.052430	0.16233
5	12.24586	15.07816	41.496	0.052430	0.20871
6	12.82500	15.57500	41.496	1.4735	0.23190
7	13.40414	16.07184	41.496	0.052430	0.20871
8	13.45878	16.08921	41.496	0.052430	0.16233
9	13.51341	16.10658	41.496	0.052430	0.11595
10	13.56805	16.12395	41.496	0.052430	0.069570
11	13.62268	16.14132	41.496	0.052430	0.023190
Load 7 : wall 6 30kN/m					
(Edge 2 optimal)					
1	10.17500	13.07500	0.0	0.35000	6.1500
2	11.77500	10.17500	0.0	2.8500	0.35000
Load 8 : wall 5 100 kN/m					
(Edge 1 optimal)					
1	18.77500	10.17500	0.0	11.150	0.35000
2	24.52500	11.62500	0.0	0.35000	3.2500
Load 9 : wall 1 100kN/m					
(Edge 2 optimal)					
1	17.35000	16.32500	0.0	14.700	0.35000
Load 10 : excavation cellar					
(Edge 1 optimal)					
1	17.35000	14.87500	0.0	14.700	3.2500

Displacement Lines

Name	X1 [m]	Y1 [m]	Z1 [m]	X2 [m]	Y2 [m]	Z2 [m]	Intervals [No.]	Calculate	Detailed Results
Long section	0.00000	11.00000	70.00000	36.00000	15.50000	70.00000	20	Yes	Yes
Cross Secton	25.50000	0.00000	70.00000	20.00000	26.00000	70.00000	12	Yes	Yes

Displacement Grids

Name	Extrusion: Direction	X1 [m]	Y1 [m]	Z1 [m]	X2 [m]	Y2 [m]	Z2 [m]	Intervals Along Line [No.]	Extrusion: Distance [m]	Extrusion: Intervals Along [No.]	Calculate	Detailed Results
Grid	Global X	0.00000	0.00000	70.00000	-	26.00000	70.00000	15	36.00000	20	Yes	Yes

Results : Immediate : Load Centres : Polygonal

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	excavation full	21.74929	12.73088	70.00000	-6.18765	69.730	-49.353	-99.081	-0.0019449
2	wall2 60 kN/m	27.45000	16.32500	70.00000	2.99353	69.730	74.098	77.061	0.0057674
3	wall3 30 kN/m	31.66747	14.70000	70.00000	-4.60508	69.730	-46.273	-79.713	-0.0023472
4	wall4 60 kN/m	27.53025	12.47315	70.00000	-3.46897	69.730	-46.210	-68.989	-0.0027656
5	bay A 60 kN/m	12.82500	10.92500	70.00000	0.15873	69.730	37.515	16.976	0.0037952
6	bay b 60 kN/m	12.82500	15.57500	70.00000	4.97538	69.730	65.509	87.161	0.0043431
7	wall 6 30kN/m	10.68167	12.15667	70.00000	-4.55011	69.730	-44.980	-76.647	-0.0023149
8	wall 5 100 kN/m	20.07274	10.50226	70.00000	0.12206	69.730	3.4036	30.190	-793.42E-6
9	wall 1 100kN/m	17.35000	16.32500	70.00000	11.17077	69.730	174.36	221.12	0.011991
10	excavation cellar	17.35000	14.87500	70.00000	-2.61881	69.730	-23.709	-44.621	-0.0010526

Results : Consolidation : Load Centres : Polygonal

None

Results : Total : Load Centres : Polygonal

None

Results : Immediate : Displacement Data : Lines

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Long section	0.00000	11.00000	70.00000	-0.00361	69.730	-6.7074E-6	-0.013092	0.0
1	Long section	1.80000	11.22500	70.00000	-0.01060	69.730	-15.698E-6	-0.021136	0.0
1	Long section	3.60000	11.45000	70.00000	-0.02438	69.730	-44.603E-6	-0.038506	1.5238E-6
1	Long section	5.40000	11.67500	70.00000	-0.05467	69.730	-166.78E-6	-0.084483	3.3351E-6
1	Long section	7.20000	11.90000	70.00000	-0.13515	69.730	-880.92E-6	-0.24888	9.7785E-6
1	Long section	9.00000	12.12500	70.00000	-0.42819	69.730	0.018594	-1.0567	44.177E-6
1	Long section	10.80000	12.35000	70.00000	-4.84693	69.730	-47.380	-83.847	-0.0023149
1	Long section	12.60000	12.57500	70.00000	-6.20714	69.730	-49.563	-99.682	-0.0019461
1	Long section	14.40000	12.80000	70.00000	-6.39042	69.730	-49.123	-98.854	-0.0019266
1	Long section	16.20000	13.02500	70.00000	-6.21941	69.730	-46.773	-92.952	-0.0018810
1	Long section	18.00000	13.25000	70.00000	-5.53903	69.730	-36.962	-79.425	-0.0012493
1	Long section	19.80000	13.47500	70.00000	-4.75539	69.730	-27.145	-65.546	-631.03E-6
1	Long section	21.60000	13.70000	70.00000	-4.20046	69.730	-24.772	-58.163	-641.51E-6
1	Long section	23.40000	13.92500	70.00000	-3.41781	69.730	-24.125	-51.570	-826.25E-6
1	Long section	25.20000	14.15000	70.00000	-4.81939	69.730	-48.667	-87.706	-0.0023149
1	Long section	27.00000	14.37500	70.00000	-6.03854	69.730	-49.770	-100.38	-0.0019433
1	Long section	28.80000	14.60000	70.00000	-6.16898	69.730	-49.768	-100.69	-0.0019305
1	Long section	30.60000	14.82500	70.00000	-5.83170	69.730	-49.712	-98.771	-0.0020001
1	Long section	32.40000	15.05000	70.00000	-0.45383	69.730	13.320	7.4005	0.0012930
1	Long section	34.20000	15.27500	70.00000	-0.27947	69.730	-0.0017510	-0.56964	22.413E-6
1	Long section	36.00000	15.50000	70.00000	-0.12078	69.730	-486.65E-6	-0.18842	7.4244E-6
2	Cross Secton	25.50000	0.00000	70.00000	0.00406	69.730	8.8009E-6	-0.0076120	0.0
2	Cross Secton	25.04167	2.16667	70.00000	0.00547	69.730	44.160E-6	-84.668E-6	0.0
2	Cross Secton	24.58333	4.33333	70.00000	0.01824	69.730	266.80E-6	0.042179	-1.6432E-6
2	Cross Secton	24.12500	6.50000	70.00000	0.08960	69.730	0.0028165	0.31449	-12.153E-6
2	Cross Secton	23.66667	8.66667	70.00000	0.63631	69.730	0.16720	4.5625	-161.26E-6
2	Cross Secton	23.20833	10.83333	70.00000	-2.18817	69.730	-43.343	-51.785	-0.0031071
2	Cross Secton	22.75000	13.00000	70.00000	-5.47279	69.730	-47.173	-90.212	-0.0020375
2	Cross Secton	22.29167	15.16667	70.00000	-1.92685	69.730	-23.275	-38.229	-0.0012547
2	Cross Secton	21.83333	17.33333	70.00000	1.51911	69.730	1.0400	14.757	-462.11E-6
2	Cross Secton	21.37500	19.50000	70.00000	0.27394	69.730	0.0087096	0.87897	-33.868E-6
2	Cross Secton	20.91667	21.66667	70.00000	0.09585	69.730	816.31E-6	0.18119	-7.0981E-6
2	Cross Secton	20.45833	23.83333	70.00000	0.04619	69.730	156.81E-6	0.054580	-2.1488E-6
2	Cross Secton	20.00000	26.00000	70.00000	0.02727	69.730	42.862E-6	0.019192	0.0

Results : Consolidation : Displacement Data : Lines

None

Results : Total : Displacement Data : Lines

None

Results : Immediate : Displacement Data : Grids

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Grid	0.00000	0.00000	70.00000	0.00187	69.730	-1.9723E-6	-0.0071059	0.0
1	Grid	1.80000	0.00000	70.00000	0.00044	69.730	-2.8753E-6	-0.0089632	0.0
1	Grid	3.60000	0.00000	70.00000	-0.00144	69.730	-4.1040E-6	-0.011228	0.0
1	Grid	5.40000	0.00000	70.00000	-0.00369	69.730	-5.6118E-6	-0.013819	0.0
1	Grid	7.20000	0.00000	70.00000	-0.00605	69.730	-7.1339E-6	-0.016484	0.0
1	Grid	9.00000	0.00000	70.00000	-0.00813	69.730	-8.1010E-6	-0.018770	0.0
1	Grid	10.80000	0.00000	70.00000	-0.00941	69.730	-7.7873E-6	-0.020137	0.0
1	Grid	12.60000	0.00000	70.00000	-0.00956	69.730	-5.7943E-6	-0.020215	0.0
1	Grid	14.40000	0.00000	70.00000	-0.00850	69.730	-2.4571E-6	-0.019019	0.0
1	Grid	16.20000	0.00000	70.00000	-0.00646	69.730	1.4077E-6	-0.016889	0.0
1	Grid	18.00000	0.00000	70.00000	-0.00381	69.730	5.1077E-6	-0.014259	0.0
1	Grid	19.80000	0.00000	70.00000	-0.00097	69.730	8.2197E-6	-0.011552	0.0
1	Grid	21.60000	0.00000	70.00000	0.00157	69.730	10.281E-6	-0.0092433	0.0
1	Grid	23.40000	0.00000	70.00000	0.00333	69.730	10.699E-6	-0.0078228	0.0
1	Grid	25.20000	0.00000	70.00000	0.00405	69.730	9.2093E-6	-0.0075522	0.0
1	Grid	27.00000	0.00000	70.00000	0.00382	69.730	6.3367E-6	-0.0082367	0.0
1	Grid	28.80000	0.00000	70.00000	0.00309	69.730	3.1355E-6	-0.0093200	0.0
1	Grid	30.60000	0.00000	70.00000	0.00233	69.730	0.0	-0.010223	0.0
1	Grid	32.40000	0.00000	70.00000	0.00189	69.730	-1.2107E-6	-0.010602	0.0
1	Grid	34.20000	0.00000	70.00000	0.00187	69.730	-2.0323E-6	-0.010387	0.0
1	Grid	36.00000	0.00000	70.00000	0.00221	69.730	-2.2199E-6	-0.0096969	0.0
1	Grid	0.00000	1.73333	70.00000	0.00060	69.730	-2.7586E-6	-0.0085035	0.0
1	Grid	1.80000	1.73333	70.00000	-0.00165	69.730	-4.3045E-6	-0.011151	0.0
1	Grid	3.60000	1.73333	70.00000	-0.00472	69.730	-6.6298E-6	-0.014599	0.0
1	Grid	5.40000	1.73333	70.00000	-0.00857	69.730	-9.8082E-6	-0.018825	0.0
1	Grid	7.20000	1.73333	70.00000	-0.01283	69.730	-13.355E-6	-0.023437	0.0
1	Grid	9.00000	1.73333	70.00000	-0.01672	69.730	-15.655E-6	-0.027474	1.0892E-6
1	Grid	10.80000	1.73333	70.00000	-0.01914	69.730	-14.072E-6	-0.029563	1.1723E-6
1	Grid	12.60000	1.73333	70.00000	-0.01928	69.730	-6.9389E-6	-0.028728	1.1400E-6
1	Grid	14.40000	1.73333	70.00000	-0.01711	69.730	4.0880E-6	-0.025230	1.0024E-6
1	Grid	16.20000	1.73333	70.00000	-0.01326	69.730	15.423E-6	-0.020212	0.0
1	Grid	18.00000	1.73333	70.00000	-0.00846	69.730	25.046E-6	-0.014662	0.0
1	Grid	19.80000	1.73333	70.00000	-0.00338	69.730	32.711E-6	-0.0091999	0.0
1	Grid	21.60000	1.73333	70.00000	0.00115	69.730	37.665E-6	-0.0046658	0.0
1	Grid	23.40000	1.73333	70.00000	0.00409	69.730	37.711E-6	-0.0023008	0.0
1	Grid	25.20000	1.73333	70.00000	0.00476	69.730	31.457E-6	-0.0029052	0.0
1	Grid	27.00000	1.73333	70.00000	0.00347	69.730	21.058E-6	-0.0058575	0.0
1	Grid	28.80000	1.73333	70.00000	0.00134	69.730	10.681E-6	-0.0094872	0.0
1	Grid	30.60000	1.73333	70.00000	-0.00052	69.730	3.0205E-6	-0.012318	0.0
1	Grid	32.40000	1.73333	70.00000	-0.00147	69.730	-1.4301E-6	-0.013701	0.0
1	Grid	34.20000	1.73333	70.00000	-0.00143	69.730	-3.3450E-6	-0.013692	0.0
1	Grid	36.00000	1.73333	70.00000	-0.00066	69.730	-3.6905E-6	-0.012704	0.0
1	Grid	0.00000	3.46667	70.00000	-0.00089	69.730	-3.8108E-6	-0.010084	0.0
1	Grid	1.80000	3.46667	70.00000	-0.00425	69.730	-6.4506E-6	-0.013848	0.0
1	Grid	3.60000	3.46667	70.00000	-0.00910	69.730	-10.951E-6	-0.019179	0.0
1	Grid	5.40000	3.46667	70.00000	-0.01560	69.730	-18.076E-6	-0.026366	1.0449E-6
1	Grid	7.20000	3.46667	70.00000	-0.02336	69.730	-27.419E-6	-0.035000	1.3866E-6
1	Grid	9.00000	3.46667	70.00000	-0.03086	69.730	-34.361E-6	-0.043022	1.7044E-6
1	Grid	10.80000	3.46667	70.00000	-0.03547	69.730	-27.482E-6	-0.046403	1.8394E-6
1	Grid	12.60000	3.46667	70.00000	-0.03499	69.730	3.1958E-6	-0.041808	1.6606E-6
1	Grid	14.40000	3.46667	70.00000	-0.02976	69.730	48.199E-6	-0.030813	1.2294E-6
1	Grid	16.20000	3.46667	70.00000	-0.02195	69.730	87.120E-6	-0.018135	0.0
1	Grid	18.00000	3.46667	70.00000	-0.01306	69.730	114.06E-6	-0.0061104	0.0
1	Grid	19.80000	3.46667	70.00000	-0.00370	69.730	134.19E-6	0.0053002	0.0
1	Grid	21.60000	3.46667	70.00000	0.00486	69.730	148.05E-6	0.015020	0.0
1	Grid	23.40000	3.46667	70.00000	0.01008	69.730	145.03E-6	0.019280	0.0
1	Grid	25.20000	3.46667	70.00000	0.00987	69.730	115.50E-6	0.014855	0.0
1	Grid	27.00000	3.46667	70.00000	0.00521	69.730	71.456E-6	0.0041038	0.0
1	Grid	28.80000	3.46667	70.00000	-0.00068	69.730	33.819E-6	-0.0071014	0.0
1	Grid	30.60000	3.46667	70.00000	-0.00513	69.730	10.107E-6	-0.014948	0.0
1	Grid	32.40000	3.46667	70.00000	-0.00712	69.730	-1.8852E-6	-0.018634	0.0
1	Grid	34.20000	3.46667	70.00000	-0.00689	69.730	-6.2683E-6	-0.018974	0.0
1	Grid	36.00000	3.46667	70.00000	-0.00524	69.730	-6.6700E-6	-0.017304	0.0
1	Grid	0.00000	5.20000	70.00000	-0.00246	69.730	-5.1033E-6	-0.011724	0.0
1	Grid	1.80000	5.20000	70.00000	-0.00720	69.730	-9.4847E-6	-0.016969	0.0
1	Grid	3.60000	5.20000	70.00000	-0.01456	69.730	-18.159E-6	-0.025194	0.0
1	Grid	5.40000	5.20000	70.00000	-0.02539	69.730	-34.765E-6	-0.037796	1.4968E-6
1	Grid	7.20000	5.20000	70.00000	-0.03979	69.730	-62.297E-6	-0.055382	2.1919E-6
1	Grid	9.00000	5.20000	70.00000	-0.05527	69.730	-90.020E-6	-0.074206	2.9361E-6
1	Grid	10.80000	5.20000	70.00000	-0.06481	69.730	-60.800E-6	-0.080851	3.2035E-6
1	Grid	12.60000	5.20000	70.00000	-0.06077	69.730	114.70E-6	-0.058996	2.3565E-6
1	Grid	14.40000	5.20000	70.00000	-0.04549	69.730	370.12E-6	-0.017510	0.0
1	Grid	16.20000	5.20000	70.00000	-0.02819	69.730	538.09E-6	0.018540	0.0
1	Grid	18.00000	5.20000	70.00000	-0.01168	69.730	618.65E-6	0.044948	-1.7113E-6
1	Grid	19.80000	5.20000	70.00000	0.00582	69.730	674.64E-6	0.069442	-2.6773E-6
1	Grid	21.60000	5.20000	70.00000	0.02347	69.730	724.77E-6	0.093319	-3.6195E-6

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Grid	23.40000	5.20000	70.00000	0.03413	69.730	704.12E-6	0.10278	-3.9976E-6
1	Grid	25.20000	5.20000	70.00000	0.02957	69.730	517.76E-6	0.080194	-3.1229E-6
1	Grid	27.00000	5.20000	70.00000	0.01359	69.730	271.57E-6	0.038089	-1.4802E-6
1	Grid	28.80000	5.20000	70.00000	-0.00259	69.730	111.18E-6	0.0025130	0.0
1	Grid	30.60000	5.20000	70.00000	-0.01303	69.730	31.036E-6	-0.018651	0.0
1	Grid	32.40000	5.20000	70.00000	-0.01699	69.730	-3.5573E-6	-0.027508	1.0920E-6
1	Grid	34.20000	5.20000	70.00000	-0.01603	69.730	-13.628E-6	-0.028134	1.1156E-6
1	Grid	36.00000	5.20000	70.00000	-0.01247	69.730	-13.138E-6	-0.024690	0.0
1	Grid	0.00000	6.93333	70.00000	-0.00380	69.730	-6.4424E-6	-0.013155	0.0
1	Grid	1.80000	6.93333	70.00000	-0.01004	69.730	-13.232E-6	-0.020118	0.0
1	Grid	3.60000	6.93333	70.00000	-0.02058	69.730	-29.128E-6	-0.032377	1.2823E-6
1	Grid	5.40000	6.93333	70.00000	-0.03801	69.730	-67.334E-6	-0.054428	2.1534E-6
1	Grid	7.20000	6.93333	70.00000	-0.06513	69.730	-151.95E-6	-0.092562	3.6577E-6
1	Grid	9.00000	6.93333	70.00000	-0.10042	69.730	-274.25E-6	-0.14599	5.7647E-6
1	Grid	10.80000	6.93333	70.00000	-0.12539	69.730	-159.95E-6	-0.17079	6.7635E-6
1	Grid	12.60000	6.93333	70.00000	-0.10274	69.730	0.0014579	-0.046607	2.0245E-6
1	Grid	14.40000	6.93333	70.00000	-0.04482	69.730	0.0040567	0.17531	-6.4786E-6
1	Grid	16.20000	6.93333	70.00000	-0.00264	69.730	0.0050632	0.29673	-11.181E-6
1	Grid	18.00000	6.93333	70.00000	0.02630	69.730	0.0053034	0.35218	-13.354E-6
1	Grid	19.80000	6.93333	70.00000	0.05864	69.730	0.0054626	0.40471	-15.421E-6
1	Grid	21.60000	6.93333	70.00000	0.09964	69.730	0.0057201	0.47585	-18.215E-6
1	Grid	23.40000	6.93333	70.00000	0.12881	69.730	0.0056336	0.51248	-19.680E-6
1	Grid	25.20000	6.93333	70.00000	0.10182	69.730	0.0035119	0.36775	-14.185E-6
1	Grid	27.00000	6.93333	70.00000	0.04117	69.730	0.0012537	0.15496	-6.0044E-6
1	Grid	28.80000	6.93333	70.00000	-0.00382	69.730	421.22E-6	0.033462	-1.2786E-6
1	Grid	30.60000	6.93333	70.00000	-0.02782	69.730	109.67E-6	-0.024663	0.0
1	Grid	32.40000	6.93333	70.00000	-0.03513	69.730	-9.9895E-6	-0.045791	1.8172E-6
1	Grid	34.20000	6.93333	70.00000	-0.03162	69.730	-34.341E-6	-0.045419	1.7995E-6
1	Grid	36.00000	6.93333	70.00000	-0.02375	69.730	-27.982E-6	-0.037028	1.4671E-6
1	Grid	0.00000	8.66667	70.00000	-0.00449	69.730	-7.3607E-6	-0.013938	0.0
1	Grid	1.80000	8.66667	70.00000	-0.01193	69.730	-16.610E-6	-0.022380	0.0
1	Grid	3.60000	8.66667	70.00000	-0.02562	69.730	-42.286E-6	-0.039085	1.5471E-6
1	Grid	5.40000	8.66667	70.00000	-0.05149	69.730	-121.67E-6	-0.075083	2.9672E-6
1	Grid	7.20000	8.66667	70.00000	-0.10089	69.730	-356.50E-6	-0.15666	6.1787E-6
1	Grid	9.00000	8.66667	70.00000	-0.18713	69.730	379.30E-6	-0.30935	12.330E-6
1	Grid	10.80000	8.66667	70.00000	-0.28735	69.730	0.0066000	-0.47722	19.737E-6
1	Grid	12.60000	8.66667	70.00000	-0.15357	69.730	0.045120	0.65088	-20.472E-6
1	Grid	14.40000	8.66667	70.00000	0.19453	69.730	0.15492	3.3146	-113.17E-6
1	Grid	16.20000	8.66667	70.00000	0.29532	69.730	0.16348	3.7684	-130.17E-6
1	Grid	18.00000	8.66667	70.00000	0.33587	69.730	0.16399	3.8582	-133.68E-6
1	Grid	19.80000	8.66667	70.00000	0.39131	69.730	0.16441	3.9627	-137.78E-6
1	Grid	21.60000	8.66667	70.00000	0.49593	69.730	0.16608	4.2112	-147.45E-6
1	Grid	23.40000	8.66667	70.00000	0.63133	69.730	0.16959	4.5962	-162.32E-6
1	Grid	25.20000	8.66667	70.00000	0.41969	69.730	0.064889	2.4601	-89.964E-6
1	Grid	27.00000	8.66667	70.00000	0.11819	69.730	0.0074497	0.58160	-22.209E-6
1	Grid	28.80000	8.66667	70.00000	-0.00108	69.730	0.0025964	0.16003	-6.0457E-6
1	Grid	30.60000	8.66667	70.00000	-0.05773	69.730	628.76E-6	-0.028831	1.2198E-6
1	Grid	32.40000	8.66667	70.00000	-0.07099	69.730	-36.369E-6	-0.089594	3.5536E-6
1	Grid	34.20000	8.66667	70.00000	-0.05879	69.730	-98.982E-6	-0.080766	3.1955E-6
1	Grid	36.00000	8.66667	70.00000	-0.04092	69.730	-62.987E-6	-0.058014	2.2963E-6
1	Grid	0.00000	10.40000	70.00000	-0.00407	69.730	-7.1571E-6	-0.013562	0.0
1	Grid	1.80000	10.40000	70.00000	-0.01172	69.730	-17.221E-6	-0.022349	0.0
1	Grid	3.60000	10.40000	70.00000	-0.02684	69.730	-49.450E-6	-0.041410	1.6386E-6
1	Grid	5.40000	10.40000	70.00000	-0.05919	69.730	-176.76E-6	-0.089938	3.5505E-6
1	Grid	7.20000	10.40000	70.00000	-0.13646	69.730	-754.13E-6	-0.23896	9.3996E-6
1	Grid	9.00000	10.40000	70.00000	-0.33688	69.730	0.027960	-0.55689	25.446E-6
1	Grid	10.80000	10.40000	70.00000	-2.11746	69.730	-17.052	-28.706	-891.51E-6
1	Grid	12.60000	10.40000	70.00000	-1.55167	69.730	-13.634	-13.064	-0.0011055
1	Grid	14.40000	10.40000	70.00000	2.77544	69.730	53.796	85.959	0.0029954
1	Grid	16.20000	10.40000	70.00000	2.79715	69.730	53.713	85.543	0.0030021
1	Grid	18.00000	10.40000	70.00000	2.82754	69.730	53.713	85.603	0.0029997
1	Grid	19.80000	10.40000	70.00000	2.90553	69.730	53.714	85.770	0.0029932
1	Grid	21.60000	10.40000	70.00000	3.13654	69.730	53.722	86.485	0.0029657
1	Grid	23.40000	10.40000	70.00000	4.05917	69.730	54.111	93.494	0.0027337
1	Grid	25.20000	10.40000	70.00000	1.77590	69.730	4.0131	27.099	-598.02E-6
1	Grid	27.00000	10.40000	70.00000	0.33364	69.730	0.12383	3.0089	-104.74E-6
1	Grid	28.80000	10.40000	70.00000	0.09494	69.730	0.093439	1.8284	-61.478E-6
1	Grid	30.60000	10.40000	70.00000	-0.12353	69.730	0.0071307	0.051117	-1.1804E-6
1	Grid	32.40000	10.40000	70.00000	-0.14970	69.730	-114.17E-6	-0.21816	8.6499E-6
1	Grid	34.20000	10.40000	70.00000	-0.10621	69.730	-292.35E-6	-0.15657	6.1828E-6
1	Grid	36.00000	10.40000	70.00000	-0.06548	69.730	-141.97E-6	-0.092526	3.6574E-6
1	Grid	0.00000	12.13333	70.00000	-0.00229	69.730	-5.2793E-6	-0.011712	0.0
1	Grid	1.80000	12.13333	70.00000	-0.00857	69.730	-12.378E-6	-0.018812	0.0
1	Grid	3.60000	12.13333	70.00000	-0.02126	69.730	-36.020E-6	-0.034414	1.3624E-6
1	Grid	5.40000	12.13333	70.00000	-0.05009	69.730	-141.92E-6	-0.077147	3.0467E-6
1	Grid	7.20000	12.13333	70.00000	-0.12968	69.730	-798.65E-6	-0.23700	9.3164E-6
1	Grid	9.00000	12.13333	70.00000	-0.42767	69.730	0.018670	-1.0543	44.092E-6
1	Grid	10.80000	12.13333	70.00000	-4.88010	69.730	-47.423	-84.270	-0.0023032
1	Grid	12.60000	12.13333	70.00000	-6.10612	69.730	-49.347	-98.038	-0.0019857
1	Grid	14.40000	12.13333	70.00000	-6.46640	69.730	-49.800	-102.00	-0.0018823
1	Grid	16.20000	12.13333	70.00000	-6.55407	69.730	-49.812	-102.41	-0.0018674
1	Grid	18.00000	12.13333	70.00000	-6.55419	69.730	-49.812	-102.43	-0.0018669
1	Grid	19.80000	12.13333	70.00000	-6.47002	69.730	-49.812	-102.25	-0.0018736
1	Grid	21.60000	12.13333	70.00000	-6.18933	69.730	-49.800	-101.27	-0.0019113
1	Grid	23.40000	12.13333	70.00000	-4.54085	69.730	-49.019	-87.534	-0.0023637
1	Grid	25.20000	12.13333	70.00000	1.51257	69.730	4.7641	30.841	-657.18E-6
1	Grid	27.00000	12.13333	70.00000	-0.81445	69.730	-18.115	-1.6303	-0.0020933
1	Grid	28.80000	12.13333	70.00000	3.04769	69.730	58.651	78.561	0.0038676
1	Grid	30.60000	12.13333	70.00000	-0.38004	69.730	0.19687	0.73396	-5.6929E-6
1	Grid	32.40000	12.13333	70.00000	-0.32688	69.730	0.068733	-0.22172	16.993E-6
1	Grid	34.20000	12.13333	70.00000	-0.18222	69.730	-388.03E-6	-0.30428	12.037E-6
1	Grid	36.00000	12.13333	70.00000	-0.09541	69.730	-292.82E-6	-0.14147	5.5833E-6
1	Grid	0.00000	13.86667	70.00000	0.00063	69.730	-1.9354E-6	-0.0085955	0.0
1	Grid	1.80000	13.86667	70.00000	0.00275	69.730	-2.0926E-6	-0.012010	0.0
1	Grid	3.60000	13.86667	70.00000	-0.00874	69.730	3.1084E-6	-0.017294	0.0
1	Grid	5.40000	13.86667	70.00000	-0.01973	69.730	60.089E-6	-0.024545	0.0
1	Grid	7.20000	13.86667	70.00000	-0.04188	69.730	930.55E-6	-0.018686	0.0
1	Grid	9.00000	13.86667	70.00000	-0.08092	69.730	0.088073	0.77849	-20.423E-6
1	Grid	10.80000	13.86667	70.00000	-2.34202	69.730	-22.024	-37.881	-0.0011195
1	Grid	12.60000	13.86667	70.00000	-3.60700	69.730	-24.243	-53.321	-770.71E-6
1	Grid	14.40000	13.86667	70.00000	-3.98830	69.730	-24.314	-55.344	-698.86E-6
1	Grid	16.20000	13.86667	70.00000	-4.14326	69.730	-24.323	-55.917	-677.21E-6
1	Grid	18.00000	13.86667	70.00000	-4.17744	69.730	-24.324	-56.010	-673.62E-6
1	Grid	19.80000	13.86667	70.00000	-4.14121	69.730	-24.324	-55.923	-677.01E-6
1	Grid	21.60000	13.86667	70.00000	-3.98840	69.730	-24.319	-55.431	-695.94E-6
1	Grid	23.40000	13.86667	70.00000	-3.44519	69.730	-24.190	-51.956	-818.61E-6
1	Grid	25.20000	13.86667	70.00000	-4.26810	69.730	-47.285	-78.022	-0.0025349
1	Grid	27.00000	13.86667	70.00000	-5.65827	69.730	-49.389	-96.041	-0.0020700
1	Grid	28.80000	13.86667	70.00000	-5.57005	69.730	-48.745	-92.166	-0.0021472
1	Grid	30.60000	13.86667	70.00000	-5.16026	69.730	-48.658	-89.405	-0.0022464
1	Grid	32.40000	13.86667	70.00000	-0.29405	69.730	13.478	9.1572	0.0012420
1	Grid	34.20000	13.86667	70.00000	-0.26934	69.730	-0.0013750	-0.53788	21.196E-6
1	Grid	36.00000	13.86667	70.00000	-0.11943	69.730	-480.20E-6	-0.18645	7.3470E-6
1	Grid	0.00000	15.60000	70.00000	0.00401	69.730	1.7228E-6	-0.0049988	0.0
1	Grid	1.80000	15.60000	70.00000	0.00405	69.730	9.1536E-6	-0.0041557	0.0
1	Grid	3.60000	15.60000	70.00000	0.00616	69.730	46.505E-6	0.0026767	0.0
1	Grid	5.40000	15.60000	70.00000	0.01767	69.730	297.26E-6	0.039142	-1.5190E-6
1	Grid	7.20000	15.60000	70.00000	0.07630	69.730	0.0033205	0.27759	-10.628E-6
1	Grid	9.00000	15.60000	70.00000	0.48645	69.730	0.18480	3.7511	-126.95E-6
1	Grid	10.80000	15.60000	70.00000	0.52070	69.730	-17.748	-3.1161	-0.0019906
1	Grid	12.60000	15.60000	70.00000	3.35565	69.730	32.325	63.807	0.0013171
1	Grid	14.40000	15.60000	70.00000	-0.06533	69.730	-19.551	-12.147	-0.0018468
1	Grid	16.20000	15.60000	70.00000	-0.36382	69.730	-19.671	-14.333	-0.0017743
1	Grid	18.00000	15.60000	70.00000	-0.42152	69.730	-19.672	-14.497	-0.0017680
1	Grid	19.80000	15.60000	70.00000	-0.43017	69.730	-19.672	-14.510	-0.0017674
1	Grid	21.60000	15.60000	70.00000	-0.43642	69.730	-19.673	-14.533	-0.0017666
1	Grid	23.40000	15.60000	70.00000	-0.66202	69.730	-19.720	-15.934	-0.0017165
1	Grid	25.20000	15.60000	70.00000	-3.69625	69.730	-46.404	-71.633	-0.0026837
1	Grid	27.00000	15.60000	70.00000	-4.67270	69.730	-47.210	-80.545	-0.0024258
1	Grid	28.80000	15.60000	70.00000	-4.87021	69.730	-47.226	-81.378	-0.0023947

15 Lyncroft Gardens

Excavation and wall loads combined long term

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	Grid	30.60000	15.60000	70.00000	-5.02285	69.730	-48.228	-86.951	-0.0022926
1	Grid	32.40000	15.60000	70.00000	-0.26728	69.730	13.531	9.5706	0.0012320
1	Grid	34.20000	15.60000	70.00000	-0.26942	69.730	-0.0012949	-0.53407	21.054E-6
1	Grid	36.00000	15.60000	70.00000	-0.12005	69.730	-479.05E-6	-0.18690	7.3650E-6
1	Grid	0.00000	17.33333	70.00000	0.00701	69.730	4.3236E-6	-0.0018813	0.0
1	Grid	1.80000	17.33333	70.00000	0.00972	69.730	15.764E-6	0.0019529	0.0
1	Grid	3.60000	17.33333	70.00000	0.01727	69.730	64.392E-6	0.015605	0.0
1	Grid	5.40000	17.33333	70.00000	0.04028	69.730	334.79E-6	0.067849	-2.6545E-6
1	Grid	7.20000	17.33333	70.00000	0.12084	69.730	0.0027925	0.32099	-12.414E-6
1	Grid	9.00000	17.33333	70.00000	0.47950	69.730	0.067871	2.4058	-87.453E-6
1	Grid	10.80000	17.33333	70.00000	1.53849	69.730	0.97663	13.723	-428.61E-6
1	Grid	12.60000	17.33333	70.00000	1.88528	69.730	1.0832	16.302	-518.34E-6
1	Grid	14.40000	17.33333	70.00000	1.79482	69.730	1.0593	15.721	-498.09E-6
1	Grid	16.20000	17.33333	70.00000	1.67069	69.730	1.0428	15.118	-476.11E-6
1	Grid	18.00000	17.33333	70.00000	1.62346	69.730	1.0418	15.001	-471.62E-6
1	Grid	19.80000	17.33333	70.00000	1.59416	69.730	1.0416	14.949	-469.56E-6
1	Grid	21.60000	17.33333	70.00000	1.53424	69.730	1.0405	14.802	-463.87E-6
1	Grid	23.40000	17.33333	70.00000	1.29197	69.730	1.0190	13.769	-425.38E-6
1	Grid	25.20000	17.33333	70.00000	0.45435	69.730	0.52172	6.6151	-200.54E-6
1	Grid	27.00000	17.33333	70.00000	-0.05978	69.730	0.39870	3.5879	-94.981E-6
1	Grid	28.80000	17.33333	70.00000	-0.23658	69.730	0.38697	2.9043	-69.232E-6
1	Grid	30.60000	17.33333	70.00000	-0.45937	69.730	0.12581	-0.099235	18.929E-6
1	Grid	32.40000	17.33333	70.00000	-0.33874	69.730	0.049048	-0.34857	19.686E-6
1	Grid	34.20000	17.33333	70.00000	-0.18607	69.730	-457.31E-6	-0.31001	12.256E-6
1	Grid	36.00000	17.33333	70.00000	-0.09751	69.730	-296.71E-6	-0.14365	5.6692E-6
1	Grid	0.00000	19.06667	70.00000	0.00905	69.730	5.2637E-6	169.10E-6	0.0
1	Grid	1.80000	19.06667	70.00000	0.01304	69.730	16.185E-6	0.0049862	0.0
1	Grid	3.60000	19.06667	70.00000	0.02199	69.730	54.586E-6	0.018585	0.0
1	Grid	5.40000	19.06667	70.00000	0.04337	69.730	212.74E-6	0.058716	-2.3063E-6
1	Grid	7.20000	19.06667	70.00000	0.09608	69.730	994.79E-6	0.18502	-7.2291E-6
1	Grid	9.00000	19.06667	70.00000	0.21577	69.730	0.0049243	0.56358	-21.794E-6
1	Grid	10.80000	19.06667	70.00000	0.38575	69.730	0.013663	1.2007	-46.054E-6
1	Grid	12.60000	19.06667	70.00000	0.48275	69.730	0.017876	1.5509	-59.460E-6
1	Grid	14.40000	19.06667	70.00000	0.48734	69.730	0.017952	1.5703	-60.221E-6
1	Grid	16.20000	19.06667	70.00000	0.45836	69.730	0.017290	1.4973	-57.399E-6
1	Grid	18.00000	19.06667	70.00000	0.43156	69.730	0.017057	1.4482	-55.479E-6
1	Grid	19.80000	19.06667	70.00000	0.40323	69.730	0.016917	1.4033	-53.713E-6
1	Grid	21.60000	19.06667	70.00000	0.35278	69.730	0.016461	1.3063	-49.913E-6
1	Grid	23.40000	19.06667	70.00000	0.24342	69.730	0.014240	1.0285	-39.145E-6
1	Grid	25.20000	19.06667	70.00000	0.06438	69.730	0.0081824	0.48435	-18.259E-6
1	Grid	27.00000	19.06667	70.00000	-0.09023	69.730	0.0040152	0.046922	-1.3850E-6
1	Grid	28.80000	19.06667	70.00000	-0.17347	69.730	0.0023294	-0.16972	7.0174E-6
1	Grid	30.60000	19.06667	70.00000	-0.20227	69.730	109.86E-6	-0.30161	11.990E-6
1	Grid	32.40000	19.06667	70.00000	-0.16993	69.730	-559.41E-6	-0.26988	10.651E-6
1	Grid	34.20000	19.06667	70.00000	-0.11348	69.730	-342.28E-6	-0.16836	6.6450E-6
1	Grid	36.00000	19.06667	70.00000	-0.06888	69.730	-151.09E-6	-0.096340	3.8078E-6
1	Grid	0.00000	20.80000	70.00000	0.01001	69.730	4.8894E-6	0.0011281	0.0
1	Grid	1.80000	20.80000	70.00000	0.01408	69.730	12.973E-6	0.0054727	0.0
1	Grid	3.60000	20.80000	70.00000	0.02190	69.730	36.108E-6	0.015685	0.0
1	Grid	5.40000	20.80000	70.00000	0.03709	69.730	105.74E-6	0.039423	-1.5529E-6
1	Grid	7.20000	20.80000	70.00000	0.06543	69.730	313.04E-6	0.091986	-3.6156E-6
1	Grid	9.00000	20.80000	70.00000	0.11071	69.730	818.92E-6	0.18981	-7.4400E-6
1	Grid	10.80000	20.80000	70.00000	0.16212	69.730	0.0015426	0.31123	-12.176E-6
1	Grid	12.60000	20.80000	70.00000	0.19606	69.730	0.0020150	0.39246	-15.345E-6
1	Grid	14.40000	20.80000	70.00000	0.20405	69.730	0.0021204	0.41297	-16.147E-6
1	Grid	16.20000	20.80000	70.00000	0.19585	69.730	0.0020736	0.40079	-15.669E-6
1	Grid	18.00000	20.80000	70.00000	0.18115	69.730	0.0020188	0.38004	-14.852E-6
1	Grid	19.80000	20.80000	70.00000	0.16068	69.730	0.0019539	0.35178	-13.737E-6
1	Grid	21.60000	20.80000	70.00000	0.12844	69.730	0.0018045	0.30178	-11.769E-6
1	Grid	23.40000	20.80000	70.00000	0.07735	69.730	0.0014361	0.21023	-8.1773E-6
1	Grid	25.20000	20.80000	70.00000	0.01141	69.730	831.88E-6	0.081709	-3.1457E-6
1	Grid	27.00000	20.80000	70.00000	-0.04870	69.730	304.68E-6	-0.034871	1.4211E-6
1	Grid	28.80000	20.80000	70.00000	-0.08646	69.730	-5.6800E-6	-0.10700	4.2485E-6
1	Grid	30.60000	20.80000	70.00000	-0.09862	69.730	-182.49E-6	-0.13530	5.3512E-6
1	Grid	32.40000	20.80000	70.00000	-0.08832	69.730	-203.76E-6	-0.12367	4.8868E-6
1	Grid	34.20000	20.80000	70.00000	-0.06654	69.730	-134.59E-6	-0.091943	3.6352E-6
1	Grid	36.00000	20.80000	70.00000	-0.04484	69.730	-72.229E-6	-0.062103	2.4576E-6
1	Grid	0.00000	22.53333	70.00000	0.01010	69.730	3.9084E-6	0.0013159	0.0
1	Grid	1.80000	22.53333	70.00000	0.01363	69.730	9.0770E-6	0.0046324	0.0
1	Grid	3.60000	22.53333	70.00000	0.01956	69.730	21.299E-6	0.011315	0.0
1	Grid	5.40000	22.53333	70.00000	0.02937	69.730	49.708E-6	0.024136	0.0
1	Grid	7.20000	22.53333	70.00000	0.04443	69.730	110.29E-6	0.046556	-1.8357E-6
1	Grid	9.00000	22.53333	70.00000	0.06433	69.730	214.98E-6	0.079347	-3.1254E-6
1	Grid	10.80000	22.53333	70.00000	0.08464	69.730	340.13E-6	0.11500	-4.5263E-6
1	Grid	12.60000	22.53333	70.00000	0.09879	69.730	431.38E-6	0.14055	-5.5299E-6
1	Grid	14.40000	22.53333	70.00000	0.10355	69.730	466.18E-6	0.14998	-5.9002E-6
1	Grid	16.20000	22.53333	70.00000	0.10042	69.730	464.52E-6	0.14703	-5.7833E-6
1	Grid	18.00000	22.53333	70.00000	0.09192	69.730	448.49E-6	0.13694	-5.3847E-6
1	Grid	19.80000	22.53333	70.00000	0.07862	69.730	421.00E-6	0.12068	-4.7424E-6
1	Grid	21.60000	22.53333	70.00000	0.05928	69.730	369.45E-6	0.095331	-3.7417E-6
1	Grid	23.40000	22.53333	70.00000	0.03311	69.730	278.55E-6	0.058192	-2.2777E-6
1	Grid	25.20000	22.53333	70.00000	0.00294	69.730	156.39E-6	0.013143	0.0
1	Grid	27.00000	22.53333	70.00000	-0.02452	69.730	42.643E-6	-0.028360	1.1313E-6
1	Grid	28.80000	22.53333	70.00000	-0.04305	69.730	-33.870E-6	-0.056359	2.2340E-6
1	Grid	30.60000	22.53333	70.00000	-0.05019	69.730	-70.483E-6	-0.067776	2.6831E-6
1	Grid	32.40000	22.53333	70.00000	-0.04722	69.730	-72.333E-6	-0.064718	2.5614E-6
1	Grid	34.20000	22.53333	70.00000	-0.03816	69.730	-54.604E-6	-0.053343	2.1118E-6
1	Grid	36.00000	22.53333	70.00000	-0.02747	69.730	-34.856E-6	-0.040353	1.5983E-6
1	Grid	0.00000	24.26667	70.00000	0.00963	69.730	2.8580E-6	0.0010985	0.0
1	Grid	1.80000	24.26667	70.00000	0.01244	69.730	5.9141E-6	0.0034051	0.0
1	Grid	3.60000	24.26667	70.00000	0.01668	69.730	12.068E-6	0.0075053	0.0
1	Grid	5.40000	24.26667	70.00000	0.02286	69.730	23.841E-6	0.014311	0.0
1	Grid	7.20000	24.26667	70.00000	0.03117	69.730	44.087E-6	0.024487	0.0
1	Grid	9.00000	24.26667	70.00000	0.04095	69.730	73.019E-6	0.037432	-1.4778E-6
1	Grid	10.80000	24.26667	70.00000	0.05031	69.730	104.51E-6	0.050471	-1.9918E-6
1	Grid	12.60000	24.26667	70.00000	0.05691	69.730	128.66E-6	0.059972	-2.3662E-6
1	Grid	14.40000	24.26667	70.00000	0.05939	69.730	140.25E-6	0.063871	-2.5197E-6
1	Grid	16.20000	24.26667	70.00000	0.05775	69.730	141.23E-6	0.062480	-2.4643E-6
1	Grid	18.00000	24.26667	70.00000	0.05261	69.730	135.36E-6	0.056938	-2.2450E-6
1	Grid	19.80000	24.26667	70.00000	0.04429	69.730	123.57E-6	0.047681	-1.8788E-6
1	Grid	21.60000	24.26667	70.00000	0.03278	69.730	103.97E-6	0.034364	-1.3523E-6
1	Grid	23.40000	24.26667	70.00000	0.01847	69.730	75.024E-6	0.017076	0.0
1	Grid	25.20000	24.26667	70.00000	0.00297	69.730	40.007E-6	-0.0022317	0.0
1	Grid	27.00000	24.26667	70.00000	-0.01099	69.730	7.1073E-6	-0.019835	0.0
1	Grid	28.80000	24.26667	70.00000	-0.02085	69.730	-16.435E-6	-0.032246	1.2786E-6
1	Grid	30.60000	24.26667	70.00000	-0.02534	69.730	-28.125E-6	-0.037013	1.5022E-6
1	Grid	32.40000	24.26667	70.00000	-0.02486	69.730	-29.399E-6	-0.037438	1.4832E-6
1	Grid	34.20000	24.26667	70.00000	-0.02099	69.730	-24.367E-6	-0.032951	1.3056E-6
1	Grid	36.00000	24.26667	70.00000	-0.01566	69.730	-17.570E-6	-0.026925	1.0671E-6
1	Grid	0.00000	26.00000	70.00000	0.00889	69.730	1.9831E-6	737.09E-6	0.0
1	Grid	1.80000	26.00000	70.00000	0.01103	69.730	3.7264E-6	0.0022571	0.0
1	Grid	3.60000	26.00000	70.00000	0.01399	69.730	6.8103E-6	0.0047028	0.0
1	Grid	5.40000	26.00000	70.00000	0.01790	69.730	11.921E-6	0.0083457	0.0
1	Grid	7.20000	26.00000	70.00000	0.02271	69.730	19.533E-6	0.013233	0.0
1	Grid	9.00000	26.00000	70.00000	0.02794	69.730	29.212E-6	0.018905	0.0
1	Grid	10.80000	26.00000	70.00000	0.03271	69.730	39.150E-6	0.024301	0.0
1	Grid	12.60000	26.00000	70.00000	0.03606	69.730	46.922E-6	0.028153	-1.1124E-6
1	Grid	14.40000	26.00000	70.00000	0.03731	69.730	51.031E-6	0.029634	-1.1707E-6
1	Grid	16.20000	26.00000	70.00000	0.03628	69.730	51.481E-6	0.028602	-1.1297E-6
1	Grid	18.00000	26.00000	70.00000	0.03310	69.730	48.914E-6	0.025292	0.0
1	Grid	19.80000	26.00000	70.00000	0.02796	69.730	43.624E-6	0.019912	0.0
1	Grid	21.60000	26.00000	70.00000	0.02107	69.730	35.460E-6	0.012605	0.0
1	Grid	23.40000	26.00000	70.00000	0.01289	69.730	24.567E-6	0.0037732	0.0
1	Grid	25.20000	26.00000	70.00000	0.00435	69.730	12.215E-6	-0.0055906	0.0
1	Grid	27.00000	26.00000	70.00000	-0.00330	69.730	0.0	-0.014012	0.0
1	Grid	28.80000	26.00000	70.00000	-0.00889	69.730	-7.8534E-6	-0.020115	0.0
1	Grid	30.60000	26.00000	70.00000	-0.01179	69.730	-12.437E-6	-0.023193	0.0
1	Grid	32.40000	26.00000	70.00000	-0.01211	69.730	-13.368E-6	-0.023391	0.0
1	Grid	34.20000	26.00000	70.00000	-0.01050	69.730	-11.857E-6	-0.021503	0.0
1	Grid	36.00000	26.00000	70.00000	-0.00784	69.730	-9.3270E-6	-0.018541	0.0

Ref.	Name	x	y	z	δz	Stress: Calc. Level	Stress: Vertical	Stress: Sum Princ.	Vert. Strain
		[m]	[m]	[mOD]	[mm]	[mOD]	[kN/m²]	[kN/m²]	[μ]

Results : Consolidation : Displacement Data : Grids

None

Results : Total : Displacement Data : Grids

None