Basement Impact Assessment: 106 Highgate Road, NW5 1PB

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Prepared for:

Michael Snelling
106 Highgate Road
London
NW5 1PB

Report reference: 65145 R1, August 2016
Report status: Final

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Basement Impact Assessment: 106 Highgate Road, NW5 1PB

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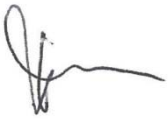
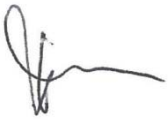
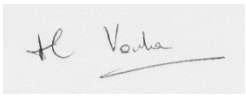
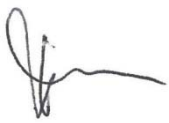
65145 R1. Final

Surface Water

	Name	Signature
Author	Tim Taylor	
Checked by	Tim Taylor	
Reviewed by	Helen Vonka (C.WEM)	

Groundwater

	Name	Signature
Author	Tim Taylor	
Checked by	Tim Taylor	
Reviewed by	Heather Streetly (C.Geol)	

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Revision record:

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2	65145R1	Final	TKT	TKT	HCV / HRS	24/08/2016	Michael Snelling

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REPORT SUMMARY

The assessment findings are summarised as follows:

1. Impacts to surface water flows and related flooding	High	
	Med	
	Low	
2. Impacts to ground water flows and related flooding	High	
	Med	
	Low	
3. Overall risk posed by the site	High	
	Med	
	Low	

Key:

High		*There is a high potential risk*
Med		*There is medium potential risk*
Low		*There is a low potential risk*

RECOMMENDATIONS (FOR NEXT STEPS)

Surface Water: It is recommended that a Flood Risk Assessment should be carried out to determine the potential risks to the proposed development from surface water and reservoir sources of flooding.

Surface Water and Groundwater: A detailed assessment of the proposed drainage system should confirm the impacts to surface water flows and runoff resulting from the proposed changes to the proportion of impermeable surface.

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1 INTRODUCTION

1.1 This Document

ESI Ltd. (ESI) was commissioned by Mr Michael Snelling in August 2016 to undertake a hydrological and hydrogeological Basement Impact Assessment for the proposed development at 106 Highgate Road, London, NW5 1PB (the Site). Grid reference for the Site is TQ 28705 85680 and it falls within the London Borough of Camden (see Figure 1.1).

This document comprises a desk study which considers the potential impact relating to the proposed basement development in terms of surface water and groundwater flow and flooding and complies with the London Borough of Camden planning guidance notes on subterranean development (CPG4, London Borough of Camden, 2015).

1.2 Scope of Works

The following scope of works has been undertaken:

- an assessment of groundwater levels and groundwater flow; and,
- an assessment of the impacts of the proposed development on surface water flow.

To satisfy the planning guidance, a screening analysis of key hydrological and hydrogeological issues has been undertaken.

The report has been set out in accordance with this guidance with an initial screening assessment followed by a more detailed scoping assessment of specific items.

1.3 Proposed Basement Works

The proposed development is the extension of the existing ground floor level horizontally under part of the existing garden, without increasing its depth. The area of the proposed basement will be 20.7 m^2 (Pers. Comm. (2016))

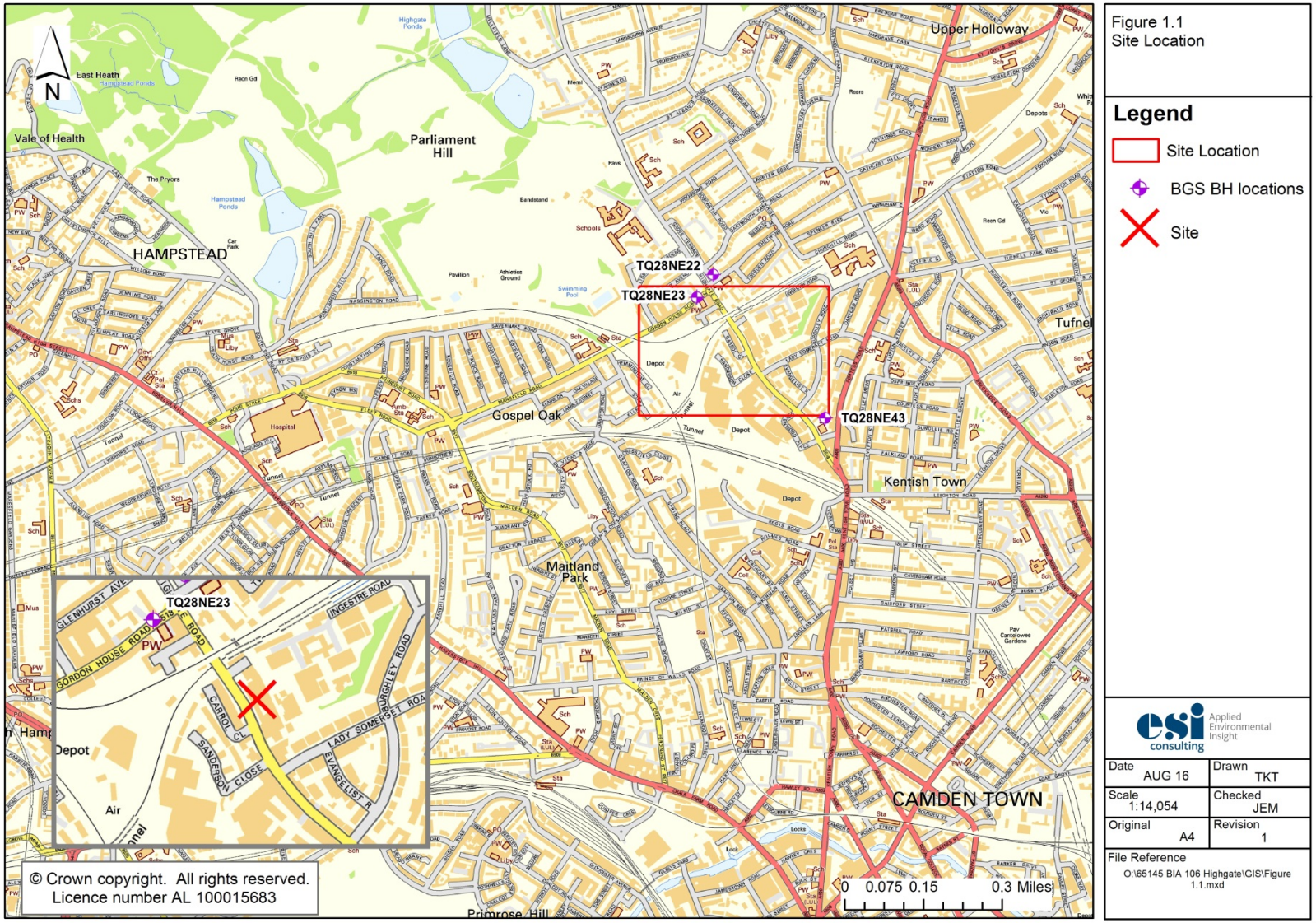


Figure 1.1 Site Location Plan

2 SCREENING

The screening stage for Impact Assessment has been considered as set out in CPG4 (Camden Council, 2011) and the results have been tabulated below.

2.1 SURFACE WATER (Surface flow and flooding screening flowchart (Figure 3, CPG4 (Camden Council, 2011))			
Impact question	**Answer**	**Justification**	**Reference**
1) Is the site within the catchment of the pond chains on Hampstead Heath?	**No**	The Site falls outside all the Hampstead Heath Chain Catchments	ARUP, 2010
2) As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	**Yes**	It is understood that the drainage at the rear of the property will be altered to either a gravity or pumped system to compensate for the reduction in permeable surface.	Pers comm., (2016)
3) Will the proposed basement development result in a change in the proportion of hard surfaced/ paved external areas?	**Yes**	The existing outhouse at the rear of the property will be removed, however the area of the proposed basement is greater so that the proportion of hard surfaced/ paved external areas will be increased by 9.9 m^2.	Site plans (Appendix A).
4) Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses?	**No**	A tributary to the "lost" River Fleet runs north to south, passing approximately 300m east of the Site. It may be possible that the Site falls within the catchment of this underground river. However, it is highly likely that the river is culverted and it is highly unlikely that there is any direct hydraulic continuity between the historical river course and the Site.	Barton, 1992. Ordnance Survey Mapping.
5) Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	**No**	It is possible that the Site falls within the catchment of the underground river mentioned above. However, run-off from the Site would be unlikely to affect the quality of the river.	Barton, 1992. Ordnance Survey Mapping.
6) Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?	**Yes**	Highgate Road is identified in ARUP (2010) as having flooded in 1975. The Environment Agency identifies that the Site falls in an area at risk of reservoir flooding.	Environment Agency, 2015. Camden Council 2015 URS, 2014 ARUP, 2010

2.2 GROUND WATER (Subterranean (ground water) flow screening chart (Figure 1, CPG4 (Camden Council, 2011))			
Impact question	**Answer**	**Justification**	**Reference**
1a) Is the site located directly above an aquifer?	**No**	The geology beneath the Site is the London Clay Formation. There is potential for an unknown depth of Made Ground to be present overlying the London Clay Formation. Made Ground is not classified as an aquifer.	British Geological Survey, 2016. Environment Agency, 2016. ARUP, 2010
1b) Will the proposed basement extend beneath the water table surface?	**Unlikely**	BGS boreholes TQ28NE22, TQ28NE23 and TQ28NE43 are the nearest available logs to the Site, 190 m - 210 m to the northwest and 350m to the southeast (see Figure 1.1). TQ28NE22 and TQ28NE23 did not record any groundwater, TQ28NE43 records a groundwater level at approximately 9 m below ground level.	British Geological Survey, 2016. (Borehole logs included in Appendix B)
2) Is the site within 100 m of a watercourse, well (used/disused) or potential spring line?	**No**	There are no wells, watercourses or spring lines known to exist within 100 m of the Site.	Barton, 1992 British Geological Survey, 2016 Ordnance Survey mapping 2016 1:25,000
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 on Hampstead Heath	Environment Agency, 2016
4) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes**	The existing outhouse at the rear of the property will be removed, however the area of the proposed basement is greater. The total area of hard surfaced/ paved external areas at the Site will be increased by 9.9 m^2.	Site Plans (Appendix A) Pers. Comm. (2016)
5) As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	**Yes**	The proposed extension to the rear of the property will increase the existing area of hard standing and, according to a conversation with the Site Engineer (pers. comm, 2016) either a gravity or a pumped drainage system will be implemented.	Pers. Comm. (2016)
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 line.	**No**	There are no known ponds or spring lines within 250 m of The Site.	Ordnance Survey mapping 2016 1:25,000

3 SCOPING

The Scoping stage identifies the potential impacts of the proposed development where responses were 'Yes' to the questions raised in the Screening stage, as defined in Section 2.16 of CPG4 (Camden Council, 2011). It is noted that in some cases the answer 'Yes' relates to a positive outcome (e.g. a reduction in run-off) and this is stated under the section on potential impacts.

3.1 SURFACE WATER

Impact question	Answer	Justification	Reference
2) As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	**Yes**	It is understood that the drainage at the rear of the property will be altered to either a gravity or pumped system to compensate for the reduction in permeable surface. Confirmation from a detailed drainage assessment will be required to demonstrate the proposed scheme will not alter the surface water flows.	Pers comm., (2016)
3) Will the proposed basement development result in a change in the proportion of hard surfaced/ paved external areas?	**Yes**	The existing outhouse at the rear of the property will be removed, however the area of the proposed basement is greater so that the proportion of hard surfaced/ paved external areas will be increased by 9.9 m^2. Therefore approximately 30% of the permeable surface at the rear of the property will changed to hard standing. Confirmation will be required of how the proposed scheme will alter the drainage.	Site plans (Appendix A).
6) Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?	**Yes**	Highgate Road is identified in ARUP (2010) as having flooded in 1975. The Environment Agency identifies that the Site falls in an area at risk of reservoir flooding. A Flood Risk Assessment should be carried out to confirm the extent of flood risks to the proposed development	Environment Agency, 2015. Camden Council 2015 URS, 2014 ARUP, 2010

3.2 GROUND WATER			
Impact question	**Answer**	**Potential Impacts**	**Reference**
1b) Will the proposed basement extend beneath the water table surface?	**Unlikely**	BGS boreholes TQ28NE22, TQ28NE23 and TQ28NE43 are the nearest available logs to the Site, 190 m - 210 m to the northwest and 350 m to the southeast (see Figure 1.1). The borehole logs for TQ28NE22 and TQ28NE23 did not record any groundwater, TQ28NE43 records a groundwater level at approximately 9 m below ground level. The London Clay Formation is classified as unproductive strata with low permeability that have negligible significance for water supply or river base flow. It is possible that if Made Ground is encountered at the Site that groundwater may rest in the Made Ground above the impermeable London Clay, particularly following heavy rainfall. However, any such groundwater would most likely be localised and in no way constitute an aquifer. The groundwater encountered within the London Clay at borehole TQ28NE43 is likely to be a localised pocket of groundwater as the London Clay does not support an extended water table. Furthermore the level at which groundwater was encountered 350 m away (in borehole TQ28NE43), at a similar elevation to the Site, was significantly below the proposed base of the basement (3.4 mbgl).	British Geological Survey, 2016. (borehole logs included in Appendix B)
4) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes**	The existing outhouse at the rear of the property will be removed, however the area of the proposed basement is greater so that the proportion of hard surfaced/ paved external areas will be increased by 9.9 m^2. Approximately 30% of the permeable surface at the rear of the property will changed to hard standing. Confirmation will be required of how the proposed scheme will alter the drainage.	Site Plans (Appendix A) Pers. Comm. (2016)
5) As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	**Yes**	The proposed extension to the rear of the property will increase the existing area of hard standing and, according to a conversation with the Site Engineer (pers. comm, 2016) either a gravity or a pumped drainage system will be implemented. Confirmation will be required of how the proposed scheme will alter the drainage.	Pers. Comm. (2016)

4 CONCLUSIONS

Potential impacts of the proposed basement development at 106 Highgate Road NW5 1PB in London have been considered as set out in the scope of works. The following summary conclusions are made.

4.1 Screening Stage

- Surface water

According to the Camden SFRA (URS, 2014), Highgate Road suffered surface water flooding in 1975. The Environment Agency also identify reservoirs as a potential source of flood risk. The proposed development will change the proportion of impermeable surfaces. There is no change to the quality of surface waters. There are three issues to take forward to the Scoping assessment.

- Ground water

The Site is not located above an aquifer and is unlikely to extend below any water table. The proposed development will increase the proportion of impermeable surface and affect the Site drainage. The assessment should proceed to a Scoping assessment.

4.2 Scoping Stage

- Surface water

The changes to the proportion of impermeable surface will alter the surface water flows and require changes to the Site drainage system. A detailed assessment of these changes will be required. The historical issues with surface water flooding and the potential risk from reservoir flood should be addressed by a Flood Risk Assessment.

- Ground water

It is highly unlikely that groundwater is present at the Site, or that the proposed excavation will extend below any water table, so that any impacts to groundwater flows and or levels would be minimal. The changes to the proportion of impermeable surface and the proposed changes to the Site drainage system require detailed assessment to confirm how surface water will be dealt with.

4.3 Recommendations

It is recommended that a Flood Risk Assessment should be carried out to determine the potential risks to the proposed development from surface water and reservoir sources of flooding.

A detailed assessment of the proposed drainage system should confirm the impacts to surface water flows and runoff resulting from the proposed changes to the proportion of impermeable surface.

REFERENCES

ARUP (2010), Camden geological, hydrogeological and hydrological study. Ove Arup & Partners Ltd. (including figures).

Barton, N., 1992. The Lost Rivers of London, revised edition. Historical Publications Ltd. London.

British Geological Survey, 2016. Geoindex. Received August 2016 from http://mapapps2.bgs.ac.uk/geoindex/home.html

Camden Council, 2015. Camden Planning Guidance: Basements and lightwells. London Borough of Camden, CPG4.

Environment Agency, 2016. What's in your backyard website. Received from http://maps.environment-agency.gov.uk/wiyby, August 2016.

Ordnance survey mapping, 1:25,000. © Crown copyright. All rights reserved. Licence number AL 100015683.

Pers comm, (2016). Telephone call to Michael Chester, Structural Engineer; 23rd August 2016.

URS, 2014. London Borough of Camden Strategic Flood Risk Assessment.

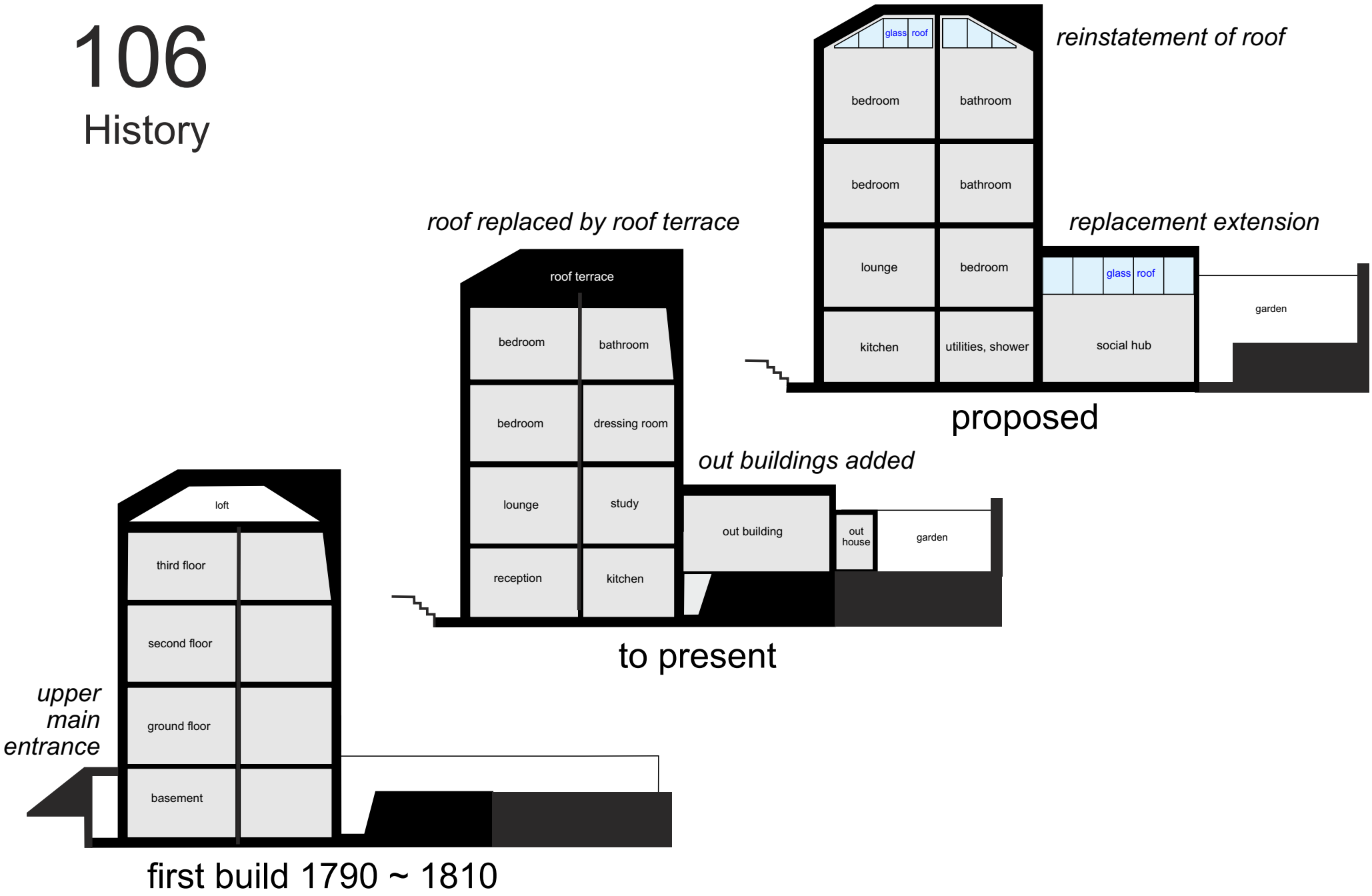
APPENDICES

APPENDIX A

Site plans

106

History


reinstatement of roof
glass
roof
bedroom
bathroom
bedroom
bathroom
lounge
bedroom
kitchen
utilities, shower
replacement extension
glass
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social hub
garden
proposed
roof replaced by roof terrace
roof terrace
bedroom
bathroom
bedroom
dressing room
lounge
study
reception
kitchen
out buildings added
out building
out house
garden
to present
loft
third floor
second floor
ground floor
basement
upper main entrance
first build 1790 ~ 1810

106
Highgate Rd

PROPOSED Longitudinal section

PROJECT:	106 Highgate Road, Fitzroy Terrace NW5 1PB
DRAWING No:	106 Highgate Rd proposed plans.01
DATE:	March 2016
SCALE:	1/50
	SNELLING & SHERRIFF

1 0 1 2 3 4
metres

SECTION A - A

A3 sheet @ 1/50 scale © copyright 2016 Snelling and Sherriff

APPENDIX B

BGS borehole logs

Junction Chetwynd Rd & | TQ 28 NE: 22 | C 5

WELL BORING at Highgate Rd. Kentish Town. County 22

Geol. map 1 in. map New Series 6 in. map 3 SW.

Made by Date

Sunk feet. Bored feet.

Communicated by L. C. C. 2860·8587

Height above Ordnance Datum 137·70. Rest level of water 256.

Yield

Quality (with copy of analysis on separate sheet)

GEOLOGICAL FORMATION	NATURE OF STRATA	THICKNESS Feet	THICKNESS Inches	DEPTH Feet	DEPTH Inches
	Brown Clay.	5	—		1·52
SUPD	Brown gravel.	1	—	6	— 1·83
LC.	Blue clay (all dry).	24	—	30	— 9·14

GEOLOGICAL SURVEY AND MUSEUM,
JERMYN STREET, LONDON, S.W. 1.

(50478X) Wt. W39733/0131 2,500 4/31 H. J. R. & L., Ltd. Gp. 616

Gordon Hause Rd 100 yds (Kentish Town) 6"
TQ 28 NE: 23

WELL BORING at West of Highgate Rd., N.W.1. County

Geol. map 1 in. map New Series 6 in. map

Made by Date —

Sunk feet. Bored feet.

Communicated by L.C.C. 2855 8580

Height above Ordnance Datum 150. Rest level of water 256

Yield

Quality (with copy of analysis on separate sheet)

GEOLOGICAL FORMATION	NATURE OF STRATA	THICKNESS Feet	THICKNESS Inches	DEPTH Feet	DEPTH Inches
	Stiff Brown Clay.	35	—		10 04
	Blue Clay.	35	—	70	— 21 24
	(all clay).				

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JERMYN STREET, LONDON, S.W. 1.

(50478X) Wt. W39733/0131 2,500 4/31 H. J. R. & L., Ltd. Gp. 616

TQ 28 NE/43

TQ28NE/43
2895-8535
256.

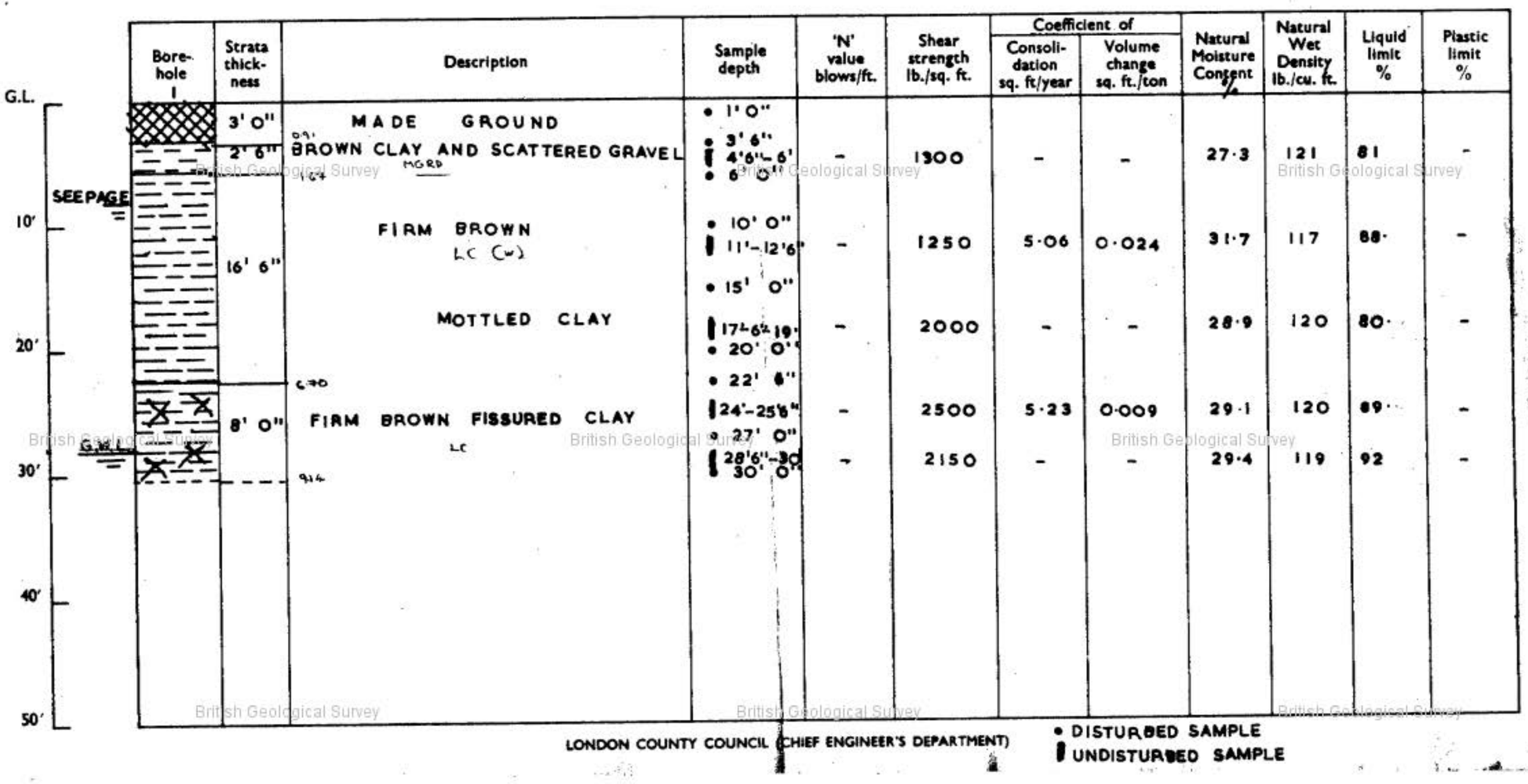
CE/BMTS/12D

British Geological Survey

SITE INVESTIGATION AT KENTISH TOWN FIRE STATION

REPORT NO. S/358/OS

FOR ARCHITECTS' DEPARTMENT SPECIAL WORKS DIVISION NOVEMBER '62 DATE



Sample depth	'N' value blows/ft.	Shear strength lb./sq. ft.	Coefficient of Consolidation sq. ft/year	Coefficient of Volume change sq. ft./ton	Natural Moisture Content %	Natural Wet Density lb./cu. ft.	Liquid limit %	Plastic limit %
• 1' 0"								
• 3' 6"								
▮ 4'6"–6'	–	1300	–	–	27·3	121	81	–
• 6' 0"								
• 10' 0"								
▮ 11'–12'6"	–	1250	5·06	0·024	31·7	117	88·	–
• 15' 0"								
▮ 17'6"–19'	–	2000	–	–	28·9	120	80·	–
• 20' 0"								
• 22' 6"								
▮ 24'–25'6"	–	2500	5·23	0·009	29·1	120	89·	–
• 27' 0"								
▮ 28'6"–30'	–	2150	–	–	29·4	119	92	–
30' 0"								

LONDON COUNTY COUNCIL (CHIEF ENGINEER'S DEPARTMENT)

• DISTURBED SAMPLE
▮ UNDISTURBED SAMPLE