KEY GS

Geological & Geotechnical Consultants

59 Redington Road, London NW3 7RP

Basement Garage Screening and Scoping – Land Stability

(October 2016)

Prepared for MY Construction Ltd

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MY Construction Ltd

59 Redington Road, London NW3 7RP

Basement Screening and Scoping - Land Stability

(October 2016)

Prepared by:

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Report Distribution List

Name	Copies	Rev.	Date	Copies	Rev.	Date	Copies	Rev.	Date
J Sheldon	1(pdf)	Draft	10/10/16						

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1.0 INTRODUCTION

Key GeoSolutions Ltd (KGS) have been commissioned by ESI Limited to undertake a land stability assessment in relation to a proposed development at 59 Redington Road, London NW3 7RP.

1.1 Proposed Development

The existing property is a detached four-storey house in the London Borough of Hampstead, which has a basement. The proposed development involves the construction of an underground garage below the front drive of the property, the garage will be accessed from the drive via a hydraulic lift. The depth to the floor level of the completed garage basement will be 3.365m below the current level of the drive and 1.350m below the current basement, as shown on MY Construction drawing number UP03-226-2015.

1.2 Scope of Work

The purpose of this assessment is to consider if the proposed basement can be constructed without having a detrimental impact on the surroundings with respect to land stability and in particular whether the development will affect the stability of neighbouring properties. The assessment conforms to the requirements of guidance set out by The London Borough of Camden which provides comprehensive guidance on planning applications for basement extensions.

1.3 Qualifications

This assessment has been undertaken by Brian Duthie and Howard Clarke. Brian holds a BEng in Engineering Geology and Geotechnics, is a chartered geologist and Fellow of the Geological Society with 27 years' experience in geotechnical engineering. Howard holds a BEng in Civil Engineering, is a chartered engineer and Member of the Institution of Civil Engineers and Member of the Institute of Structural Engineers with 11 years' experience in civil engineering. Both assessors satisfy the qualification requirements given in the Camden Planning Guidance 4.

1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the research carried out. The results of the research should be viewed in the context of the work that has been carried out and no liability can be accepted for matters outside the stated scope of the research. The assessment does not constitute a detailed structural design for the basement structure, as would be required to allow construction to take place.

This report has been prepared for the information, benefit and use of MY Construction Ltd only and any liability of Key GeoSolutions Ltd to any third party, whether in contract or in tort, is specifically excluded. Any third party finding themselves in possession of this report may not rely upon it without first obtaining the written authority of Key GeoSolutions Ltd.

2.0 SITE DESCRIPTION

The site, 59 Redington Road, is in the London Borough of Camden, post code NW3 7RP and National Grid Reference 525620mE, 186000mN. The drive is located at the front of the property, with access directly off Redington Road. The frontage onto Redington Road is approximately 15m wide and the proposed garage dimensions are 12.0m by 5.5m.

The general topography of the area slopes down from Parliament Hill, approximately 2km to the east towards the River Westbourne to the south-west. The slope is incised with a series of valleys and the site is located on the northern side of one of the valleys. The property sits at an elevation of c. 97 mAOD with a gentle fall to the end of the rear garden to an elevation of c. 94 mAOD.

The general topography of the area is gently sloping towards the south-east at a gradient of less than 7°. The location of the site is shown on Figure 1 below.

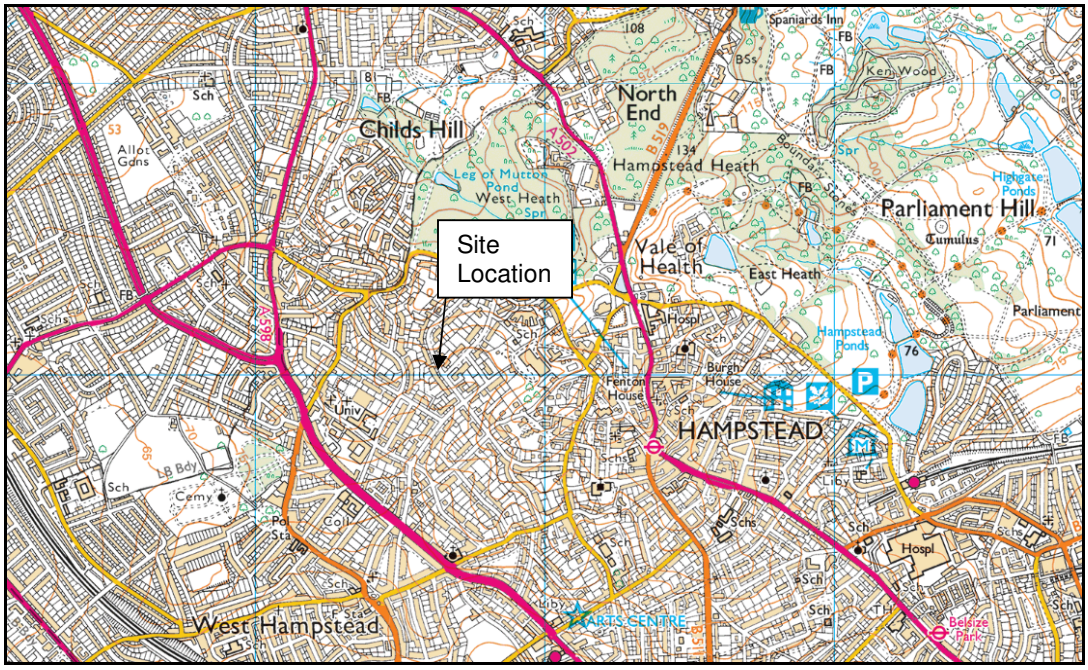

Figure 1 – Site Location

3.0 PROJECT SCREENING

Following the guidance given in the London Borough of Camden document CPG4 'Basements and lightwells' (2013) it is required to identify the potential impacts of the proposed scheme. The flowchart entitled 'Slope stability screening flowchart' in Figure 2 of CPG4 assists with understanding the potential impacts that a basement may have.

SLOPE STABILITY (Slope stability screening flowchart (Figure 2, CPG4 (Camden Council, 2013))			
Impact question	**Answer**	**Justification**	**Reference**
1) Does the existing site include slopes, natural or manmade, greater than 7°?	**No**	Figure 10 Camden Topographic Map Figure 16 Slope Angle Map	Ove Arup, 2010. Ordnance Survey Mapping.
2) Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7°?	**No**	No re-profiling of the site is proposed	
3) Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	**No**		
4) Is the site within a wider hillside setting in which the general slope is greater than 7°?	**No**	Figure 10 Camden Topographic Map	Ove Arup, 2010
5) Is the London Clay the shallowest strata at the site?	**No**	Figure 5 South Camden Geological Map and boreholes drilled to rear of property.	Ove Arup, 2010 KGS report reference 16-248-R-001
6) Will any trees be felled as part of the proposed development and / or any works proposed within any tree protection zones where trees are to be retained?	**No**	No proposed tree-felling, construction works to be limited to confines of existing driveway.	Drawings of proposed basement
7) Is there any history of seasonal shrink-swell subsidence in the local area, and / or evidence of such effects at the site?	**No**		

8) Is the site within 100m of a watercourse or potential spring line?	**No**	Figure 11 shows a tributary of the lost River Westbourne running north to south, this ties in with the topography of the valley feature. The course of the lost river should not interfere with the proposed development.	Ove Arup, 2010 BGS OS Mapping
9) Is the site within an area of previously worked ground?	**No**	Figure 5 South Camden Geological Map	Ove Arup, 2010
10) Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	**Yes**	Figure 8 Camden Aquifer Designation Map, the site is located within a Secondary A Aquifer, the Claygate Beds. Boreholes drilled in the rear garden of the property encountered ground water at between 4.5m below ground level, at an approximate elevation of 94.3 mAOD. Hence it is not expected that the basement, which has a floor level 3.365m below ground level, will encounter ground water.	Ove Arup, 2010 KGS boreholes
11) Is the site within 50m of Hampstead Heath ponds?	**No**	Figure 12, Camden Surface Water Features	Ove Arup, 2010 OS Mapping
12) Is the site within 5m of a highway or pedestrian right of way?	**Yes**	The site frontage is onto Redington Road.	OS Mapping Drawings of proposed basement
13) Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	**No**	The properties either side have existing basements.	Google Maps
14) Is the site over (or within the exclusion zone of) any tunnels e.g. railway lines?	**No**	Figure 18 Transport Infrastructure	Ove Arup, 2010

4.0 GROUND CONDITIONS

4.1 Soil Conditions

The British Geological Survey (BGS) map of the area (Sheet 256) indicates that the site is underlain by Claygate Beds of the London Clay Formation.

Boreholes drilled in the rear garden of the property in order to investigate ground conditions in relation to a proposed swimming pool encountered Head Deposits, consisting of soft sandy clay with gravel, to a depth of c. 3.60m. Beneath the Head Deposits the boreholes encountered the Claygate Beds, which was a firm grey brown sandy clay with sand partings. The borehole logs and location plan are included as Appendix 1 and 2 respectively.

4.2 Groundwater Conditions

The boreholes encountered water at a depth of 4.5m, which is an elevation of c 90.3 mAOD.

5.0 LAND STABILITY SCOPING

Where the screening checklist has returned as 'yes' response to any question that matter is carried forward to the scoping stage. The scoping produces a statement which defines the matters of concern identified in the screening stage.

5.1 Is the site within an aquifer?

The site is within a Secondary A Aquifer, defined by the Environment Agency as "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."

The boreholes drilled to the rear of the property encountered Head Deposits overlying Claygate Beds, with ground water being encountered at a depth 4.5m. No significant permeable layers were encountered in the boreholes, which were drilled to a depth of 6.45m.

5.2 Is the site within 5m of a highway or pedestrian right of way?

The property frontage is onto Redington Road. The design and construction of the basement structure will need to be planned to ensure the ongoing stability of Redington Road, suitable temporary works will be required to be installed to provide stability to the excavation whilst the permanent structure us being constructed.

5.3 Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

Both of the neighbouring properties have basements, with garages located below the house, hence the foundations will be at a similar depth to those of the proposed basement garage.

It is, however recommended that provisions be made to allow for monitoring of movement and damage caused by the construction process, with monitoring being installed prior to commencement of construction.

In order that an appropriate design and construction method can be developed a site specific site investigation will require to be undertaken. This should investigated the ground and groundwater conditions beneath the site, and the type and depth foundations of the property and those adjoining.

5.4 Damage Category

Providing a structural design is undertaken and a suitable construction method is employed for the basement construction then it is considered that it should be possible to minimise the amount of movement of the adjoining properties such that the degree of damage to the neighbouring

properties would fall into Category 0 or 1, with the degree of severity being negligible to very slight, as defined CIRIA C580 Table 2.5 (after Burland, 1995).

6.0 CONCLUSIONS

A screening and scoping exercise has been undertaken of the potential impacts of the proposed basement garage construction at 59 Redington Road with respect to slope stability and ground movement. This exercise does not constitute a detailed structural design for the basement.

The site does not lie in an area of steep topography and the area is not one associated with slope stability issues.

From the screening process three questions returned a ‘yes’ answer, of these only one will require particular attention to be paid during the construction process, this is in regard to the basement being within 5m of a public highway. It is considered that the adoption of an appropriate structural design and appropriate construction techniques will limit the impact of the proposed basement to an acceptable level.

It should be possible to ensure that the degree of damage to the neighbouring properties would fall into Category 0 or 1, with the degree of severity being negligible to very slight, as defined CIRIA C580 Table 2.5 (after Burland, 1995), which in relation to damage to the buildings would equate to fine cracks which are easily treated in normal decoration.

7.0 REFERENCES

7.1 CPG4 Basements and lightwells, London Borough of Camden, September 2013

7.2 Camden geological, hydrogeological and hydrological study, Guidance for subterranean development, Ove Arup & Partners, November 2010

7.3 CIRIA C580 Embedded retaining walls, 2003

7.4 Assessment of risk of damage to buildings due to tunnelling and excavation, Burland J B, 1995

7.5 Ground movements resulting from urban tunnelling: predictions and effects, Rankin W J, 1988

7.6 59 Redington Road, London NW3 7RP, Desk Study & Report on Ground Investigation (August 2016), reference 16-248-R-001.

7.7 Drawings of proposed basement;

- UP01-226-2015 Proposed ground floor plan – showing underground parking
- UP02-226-2015 Proposed part lower ground floor plan – showing underground parking
- UP03-226-2015 Proposed side (NW) elevation – showing underground parking

APPENDIX 1

BOREHOLE LOGS

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WELL NUMBER WS01

CLIENT SIAW **PROJECT NAME** 59 Redington Road

PROJECT NUMBER 16-248 **PROJECT LOCATION** London, NW3 7RP

DATE STARTED 4/8/16 **COMPLETED** 4/8/16 **CO-ORDINATES** 525596 mE, 186001 mN

DRILLING CONTRACTOR Dynamic Sampling UK **GROUND ELEVATION** _____ **HOLE SIZE** _____

DRILLING METHOD Windowless Sampler **LOGGED BY** Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (SPT N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS	WELL DIAGRAM
	J	()			0.10 Dark brown clayey SILT with rootlets rare coarse gravel of various lithologies (TOPSOIL)	
1					Soft light brown mottled sandy gravelly CLAY. Gravel is fine to coarse of various lithologies with occasional brick and concrete. [MADEGROUND]	
	SPT	1-1-2-2 (6)			1.50	
2					Soft dark brown black sandy CLAY with rare fine to coarse gravel of various lithologies	
	SPT	1-2-1-1 (5)			2.40	
3					Soft light brown mottled sandy CLAY with rare cobble	
	SPT	1-0-1-1 (3)			3.60	
4					Soft mottled grey yellow sandy CLAY	
	SPT	2-2-2-3 (9)			4.00 NO RECOVERY	
5					▽	
	SPT	2-2-2-2 (8)			5.40	
6					Firm light mottled grey brown slightly sandy CLAY	
	SPT	2-2-3-4 (11)			6.45	

Bottom of borehole at 6.45 metres.

NOTES Water seepage at 4.50m

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

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WELL NUMBER WS02

CLIENT SIAW **PROJECT NAME** 59 Redington Road

PROJECT NUMBER 16-248 **PROJECT LOCATION** London, NW3 7RP

DATE STARTED 4/8/16 **COMPLETED** 4/8/16 **CO-ORDINATES** 525609 mE, 186005 mN

DRILLING CONTRACTOR Dynamic Sampling UK **GROUND ELEVATION** _____ **HOLE SIZE** _____

DRILLING METHOD Windowless Sampler **LOGGED BY** Ruby Westnedge **CHECKED BY** BD

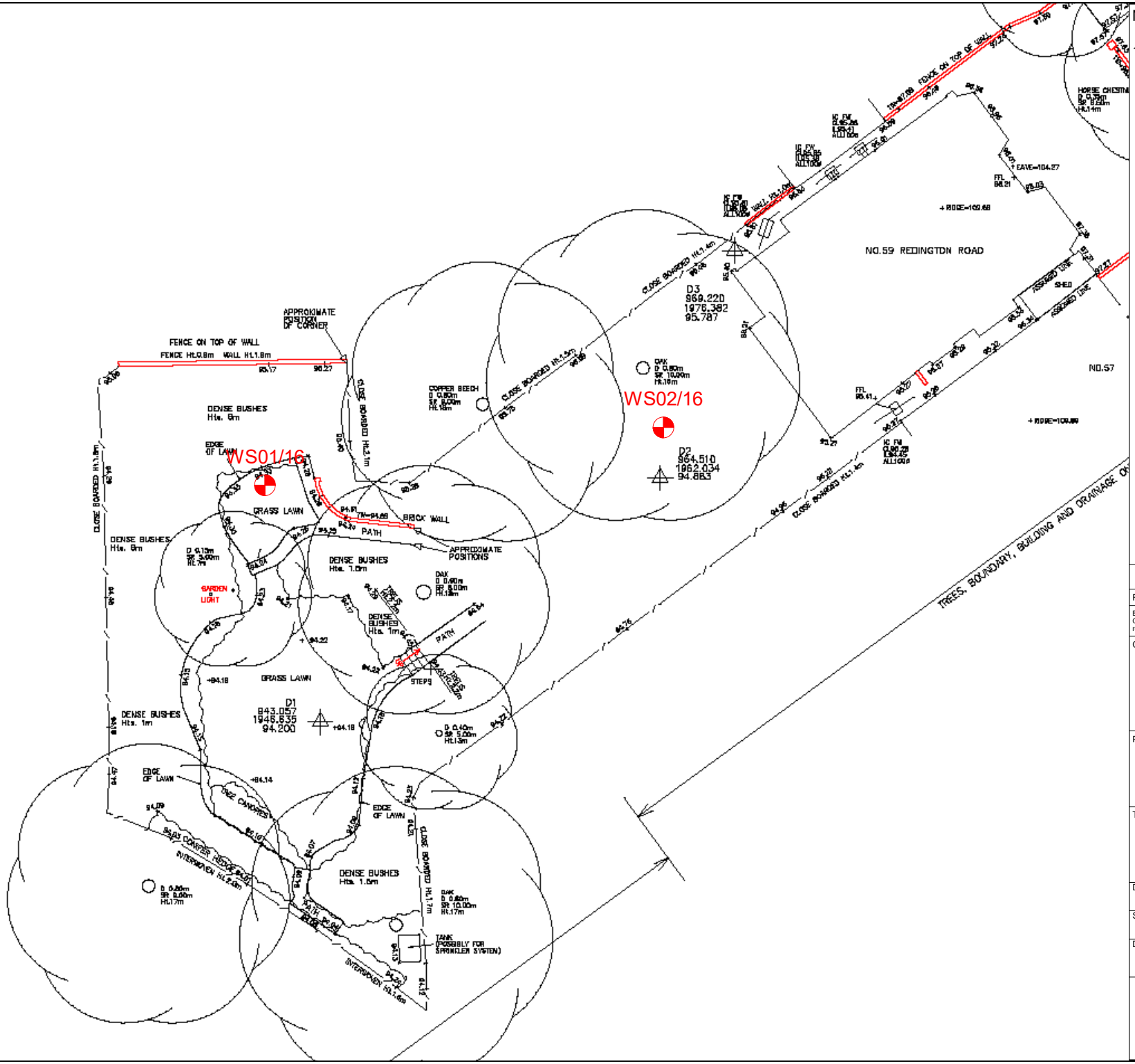
DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (SPT N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS	WELL DIAGRAM
	J	()			0.05 Dark brown clayey SILT with rootlets rare coarse gravel of various lithologies (TOPSOIL)	
1					Soft to firm light brown mottled grey sandy CLAY with rootlets and medium to coarse gravel	
	SPT	2-2-2-2 (8)				
2						
	SPT	2-3-3-3 (11)			2.20 Firm reddish brown sandy CLAY with rare fine to medium gravel	
3						
	SPT	4-4-5-5 (18)				
4					3.60 Firm grey sandy CLAY	
	SPT	3-3-3-3 (12)			▽	
5					5.00 Firm light mottled grey slightly sandy CLAY with light yellow orange sand pockets	
	SPT	3-4-3-4 (14)				
6						
	SPT	4-5-5-5 (19)			6.45 Bottom of borehole at 6.45 metres.	

NOTES Water seepage at 4.50m

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

DRAWINGS

BOREHOLE LOCATION PLAN



NOTES

1.

Rev.	Revision Detail	Drawn	Date
01	First Issue	RW	30/08/16

CLIENT:

PROJECT:

Redington Road

TITLE:

BH Location Plan

Drawn:	Checked:	Date:
RW	BD	Aug '16
Scale:	Original Sheet Size:	Status:
NTS	A4	DRAFT

Drawing No.: **Figure 2** Revision: **01**

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