Appendix D Ground and Water Ltd Ground Investigation Report

Basement Impact Assessment

3A Mornington Crescent, London NW1 7RH

Geotechnical Factual Report

21 November 2017

MAUND GEO-CONSULTING

Produced for: Dilhan Sebastian

3A Mornington Crescent, NW1 7RH

Prepared by:

Julian Maund BSc PhD CEng MIMMM CGeol FGS

Geotechnical Engineer

Maund Geo-Consulting Ltd
20 Mortlake Avenue
Worcester WR5 1QD

T *07817 018716*

E *julian.maund@gmail.com*

Report Title	Basement Impact Assessment	**Site Address**	3A Mornington Crescent, London NW1 6RH
Work Stage	Factual Geotechnical Report	**Report Date**	November 2017
Brief Description of the Report Contents	Factual report on ground investigation undertaken in November 2017 as part of a Basement Impact Assessment		

Document Control Sheet

Project Title	3A Mornington Crescent
Report Title	Ground Investigation Factual Report
Reference	MGC-FGR-17-25-V1
Revision	1
Status	Final
Control Date	21 November 2017

Record of Issue

Issue	Status	Date	Author	
A	Final	21/11/17	Julian Maund	

Distribution

	Contact	Copies
Dilhan Sebastian		1
Croft Structural Engineers	Concetta Cosenza	1

Contents

1 Introduction

1.1 Terms of Reference

Maund Geo-Consulting Ltd (MGC) was instructed on 17 October 2017 by Croft Structural Engineers Ltd on behalf of Dilhan Sebastian to undertake a ground investigation at 3A Mornington Crescent 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 Dilhan Sebastian 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 on Mornington Crescent which is within the London Borough of Camden, shown on Figure 1 in Appendix A.

2.2 Geology

Information obtained from the BGS website 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 2nd November 2017. The investigation was carried out by Topdrill Ltd which comprised 1 No. cable percussive borehole and two No. hand dug trial pits to expose party wall footings. The borehole was undertaken using a specialist LLAMR rig which was carried through the house in sections and assembled at the borehole location. The location of the exploratory holes is shown in Figure 2 in Appendix A.

3.1 Service Clearance and survey

The borehole and trial pit locations were checked for service clearance by using a Cable Avoidance Tool and the use of Thames Water service drawings. The location of the borehole and trial pits was referenced to existing features.

3.2 Drilling depths

Borehole BH01 was drilled to 9.50 m. The trial pits were excavated to approximately 0.5 m depth.

3.3 Insitu Testing

Insitu Standard Penetration Tests were undertaken at regular intervals was 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.

3.5 Installation

A groundwater monitoring standpipe was installed in BH01. 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 C.

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,	1	BRE SD1

5 Groundwater Monitoring

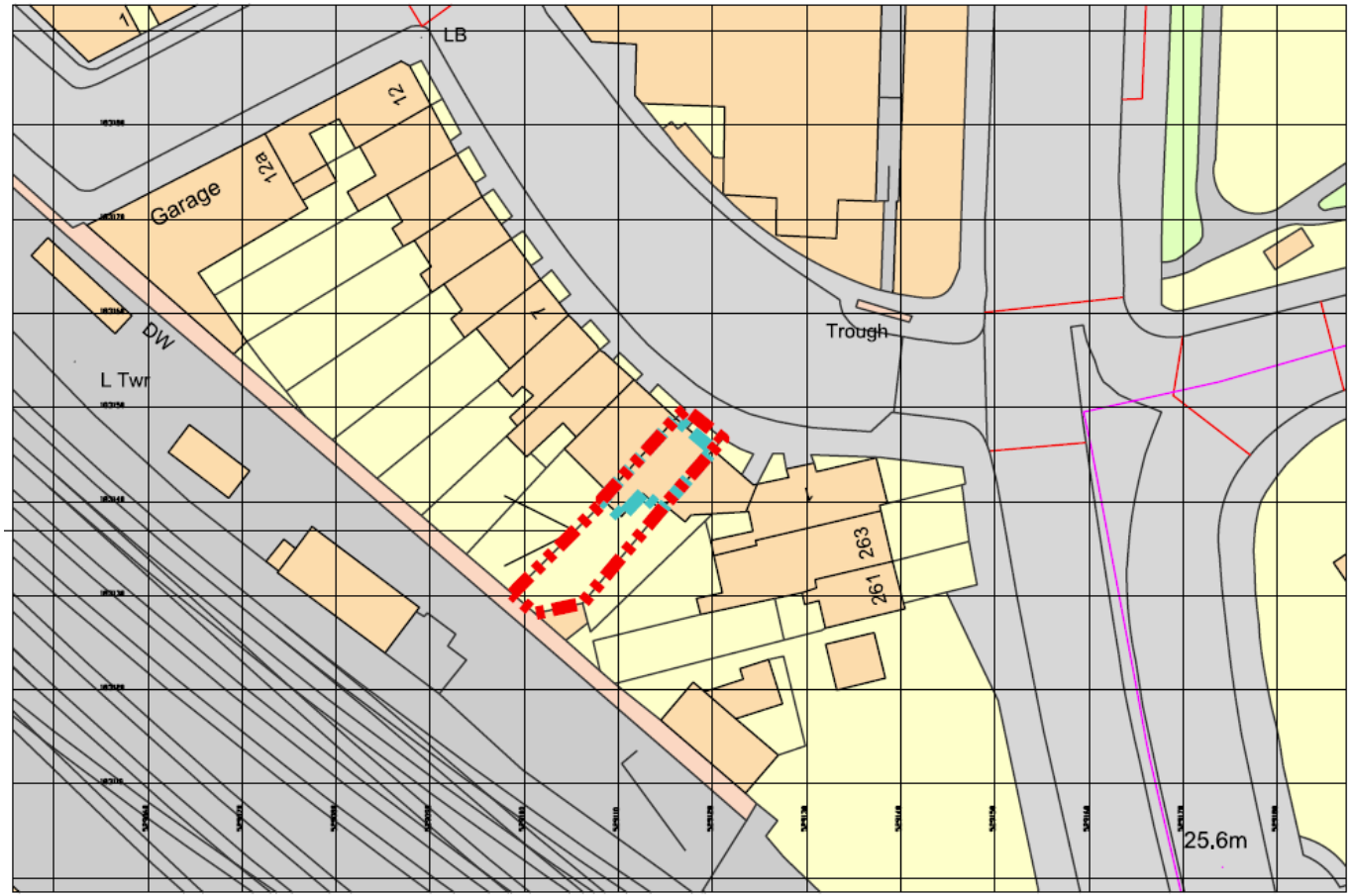
Groundwater levels in the borehole installation in BH01 was monitored while on site on 26/10/17 and 2 no. subsequent occasions. The results are proved in Table 5.1.

Table 5.1

Date of Monitoring	Groundwater (depth metres below ground level)
2/11/17	Seepages at 5.45 and 7.10 m while drilling
14/11/17	4.47
21/11/17	4.17

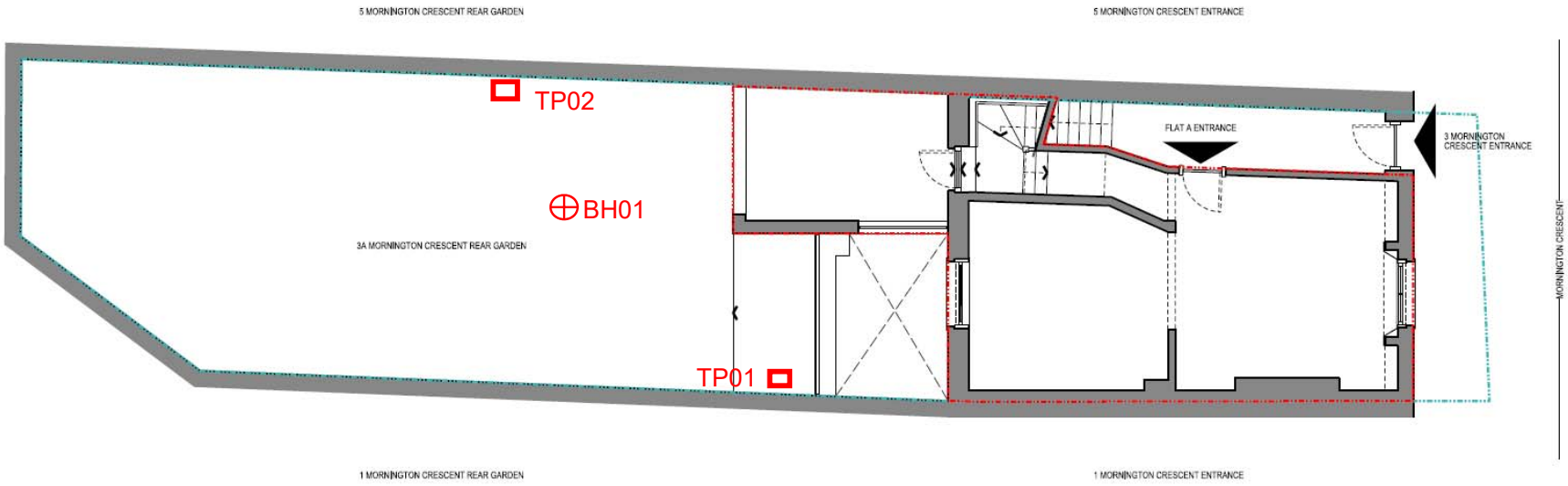
Appendices

Appendix A Drawings



Client		Project
Dilhan Sebastian	MAUND GEO-CONSULTING	3A Mornington Crescent - BIA.

Job No.	Title	Figure
MGC/17/26	Site Location Plan	1



Client		Project
Dilhan Sebastian	**MAUND GEO-CONSULTING**	3A Mornington Crescent

Job No.	Title	Figure
MGC/17/26	Exploratory Location Plan	2

Appendix B Exploratory Hole Records

MAUND GEO-CONSULTING

Julian Maund BSc PhD MIMMM CEng FGS CGeol

Maund Geo-Consulting Ltd
20 Mortlake Avenue
Worcester WR5 1QD
07817018716
julian.maund@gmail.com

Borehole No.

BH01

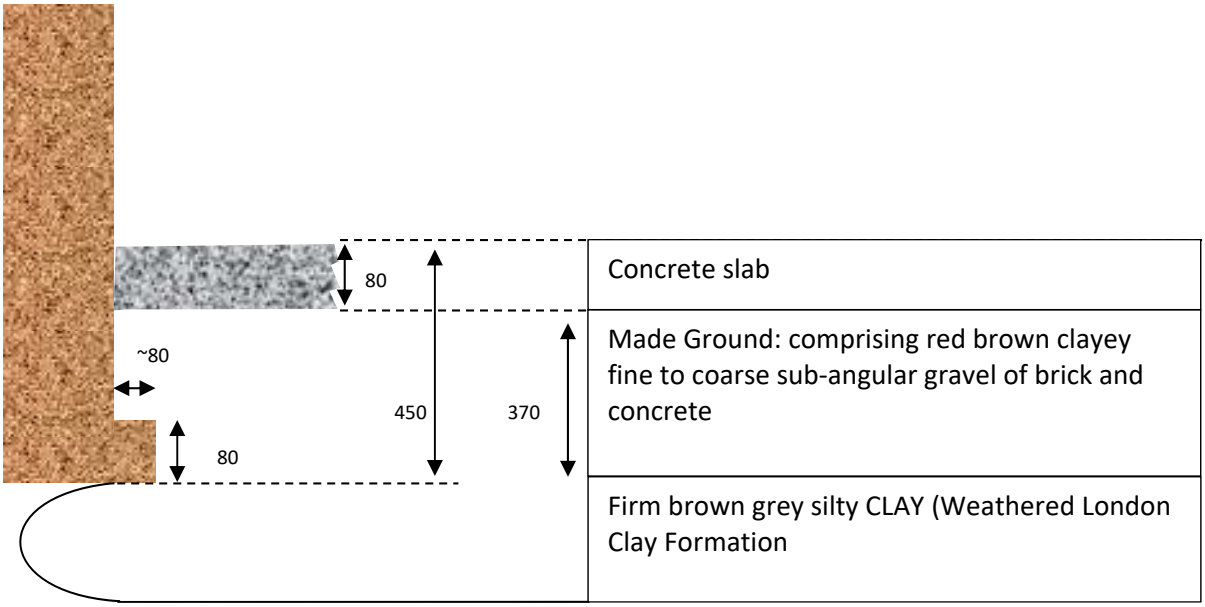
Sheet 1 of 1

Project Name: 3A Mornington Crescent, London NW1 7RH	Project No:	Co -ords	Hole Type: Top Drill LLAMR
Location: 3A Mornington Crescent, London NW1 7RH		Level: (m AOD) 26 (Approx only)	Hole Diameter: 150 mm
Client: Dilhan Sebastian		Date Drilled: 02/11/17	Logged By: JGM

Well	Water Strikes	Sampling and Insitu Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		0-0.3	E		0.05	25.95		Made Ground: Concrete 600 mm square paving slabs
					0.4	25.6		Made Ground: Fine sandy clayey gravel of brick and flint
		1.20	D	N=6 (1/1,1,1,2,2)				Firm to stiff yellow brown silty CLAY with a trace of fine brown sand (London Clay Formation)
								… rare fine gravel from 0.4 to 0.8 (possibly disturbed ground)
		2.00	D	N=17 (1/2,3,4,4,6)				
		3.00	D	N= 11 (1,/2,2,2,4,3)				
								…fine brown sand horizon at 3.9 to 3.91m
		4.00	D	N= 10 (1,/2,2,2,3,3)				… soil becoming moist at 4.0 m
		5.00	D	N= 12 (1,/1,2,3,3,4)				
	▼							… slow water seepage at 5.45 m
		6.00	D	N= 15 (1,/2,3,4,4,4)				
	▼ ▽	7.00	D	N=44 (10,/25,21,8,7,8)				… claystone fragments recovered at 7.00 m
								… water seepage at 7.1 m standing at 7.20 in 20 minutes
								… becoming brown grey in colour from 7.50 m
		8.00	D	N=17 (2,/4,4,4,4,5)				
		9.00	D	N=20 (3,/5,6,4,5,5)				
					9.5	16.5		Borehole compete at 9.50 m

Remarks

Inspection pit to 1.2 m and CAT scan.
Groundwater struck at 5.45 slow seepage no rise in 20 mins. Groundwater struck at 7.1 m at 7.2 m after 20 minutes.
Standpipe Piezomter installed to depth of 8 m. Bentonite seal from 5.0 to 0.5 m. Gas bung and flat cover

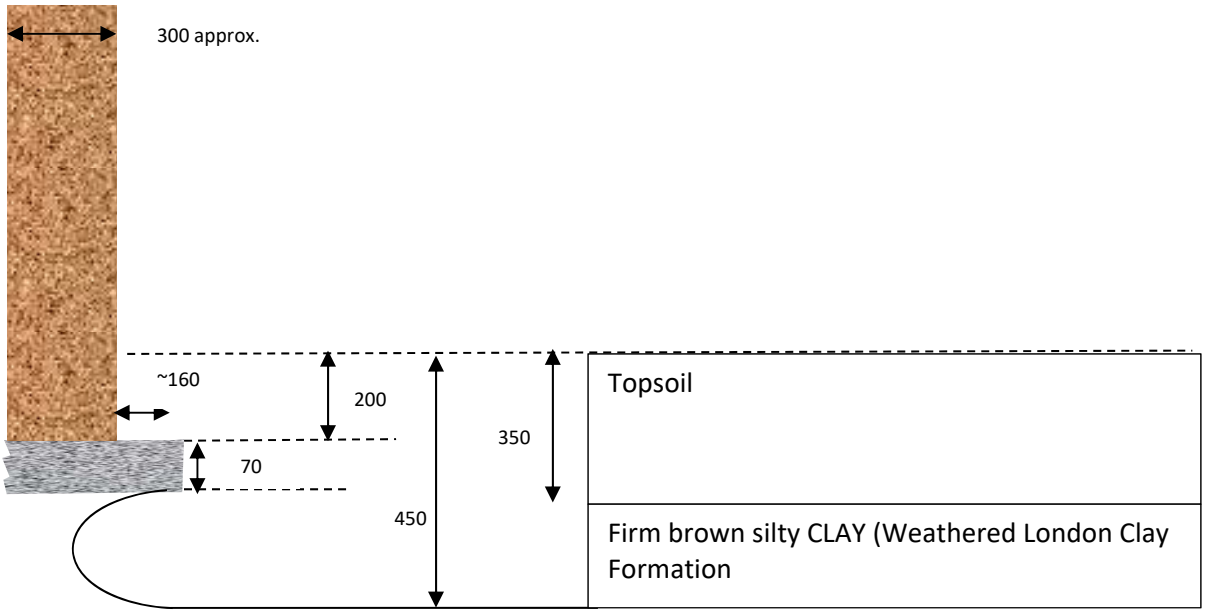


NOTE: NOT TO SCALE Dimensions in mm.

Concrete

Brick wall (with concrete render)

Client: **Dilhan Sebastian**	**Date:** **November 2017**	**Project:** **3A Mornington Crescent NW1 7RH**
Section Drawing: Foundation Exposure TP01	**MAUND GEO-CONSULTING**	**Ref:** **MGC 17-26**



NOTE: NOT TO SCALE Dimensions in mm.

Concrete footing (extent not proven on neighbour's side)

Brick wall

Client: **Dilhan Sebastian**	**Date:** **November 2017**	**Project:** **3A Mornington Crescent NW1 7RH**
Section Drawing: Foundation Exposure TP02	**MAUND GEO-CONSULTING**	**Ref:** **MGC 17-26**

Appendix C Geotechnical Laboratory Test Report

TEST CERTIFICATE

Determination of 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 BS1377-2: 1990: Clause 4.4 & 5: One Point Method

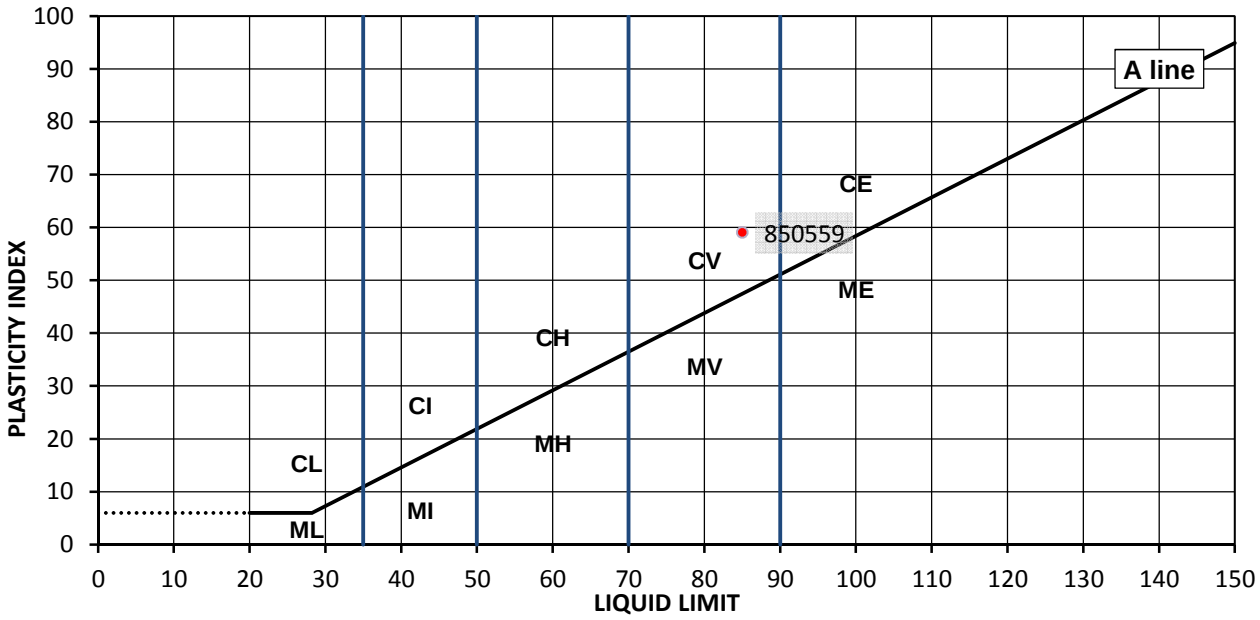
Client:	Maund GeoConsulting Ltd	Client Reference:	17-66410
Client Address:	20 Mortlake Avenue Worcester WR5 1QT	Job Number:	17-66410
		Date Sampled:	02/11/2017
		Date Received:	02/11/2017
Contact:	Julian Maund	Date Tested:	15/11/2017
Site Name:	3A Mornington Cresent NW1 7RH	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 850559
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH01	Depth Top [m]:	1.00
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
19	85	26	59	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)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 21/11/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of 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 BS1377-2: 1990: Clause 4.4 & 5: One Point Method

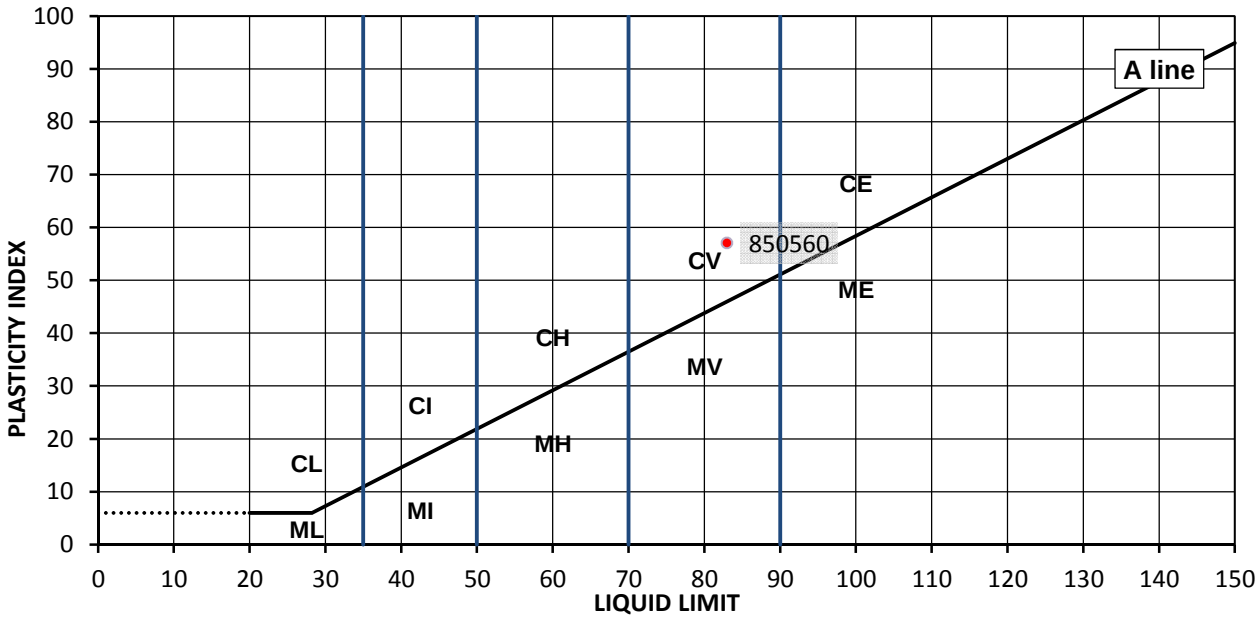
Client:	Maund GeoConsulting Ltd	Client Reference:	17-66410
Client Address:	20 Mortlake Avenue Worcester WR5 1QT	Job Number:	17-66410
		Date Sampled:	02/11/2017
		Date Received:	02/11/2017
Contact:	Julian Maund	Date Tested:	15/11/2017
Site Name:	3A Mornington Cresent NW1 7RH	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 850560
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH02	Depth Top [m]:	2.00
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
21	83	26	57	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)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 21/11/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of 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 BS1377-2: 1990: Clause 4.4 & 5: One Point Method

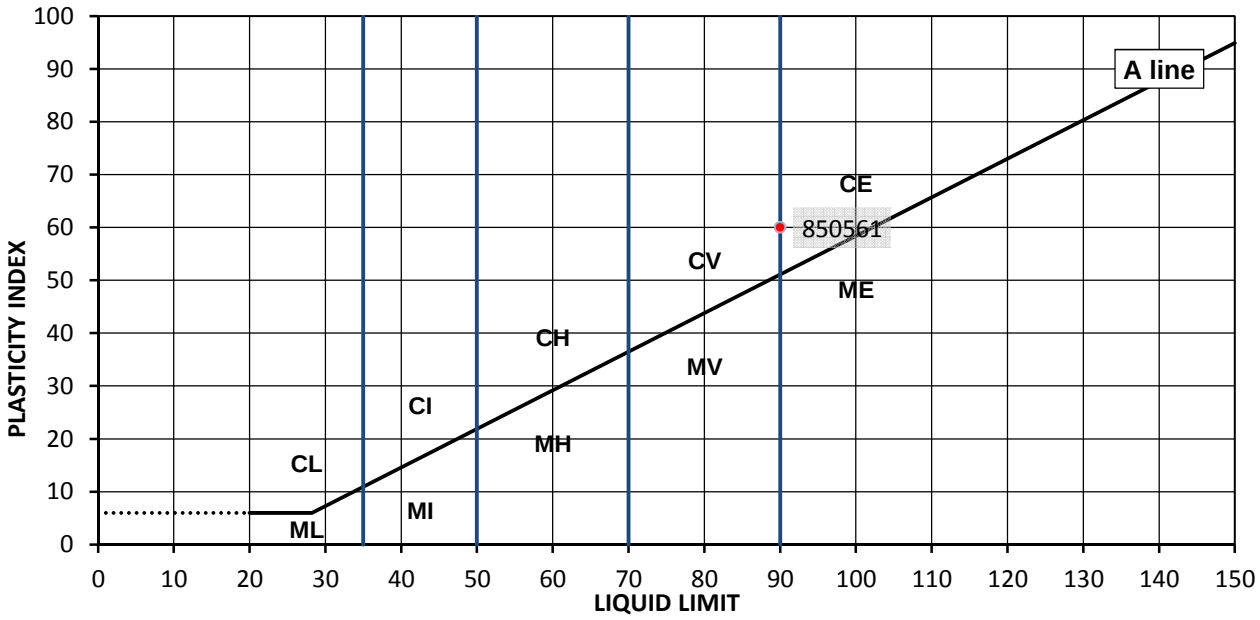
Client:	Maund GeoConsulting Ltd	Client Reference:	17-66410
Client Address:	20 Mortlake Avenue Worcester WR5 1QT	Job Number:	17-66410
		Date Sampled:	02/11/2017
		Date Received:	02/11/2017
Contact:	Julian Maund	Date Tested:	15/11/2017
Site Name:	3A Mornington Cresent NW1 7RH	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 850561
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH03	Depth Top [m]:	3.00
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
28	90	30	60	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)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section

Date Reported: 21/11/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

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

4041

Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

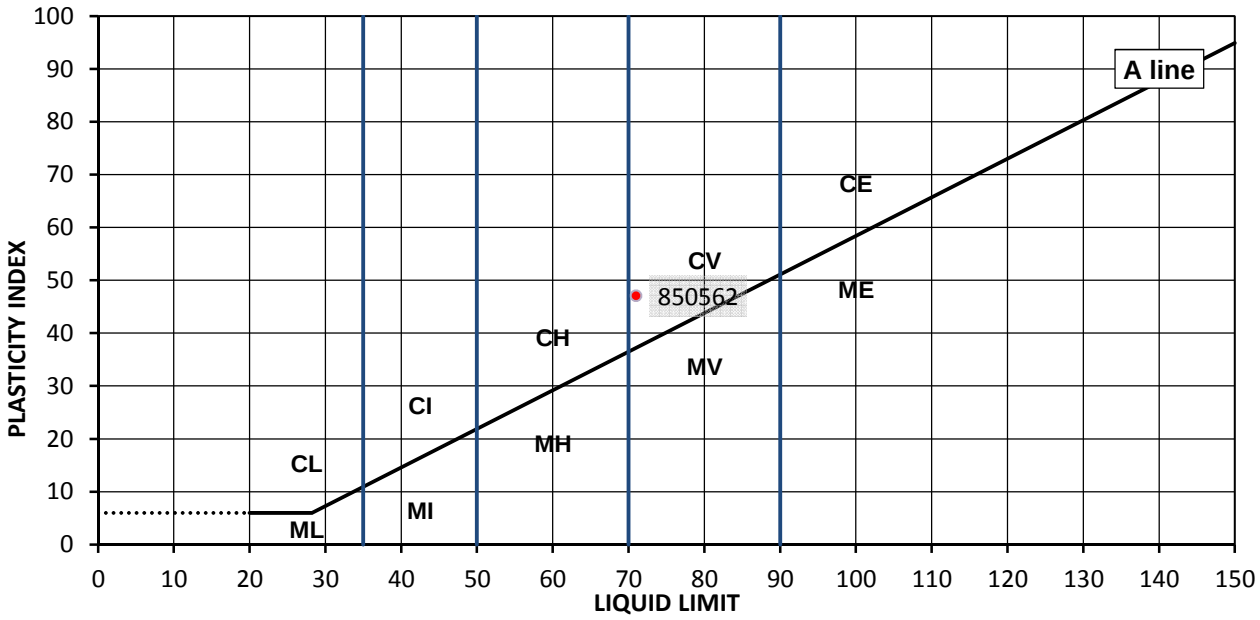
Client:	Maund GeoConsulting Ltd	Client Reference:	17-66410
Client Address:	20 Mortlake Avenue Worcester WR5 1QT	Job Number:	17-66410
		Date Sampled:	02/11/2017
		Date Received:	02/11/2017
Contact:	Julian Maund	Date Tested:	15/11/2017
Site Name:	3A Mornington Cresent NW1 7RH	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 850562
Sample Reference: Not Given

Description:	Brown CLAY	Sample Type:	B
Location:	BH01	Depth Top [m]:	6.00
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	71	24	47	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)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 21/11/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Determination of 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 BS1377-2: 1990: Clause 4.4 & 5: One Point Method

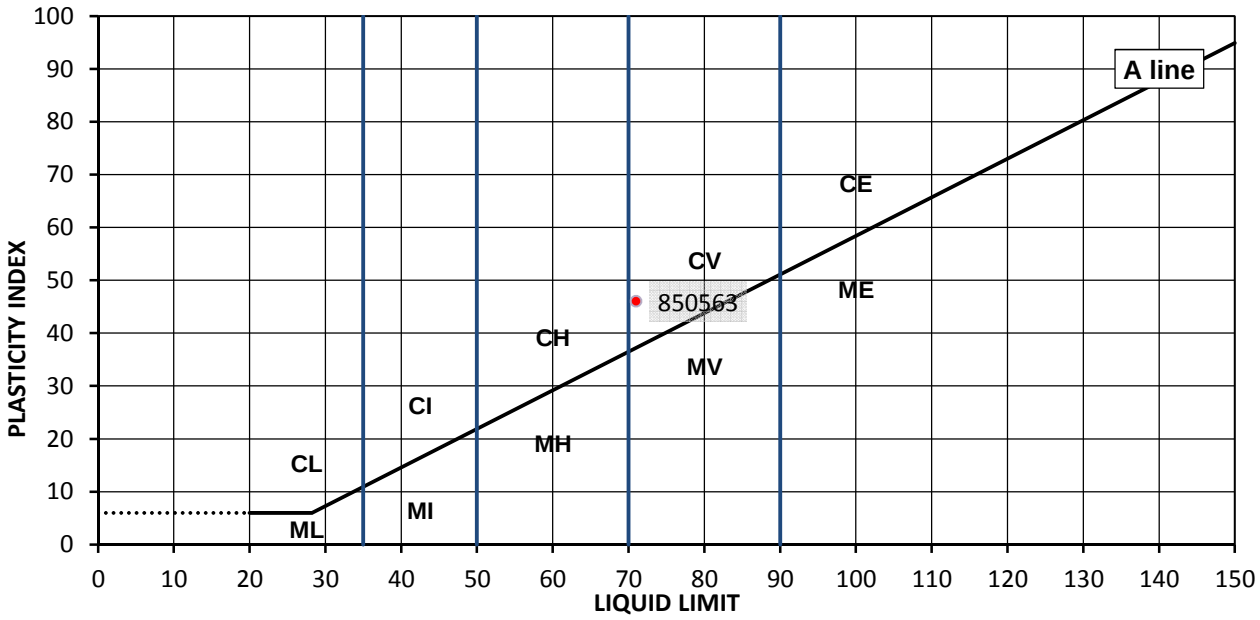
Client:	Maund GeoConsulting Ltd	Client Reference:	17-66410
Client Address:	20 Mortlake Avenue Worcester WR5 1QT	Job Number:	17-66410
		Date Sampled:	02/11/2017
		Date Received:	02/11/2017
Contact:	Julian Maund	Date Tested:	15/11/2017
Site Name:	3A Mornington Cresent NW1 7RH	Sampled By:	Not Given
Site Address:	Not Given		

TEST RESULTS

Laboratory Reference: 850563
Sample Reference: Not Given

Description:	Brown CLAY with gypsum crystals	Sample Type:	B
Location:	BH02	Depth Top [m]:	8.00
Sample Preparation:	Tested in natural condition	Depth Base [m]:	Not Given

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
30	71	25	46	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)	

Remarks

Approved:

Dariusz Piotrowski
PL Laboratory Manager Geotechnical Section
Date Reported: 21/11/2017

Signed:

Mark Beastall
Geotechnical Commercial Manager

for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

Summary of Classification Test Results

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

Client: Maund GeoConsulting Ltd
Client Address: 20 Mortlake Avenue
Worcester
WR5 1QT
Contact: Julian Maund
Site Name: 3A Mornington Cresent NW1 7RH
Site Address: Not Given

Client Reference: 17-66410
Job Number: 17-66410
Date Sampled: 02/11/2017
Date Received: 02/11/2017
Date Tested: 15/11/2017
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Soil Description	Density		M/C	Atterberg				PD
		Reference	Top depth [m]	Base depth [m]	Type		bulk Mg/m^3	dry Mg/m^3	%	% Passing 425um %	LL %	PL %	PI %	Mg/m^3
850559	BH01	Not Given	1.00	Not Given	B	Brown CLAY			19	100	85	26	59	
850562	BH01	Not Given	6.00	Not Given	B	Brown CLAY			27	100	71	24	47	
850560	BH02	Not Given	2.00	Not Given	B	Brown CLAY			21	100	83	26	57	
850563	BH02	Not Given	8.00	Not Given	B	Brown CLAY with gypsum crystals			30	100	71	25	46	
850561	BH03	Not Given	3.00	Not Given	B	Brown CLAY			28	100	90	30	60	

Comments:

Approved:

Dariusz Piotrowski
PL Laboratory Manager
Geotechnical Section

Signed:

Mark Beastall
Geotechnical Commercial Manager

Date Reported: 21/11/2017

for and on behalf of i2 Analytical Ltd

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 : 17-66619

Project / Site name:	3A Mornington Crescent, NW1 7RH	**Samples received on:**	02/11/2017
Your job number:		**Samples instructed on:**	03/11/2017
Your order number:		**Analysis completed by:**	14/11/2017
Report Issue Number:	1	**Report issued on:**	14/11/2017
Samples Analysed:	1 soil sample		

Signed:

Dr Claire Stone
Quality Manager
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.

Analytical Report Number: 17-66619

Project / Site name: 3A Mornington Crescent, NW1 7RH

Lab Sample Number				851934				
Sample Reference				BH01				
Sample Number				None Supplied				
Depth (m)				1.20				
Date Sampled				02/11/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	17				
Total mass of sample received	kg	0.001	NONE	0.24				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.0				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.10				

Analytical Report Number : 17-66619

Project / Site name: 3A Mornington Crescent, NW1 7RH

* 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 *
851934	BH01	None Supplied	1.20	Brown clay.

Analytical Report Number : 17-66619

Project / Site name: 3A Mornington Crescent, NW1 7RH

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.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical 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.