APPENDIX F

CGL exploratory hole records

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Topdrill Ltd
7 Deeping Gate
Stonebridge
Milton Keynes
MK13 0DE

SPT Hammer Ref:	036
Test Date:	17/02/2017
Report Date:	23/02/2017
File Name:	036.spt
Test Operator:	AP

Instrumented Rod Data

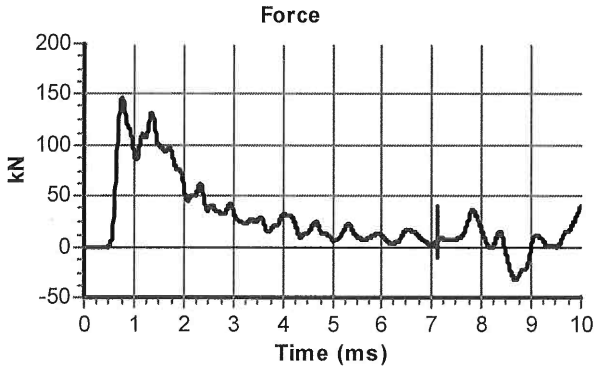
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	7.0
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	9783
Accelerometer No.2:	9784

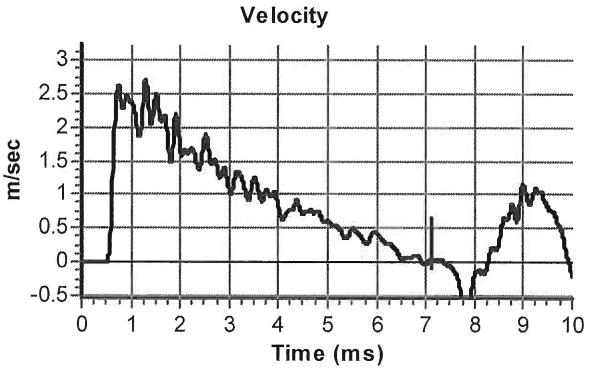
SPT Hammer Information

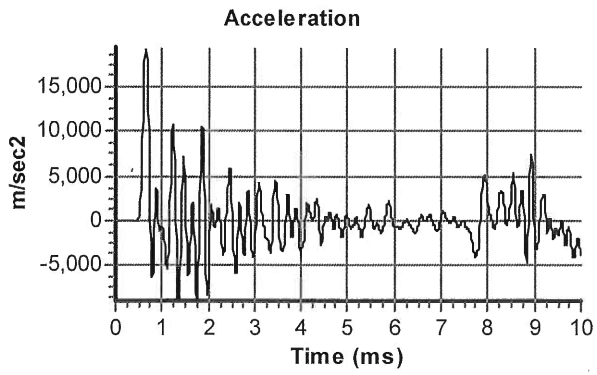
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	18.0

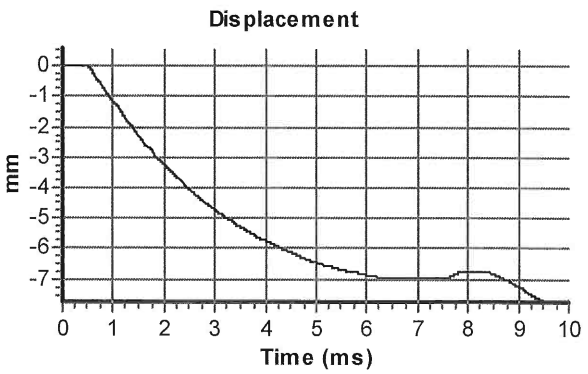
Comments / Location

WS - LLAMR 036
Topdrill - Milton Keynes









Calculations

Area of Rod A (mm2):	1034
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	453

Energy Ratio E_r (%): **96**

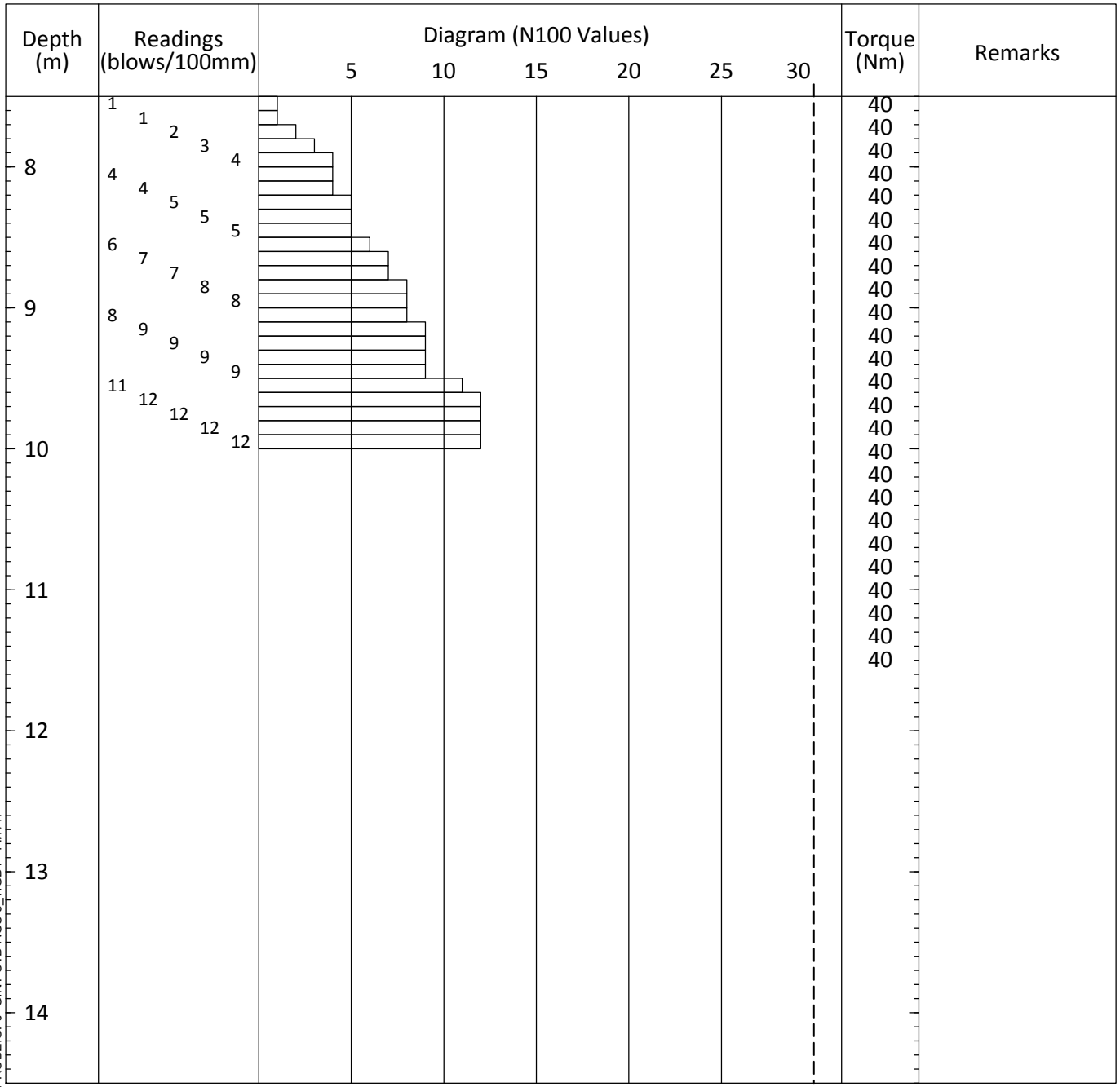
Signed:

Title: DRILLING MANAGER.

The recommended calibration interval is 12 months

DYNAMIC PROBE LOG

Project				PROBE No
20 Albert Terrace Mews				WS1
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18876a	19-06-17 19-06-17	34.00		
Client				Sheet
Progressive Property Management				1 of 1



Hammer Wt (kg)	63.5kg
Hammer Drop (mm)	750
Cone Dia (mm)	50.8
Cone Type	DPSH
Damper	

General Remarks

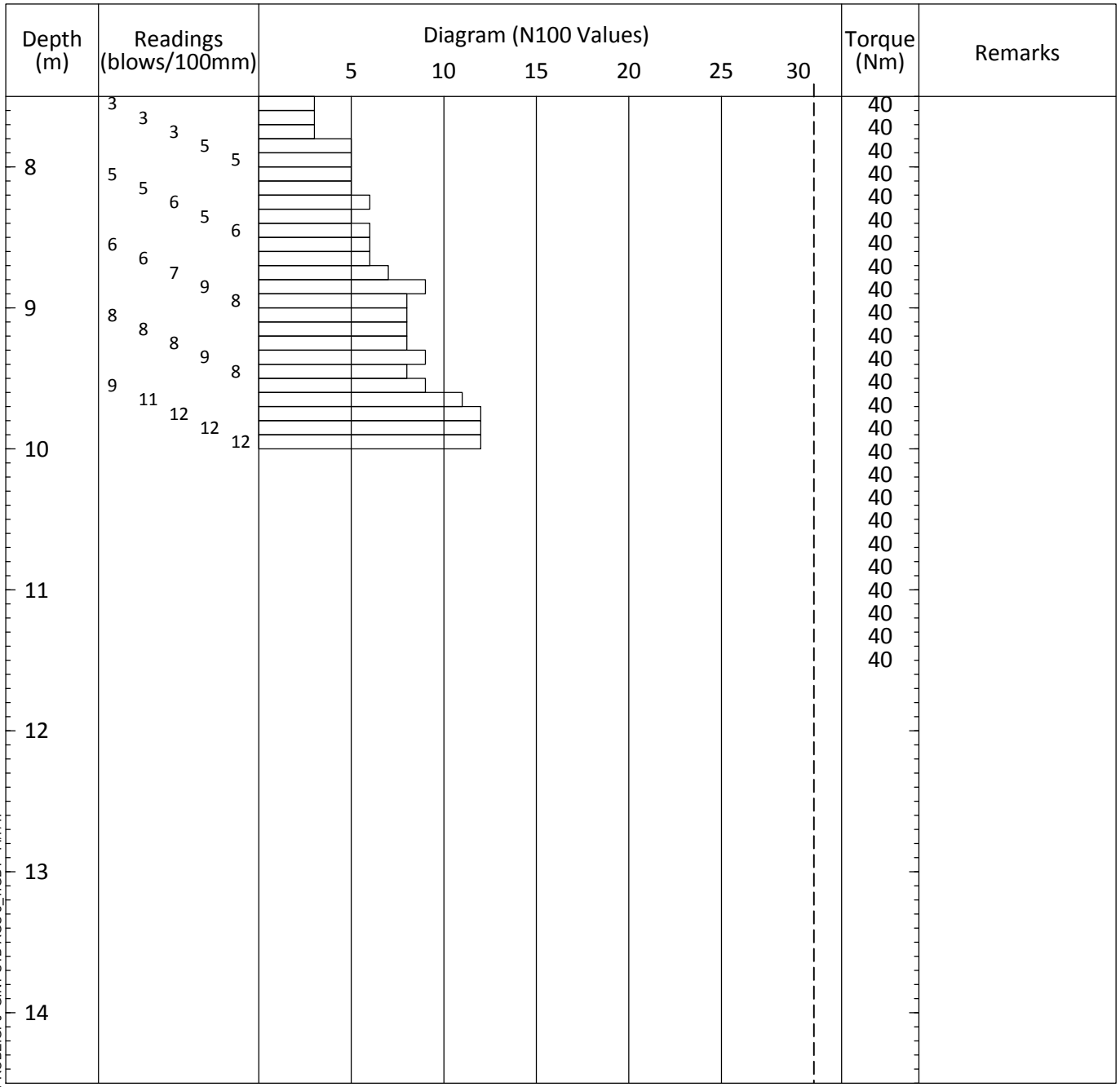
1. Borehole Terminated at 7m below ground level.
2. Dynamic probing from 7m to 10m using DPSH (63.5kg)

Method/ Plant Used	Field Crew	Logged By	Checked By
Lightweight limited access modular window sample rig	Topdrill	TJB	EJB

CGL DP LOG (STARTING DEPTH >0M) DYNAMIC PROBE.GPJ GINT STD AGS 3_1.GDT 14/7/17

DYNAMIC PROBE LOG

Project				PROBE No
20 Albert Terrace Mews				WS2
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18876a	20-06-17 20-06-17	34.00		
Client				Sheet
Progressive Property Management				1 of 1



Hammer Wt (kg)	63.5kg
Hammer Drop (mm)	750
Cone Dia (mm)	50.8
Cone Type	DPSH
Damper	

General Remarks

1. Borehole Terminated at 7m below ground level.
2. Dynamic probing from 7m to 10m using DPSH (63.5kg)

Method/ Plant Used	Field Crew	Logged By	Checked By
Lightweight limited access modular window sample rig	Topdrill	TJB	EJB

CGL DP LOG (STARTING DEPTH >0M) DYNAMIC PROBE.GPJ GINT STD AGS 3_1.GDT 14/7/17

WINDOW SAMPLE LOG

Project				HOLE No
20 Albert Terrace Mews				WS1
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18876a	19-06-17 19-06-17	34.00		
Client				Sheet
Progressive Property Management				1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth (m)	Type No	Test Result (N/kPa/ppm)		Reduced Level	Legend	Depth (m) (Thick-ness)	DESCRIPTION	
0.10	D1			33.90		0.10	Paving Slabs [MADE GROUND]	
0.35-0.85	D2			33.65		0.35	Loose orange brown very gravely sand. Gravel is fine to course, angular to sub-rounded brick and concrete. [MADE GROUND]	
0.85-1.10	D3			33.15		(0.50) 0.85	Soft to Firm dark brown slightly sandy gravelly clay. Gravel is fine to course angular to sub-rounded brick, flint and concrete. [MADE GROUND]	
1.00	SPT	N4						
1.25	D11						Firm orangish brown closely fissured silty CLAY with partings of fine sand and silt. Rootlets present to 2m. Selinite crystals present on some horizons. [WEATHERED LONDON CLAY FORMATION]	
1.75	D12					(1.65)		
2.00	SPT	N8						
2.25	D13			31.50		2.50		
2.75	D14						Firm to very stiff light grey mottled orangish brown closely fissured silty CLAY with partings of fine sand and silt. Dark grey 'veining' apparent of some horizons. Selinite crystals frequent throughout. [WEATHERED LONDON CLAY FORMATION]	
3.00	SPT	N7						
3.25	D15							
3.75	D16							
4.00	SPT	N8						
4.75	D17					(4.50)		
5.00	SPT	N9						
5.25	D18							
5.75	D19							
6.00	SPT	N10						
6.25	D20							
6.75	D21			27.00		7.00		
7.00	SPT	N11					(Refusal, Dynamic Probing to 10m) *(Window sample terminated at 7m)*	

Boring Progress and Water Observations

Date	Strike depth	Casing depth	Comment	Time measured	Standing Depth

General Remarks

1. Borehole Terminated at 7m below ground level.
2. Dynamic probing from 7m to 10m using DPSH (63.5kg)
3. No Groundwater encountered during drilling
4. Installation details; 0.0 - 0.5mbgl: Plaine pipe with bentonite backfill; 0.5-6.0mbgl; slotted pipe with gravel backfill; 6.0-7.0mbgl; Bentonite backfill
4. No visual or olfactory evidence of contamination.
5. D=Disturbed Sample
6. ES=Environmental sample
7. N=Standard penetration test 'N' value
8. SPT 'N' is raw uncorrected value

Method/ Plant Used	Field Crew	Logged By	Checked By
Lightweight limited access modular window sample rig	Topdrill	TJB	EJB

WINDOW SAMPLE LOG

Project				HOLE No
20 Albert Terrace Mews				WS2
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18876a	20-06-17 20-06-17	34.00		
Client				Sheet
Progressive Property Management				1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth (m)	Type No	Test Result (N/kPa/ppm)		Reduced Level	Legend	Depth (m) (Thick-ness)	DESCRIPTION	
				33.97		0.03	Tile	
				33.70		0.30	[MADE GROUND]	
						(0.40)	Yellowish brown slightly clayey sandy gravel. Gravel is fine to course angular to sub-rounded brick, concrete and flint.	
				33.30		0.70	[MADE GROUND]	
1.00	SPT	N4					Soft to Firm dark brown slightly sandy gravelly clay. Gravel is fine to course angular to sub-rounded brick, flint and concrete. [MADE GROUND]	
1.25	D28						Firm becoming very stiff brownish orange to dark grey closely fissured silty CLAY with fine partings of sand and silt. Rootlets frequent above 2m. Selinite crystals present on some horizons. [WEATHERED LONDON CLAY FORMATION]	
1.75	D29							
2.00	SPT	N5						
2.25	D30							
2.75	D31							
3.00	SPT	N7						
3.25	D32							
3.75	D33					(6.30)		
4.00	SPT	N9						
4.25	D34							
4.75	D35							
5.00	SPT	N15						
5.25	D36							
5.75	D37							
6.00	SPT	N11						
6.25	D38							
6.75	D39			27.00		7.00		
7.00	SPT	N13					Refusal - Dynamic Probing to 10m *(Window sample terminated at 7m)*	

Boring Progress and Water Observations

Date	Strike depth	Casing depth	Comment	Time measured	Standing Depth

General Remarks

1. Borehole Terminated at 7m below ground level.
2. Dynamic probing from 7m to 10m using DPSH (63.5kg)
3. No Groundwater encountered during drilling
4. 4. Installation details; 0.0 - 1.0mbgl: Plaine pipe with bentonite backfill; 1.0-6.0mbgl; slotted pipe with gravel backfill; 6.0-7.0mbgl; Bentonite backfill
4. No visual or olfactory evidence of contamination.
5. D=Disturbed Sample
6. ES=Environmental sample
7. N=Standard penetration test 'N' value
8. SPT 'N' is raw uncorrected value

Method/ Plant Used	Field Crew	Logged By	Checked By
Lightweight limited access modular window sample rig	Topdrill	TJB	EJB

APPENDIX G

Groundwater and gas monitoring records

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	20 Albert Terrace Mews	Job No:	CG-18876a
Date:	10/07/2017	Engineer:	TJB
Time:	16:00:00	Client	Progressive Property Managemen

METEOROLOGICAL & SITE INFORMATION

State of ground:	Dry	X	Moist		Wet			
Wind:	Calm	X	Light		Moderate		Strong	
Cloud cover:	None		Slight	X	Cloudy		Overcast	
Precipitation:	None	X	Slight		Moderate		Heavy	

Barometric pressure (mb): 1008 Local pressure system*: ______ Air temperature (°C): 24

Well No.	Time (s)	Flow (l/hr)	dA (PA)	O_2 (% vol. in air)	CO_2 (% vol. in air)	CH_4 (% vol. in air)	PID (ppm)	Depth to Groundwater (mbgl)	Depth to base (mbgl)
WS2	0	<0.1		20.2	0.4	0.0		5.04	5.84
	15	<0.1		20.0	1.4	0.0			
	30	<0.1		19.0	1.6	0.0			
	45	<0.1		19.0	1.6	0.0			
	60	<0.1		19.0	1.6	0.0			
	90	<0.1		19.0	1.6	0.0			
	120	<0.1		19.0	1.6	0.0			
	150	<0.1		19.0	1.6	0.0			
	180	<0.1		19.0	1.6	0.0			
	240	<0.1		19.0	1.6	0.0			
	300	<0.1		19.0	1.6	0.0			
WS1	0	0.1		21.1	0.8	0.0		DRY	6.22
	15	<0.1		20.4	0.4	0.0			
	30	<0.1		20.1	0.4	0.0			
	45	<0.1		20.1	0.5	0.0			
	60	<0.1		20.1	0.4	0.0			
	90	<0.1		20.1	0.4	0.0			
	120	<0.1		20.1	0.4	0.0			
	150	<0.1		20.1	0.4	0.0			
	180	<0.1		20.1	0.4	0.0			
	240	<0.1		20.1	0.4	0.0			
	300	<0.1		20.1	0.4	0.0			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Weather Underground rolling weather archive for Cambridge weather station.*
NR= Not recorded

GROUNDWATER MONITORING RECORD SHEET

JOB DETAILS			
Site:	20 Albert Terrace Mews	Job No:	CG-18876a
Date:	10/07/2017	Engineer:	TJB
Time:	1600	Client	Progressive Property Management
Weather:	Warm, Clear		

MONITORING & SAMPLING DETAILS								
Well / Borehole reference:	WS2	WS1						
Monitoring details								
Ground elevation (+mOD)	34	34						
Groundwater depth (mbgl)	5.04	DRY						
Groundwater elevation (+mOD)	28.96							
Depth to base of well (mbgl)	5.84	6.22						
Diameter of well (m)	0.05	0.05						
Condition of well	Good	Good						
Top of response zone (mbgl)	0.5	1						
Base of response zone (mbgl)	6	6						
Free product thickness (m)	0	0						
Hydrocarbon sheen noted (Y/N)	N	N						
Purging details								
Purge method	Not Purged							
Purged volume (litres)								
Recharge (good / poor)								
Sampling details								
Sampling method	Not sampled							
Volume of water sample taken (litres)								
Volume of free product sample taken (litres)								
Colour / odours noted*								
In-situ measurements								
pH								
Temperature (^{o}C)								
Dissolved oxygen (mg/l)								
Redox potential (mV)								
Electrical conductivity (µS/cm)								
Total dissolved solids (ppt)								

* Respiratory protective equipment to be worn if odours are noted during initial monitoring & on sites which are potentially contaminated

NOTES

APPENDIX H

Laboratory testing results

Thomas Bates
Card Geotechnics Ltd
12 Melcombe Place
Marylebone
London
NW1 6JJ

e: thomasbates@cgl-uk.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 : 17-52515

Project / Site name:	20 Albert Terrace Mews	**Samples received on:**	23/06/2017
Your job number:	CGL-18876A	**Samples instructed on:**	23/06/2017
Your order number:		**Analysis completed by:**	03/07/2017
Report Issue Number:	1	**Report issued on:**	03/07/2017
Samples Analysed:	6 soil samples		

Signed:

Rexona Rahman
Reporting 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: 17-52515

Project / Site name: 20 Albert Terrace Mews

Lab Sample Number				772058	772059	772060	772061	772062
Sample Reference				WS1	WS2	WS2	WS1	WS1
Sample Number				ES3	ES6	ES7	None Supplied	None Supplied
Depth (m)				0.70	0.60	1.00	2.75	6.75
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	22	8.9	16	18	17
Total mass of sample received	kg	0.001	NONE	1.4	1.6	0.83	1.3	1.4
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.6	8.3	7.8	7.7	7.7
Total Sulphate as SO_4	mg/kg	50	MCERTS	830	-	3600	-	-
Water Soluble SO4 as SO4 (2:1) Gallery 16h extraction	g/l	0.00125	MCERTS	0.114	0.289	1.65	3.23	1.06
Total Sulphur	mg/kg	50	MCERTS	470	-	1200	-	-

Analytical Report Number: 17-52515

Project / Site name: 20 Albert Terrace Mews

Lab Sample Number				772063				
Sample Reference				WS2				
Sample Number				None Supplied				
Depth (m)				3.25				
Date Sampled				Deviating				
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	18				
Total mass of sample received	kg	0.001	NONE	0.50				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.6				
Total Sulphate as SO_4	mg/kg	50	MCERTS	-				
Water Soluble SO4 as SO4 (2:1) Gallery 16h extraction	g/l	0.00125	MCERTS	3.18				
Total Sulphur	mg/kg	50	MCERTS	-				

Analytical Report Number : 17-52515

Project / Site name: 20 Albert Terrace Mews

* 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 *
772058	WS1	ES3	0.70	Brown clay and sand with gravel.
772059	WS2	ES6	0.60	Brown clay and sand with gravel and brick.
772060	WS2	ES7	1.00	Brown clay.
772061	WS1	None Supplied	2.75	Brown clay.
772062	WS1	None Supplied	6.75	Brown clay.
772063	WS2	None Supplied	3.25	Light brown clay.

Analytical Report Number : 17-52515

Project / Site name: 20 Albert Terrace Mews

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
Sulphate, water soluble, in soil by Gallery 16hr	Determination of water soluble Sulphate by discrete analyser (precipitation method).	In house method based on BS1377-3: 1990.	L082B-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	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.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS1		S	17-52515	772061	a			
WS1		S	17-52515	772062	a			
WS1	ES3	S	17-52515	772058	a			
WS2		S	17-52515	772063	a			
WS2	ES6	S	17-52515	772059	a			
WS2	ES7	S	17-52515	772060	a			

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

SUMMARY OF GEOTECHNICAL TESTING

Sample details					Classification Tests					Density Tests		Undrained Triaxial Compression			Chemical Tests			Other tests and comments
Borehole / Trial Pit	Sample Ref	Depth (m)	Type	Description	WC (%)	LL (%)	PL (%)	PI (%)	<425 µm (%)	Bulk Mg/m³	Dry Mg/m³	Cell Pressure kPa	Deviator Stress kPa	Shear Stress kPa	pH	2:1 W/S SO4 (g/L)	W/S Mg (mg/L)	
WS1		0.35-0.85	D	Multicoloured gravelly SAND.			NP		18									
WS1		1.75	D	Yellow brown and brown CLAY.	31.3													
WS2		1.75	D	Yellow brown CLAY with rare gypsum.	31.6													
WS2		3.75	D	Yellow brown and grey CLAY with rare gypsum.		80	29	51	99									
WS2		5.75	D	Brown CLAY with rare gypsum.	31.0													

Sample type: B (Bulk disturb.) BLK (Block) C (Core) D (Disturbed) LB (Large Bulk dist.) U (Undisturbed) NP=Non Plastic

Checked and Approved by

S Burke

S Burke - Senior Technician
28/06/2017

Project Number:

GEO / 26103

Project Name:

20 ALBERT TERRACE MEWS
CGL/18876a

GEOLABS®