



Client:

Jadebricks (Charles Street) Ltd
Apartment 2.2,
19 Trevor Square
Knightsbridge
London
SW7 1DZ

Architect/Consultant

(dp)2 Ltd.
Second Floor
4 Albert Street
Hebden Bridge
HX7 8AH

Ground Gas Risk Assessment

Charles Street, Manchester

Feb 2024

Site Ref: 6134/VCM-GRA v1.00

Unit 4
Sheffield Street
Heaton Norris
Stockport
Cheshire
SK4 1RU
Telephone : 0161 480 8885
e-mail : info@geoassist.co.uk

Client:
Jadebricks (Charles Street) Ltd
Apartment 2.2,
19 Trevor Square
Knightsbridge
London
SW7 1DZ

Architect/Consultant
(dp)2 Ltd.
Second Floor
4 Albert Street
Hebden Bridge
HX7 8AH

Ground Gas Risk Assessment

1. Introduction 3

2. Description of the Site 3

 2.1 Present 3

 2.2 Proposed 3

3. Ground Gas 4

4. Conceptual Model 5

5. Conclusion 6

Appendices

- A1. Site Plan with ground gas monitoring locations
- B1. Gas Monitoring Results & Risk Assessment
- B2. Equipment Calibration Certificate
- C1. Exploratory Hole Logs

Client:

Jadebricks (Charles Street) Ltd
Apartment 2.2,
19 Trevor Square
Knightsbridge
London
SW7 1DZ

Architect/Consultant

(dp)2 Ltd.
Second Floor
4 Albert Street
Hebden Bridge
HX7 8AH

Ground Gas Risk Assessment

1. Introduction

This report forms the gas risk assessment following the completion of a Phase II intrusive investigation at Charles Street, Manchester. Further background details are provided within the previously issued Phase I and Phase II reports referenced 6126 VWR PCLRA & CLRA and dated June 2023 and November 2023 respectively. The work was commissioned following acceptance of the quotation and an instruction to proceed issued by the Client Jadebricks (Charles Street) Ltd in May 2023. The approximate grid reference for the centre of the site is 384240, 397490 and the footprint area for the building is approximately 400m². A plan depicting the location of the gas monitoring points and the proposed building footprint forms Appendix A1 to this report.

2. Description of the Site

2.1 Present

The site is located on intersection of Charles Street and York Street in the centre of Manchester. The site forms a rectangular shape and the topography of the site is relatively level with the surrounding ground and streets. There are no permanent structures on site and the site is presently horded from public view and is being used as a car park and site offices. The ground cover is made up of a metalled/tarmacadam surface with no obvious soft landscaping noted. The site boundary is formed by; a motor vehicle repair garage yard operating in the railway arches to the north, Bracken House to the east, Charles Street to the south over which lies a recent development and York Street to the west.

2.2 Proposed

It is understood that the development incorporates:

- The development of a new 15 storey purpose built student accommodation scheme. The plan for the site does not indicate any associated basement levels with the development. The proposed development plan for the Site forms appendix A2 to this report.

3. Ground Gas

The preliminary risk assessment by GeoAssist Limited indicated a low potential for the presence of ground gas from historical registered landfill sites and infilled ground both on site and within 250m of the site boundary. Data obtained from the recent site investigation and ground gas risk assessment confirm upto 2.50m of inert type made ground consisting of clayey silty sand and gravel with brick fragments has been identified underlying the site. Some very minor quantities of plastic and ceramic fragments were noted in WS1 and WS3 within the made ground. The made ground has a low potential to produce significant quantities of ground gas.

Notably, no landfill or otherwise putrescible materials capable of generating significant quantities of gas have been identified on the site during the ground investigation works. Further details of the sub surface stratigraphy can be found in the exploratory hole logs which form appendix C1 to this report.

The ground gas monitoring protocol used by GeoAssist follows standard practice and measures flow rates followed by gas concentrations. The gas concentrations are measured by pumping for 90 seconds followed by a 5 second stabilization period. Once readings have been logged the instrument is then purge pumped in atmosphere for the same period. The gas analysis equipment is manufactured by Gas Data Limited and is serviced and maintained at the manufacturers recommended intervals and calibrated every 12 months.

Gas monitoring has been carried out over a period of 75 days which is considered appropriate given low generation potential and consistently low gas concentrations recorded and has incorporated periods of low and falling pressure in accordance with best practice guidance. In total six sets of readings have been obtained from each of the three gas monitoring installations. Due consideration was given to the underlying site conditions and the very low gas generation potential of the type of sources present and standpipe response zones within the monitoring installations were selected to encompass both the made ground and the Fluvio-glacial deposits accordingly.

Analysis of the gas monitoring data collected from the installations show that the following regime has been identified at the site; Upper deposits including made ground with no measured concentrations of Methane, and concentrations of Carbon Dioxide up to 0.4% v/v with steady flow rates below the limit of detection for the instrument (0.1l/hr).

Analysis of the gas monitoring data recorded from the installations show that Carbon Dioxide has been detected at levels between 0.0 and 0.4 % v/v within the exploratory holes. Peak CO₂ levels were detected in WS2 during the monitoring readings undertaken on the 23/11/2023. Methane, Hydrogen Sulphide and Carbon Monoxide have not been detected during the monitoring period. No positive gas flow rates from the installations have been recorded during the monitoring period. The combined worst-case Gas Screening Values (GSVs) in accordance with Ciria C665 are calculated at less than 0.0004 across the site.

The ground gas readings are summarised along with the gas risk assessment in Appendix B1.

The calculated worst case gas screen values and the maximum gas volume concentrations are all significantly less than the relevant threshold values prescribed within table 8.5 of Ciria C665 and indicate that no special precautions are required for gas protective measures at this site.

4. Conceptual Model

The conceptual model updated from the Phase II report and based on the information presented in this report including contamination sources, pathways and receptors is presented below.

Table 4.0 Amended Conceptual Site Model to depict the Site post construction based on information presented within this report.

Potential Source /Hazard	Nature of Hazard (Risk Level to site given a Commercial end use)	Contaminants Associated with Source	Potential Pathway	Potential Receptor
<i>Previous & Present ON SITE Land uses:</i>				
1. Terraced Property	Ground contamination Low Risk	None Identified	None Identified 100% Hard Standing Cover	Site Users Construction workers Controlled Waters
Possible infilled cellars / Made Ground	Gas from in-filled ground Very Low Risk CIRIA C665	None Identified	Vertical and Lateral Migration	Site Users Future Buildings & Services
2. Car Parking/ construction compound	Ground contamination Low Risk	None Identified	None Identified 100% Hard Standing Cover	Site Users Construction workers Controlled Waters
	Gas from in-filled ground Very Low Risk CIRIA C665	None Identified	Vertical and Lateral Migration	Site Users Future Buildings & Services
<i>Previous OFF SITE land uses within 250m as indicated by Historical Plans Including:</i>				
3. Cotton Mill	Ground contamination Low Risk	None Identified	None Identified 100% Hard Standing Cover	Site Users Construction workers Controlled Waters
	Gas from in-filled ground Very Low Risk CIRIA C665	None Identified	Vertical and Lateral Migration	Site Users Future Buildings & Services
4. Warehouse	Ground contamination Low Risk	None Identified	None Identified 100% Hard Standing Cover	Site Users Construction workers Controlled Waters
	Gas from in-filled ground Very Low Risk CIRIA C665	None Identified	Vertical and Lateral Migration	Site Users Future Buildings & Services
5. Saw Mill	Ground contamination Low Risk	None Identified	None Identified 100% Hard Standing Cover	Site Users Construction workers Controlled Waters
	Gas from in-filled ground Very Low Risk CIRIA C665	None Identified	Vertical and Lateral Migration	Site Users Future Buildings & Services
6. Cotton Mills Engineering Works Infilled reservoir Coal wharfs, Ropewalk Gasometer, Dye, Printing, Oil and Rubber Works ALL REDEVELOPED	Ground contamination Low Risk	None Identified	None Identified 100% Hard Standing Cover	Site Users Construction workers Controlled Waters
	Gas from in-filled ground Very Low Risk CIRIA C665	None Identified	Vertical and Lateral Migration	Site Users Future Buildings & Services
7. Coal Workings & Mineral Extraction	Geotechnical Hazard Low Risk	None	Ground Collapse Subsidence	Humans (site users) Future Buildings & Services
	Ground contamination Low Risk	None Identified	None Identified 100% Hard Standing Cover	Site Users Services
	Mine Gas Very Low Risk CIRIA C665	None Identified	None	Humans (site users) Future Buildings & Services

Only sources that have not been present on site in the past, or currently, are considered within the off site category. Unless the information is deemed to be pertinent to the analysis.

5. Conclusion

From the sources of information examined as part of this assessment a very low risk category and characteristic situation 1 has been established using the Ciria C665 criteria. Consequently, no special precautions are required for gas protective measures at this site.

Table 8.6 Ciria 665 Typical scope of gas protection measures.

Characteristic situation	Residential building (Not low-rise traditional housing) ¹		Office/commercial/industrial development	
(From Table 8.5)	Number of levels of protection	Typical scope of protective measures	Number of levels of protection	Typical scope of protective measures
1	None	No special precautions	None	No special precautions
2	2	a) Reinforced concrete cast <i>in situ</i> floor slab (suspended, non-suspended or raft) with at least 1200 g DPM ⁹ and underfloor venting b) Beam and block or pre-cast concrete and 2000 g DPM/reinforced gas membrane and underfloor venting All joints and penetrations sealed.	1 to 2	a) Reinforced concrete cast <i>in situ</i> floor slab (suspended, non-suspended or raft) with at least 1200 g DPM ⁹ b) Beam and block or pre cast concrete slab and minimum 2000 g DPM/reinforced gas membrane c) Possibly underfloor venting or pressurisation in combination with a) and b) depending on use All joints and penetrations sealed.
3	2	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space.	1 to 2	All types of floor slab as above. All joints and penetrations sealed. Minimum 2000 g/reinforced gas proof membrane and passively ventilated underfloor sub-space or positively pressurised underfloor sub-space
4	3	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated underfloor subspace or positively pressurised underfloor sub-space, oversite capping or blinding and in ground venting layer.	2 to 3	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility.
5	4	Reinforced concrete cast <i>in situ</i> floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and ventilated or positively pressurised underfloor sub-space, oversite capping and in ground venting layer and in ground venting wells or barriers.	3 to 4	Reinforced concrete cast <i>in-situ</i> floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised underfloor sub-space with monitoring facility. In ground venting wells or barriers.
6	5	Not suitable unless gas regime is reduced first and quantitative risk assessment carried out to assess design of protection measures in conjunction with foundation design.	4 to 5	Reinforced concrete cast <i>in-situ</i> floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and actively ventilated or positively pressurised underfloor sub-space with monitoring facility, with monitoring. In ground venting wells and reduction of gas regime.



Matthew Benson MSc GMSCE
Geotechnical/Environmental Engineer



Mark Richardson MSc CEng MICE
Technical Director

Field investigations have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions are, and can be, variable and have only been tested at isolated locations across the site. Therefore, the potential exists for ground conditions to be encountered which are different to those considered in this report.

Ground gas measurements were undertaken for a range of typical gases based on a professional understanding of the historical and operational data available at the time and it should not be inferred or otherwise, that other ground gases are not present

This report has been prepared by GeoAssist Limited with all reasonable professional skill, care and diligence within the terms of the contract with Jadebricks (Charles Street) Ltd. The report is confidential to Jadebricks (Charles Street) Ltd, their/the named persons, advisors and bankers, and GeoAssist Limited accepts no responsibility of whatever nature to third parties to whom this report may be divulged. GeoAssist Limited owns the copyright in this report. All rights are reserved, and unauthorised use is prohibited. Jadebricks (Charles Street) Ltd may use the report for their/her/his own purposes.

Appendix A

A1 Site Plan with Exploratory Hole Locations



A1 Site Plan

Site Name	Charles Street
Location	Manchester
GeoAssist Ref	6134VCM
Client	Jadebricks (Charles Street) Ltd
	Apartment 2.2, 19 Trevor Square Knightsbridge London SW7 1DZ
Planning Consultant	(dp)2 Ltd.
NGR (centre of site)	384240,397490
Production Date	Jan 2024
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

Do Not Scale

Appendix B

- B1 Gas Monitoring Results & Risk Assessment
- B2 Equipment Calibration Certificate

Site Reference:	6134 VCM
Project Site:	Charles Street
Project Location:	Manchester
Client:	Jadebricks (Charles Street) Ltd

Factual Data Summary										Interpretation & Risk Assessment					
BH Ref.	Response zone / strata	Evidence of Gas contamination	No of Monitoring occasions	Max. Recorded Methane	Max. Recorded Carbon Dioxide (%)	Min. Oxygen (%)	Max. Recorded Flow (l/hr)	Water Level (mbgl)	Atmospheric Pressure Range (mb)	Is Water Level within top 10% of the response zone?	Are readings considered representative	Explanation / Justification	Gas Screening Value (GSV) Methane*	Gas Screening Value (GSV) Carbon Dioxide*	Risk Classification & Characteristic Situation**
WS1	1.00 - 5.00 MG over FG into GT	No	6	0.0	0	20.1	0.0	4.7	982-1019	No	Yes		0.0000	0.0000	Very Low Risk Characteristic Situation 1
WS2	1.00 - 5.00 MG over FG into GT	No	6	0.0	0.4	20	0.0	4.3	982-1019	No	Yes		0.0000	0.0004	Very Low Risk Characteristic Situation 1
WS3	1.00 - 4.20 MG over FG	No	6	0.0	0.3	20	0.0	3.85	981-1019	No	Yes		0.0000	0.0003	Very Low Risk Characteristic Situation 1
Worst Case	1.00 - 5.00 MG over FG into GT	No	28	0.0	0.4	20	0.0	3.85	981-1019	No	Yes		0.0000	0.0004	Very Low Risk Characteristic Situation 1

* Where no flow measured, GSV value is determined with an instrument minimum value of 0.1 l/hr

** Risk classification / Characteristic situation based on GSV and Methane <1% / CO2 <5% and other influencing factors

Site Reference:	6134 VCM
Project Site:	Charles Street
Project Location:	Manchester
Client:	Jadebricks (Charles Street) Ltd

Ground Gas Readings

Date - Time	BH	CH4 (%)	CO2 (%)	O2 (%)	H2S (ppm)	CO (ppm)	LEL (%)	aP (mb)	Flw (l/h)	H2O (m)	State
23/11/2023	WS1	0.0	0.0	20.7	0.0	0.0	0.0	1019	0.0	4.95	
23/11/2023	WS2	0.0	0.4	20.5	0.0	0.0	0.0	1018	0.0	4.55	
23/11/2023	WS3	0.0	0.3	20.5	0.0	0.0	0.0	1018	0.0	Nil	
04/12/2023	WS1	0.0	0.0	20.6	0.0	0.0	0.0	993	0.0	4.90	
04/12/2023	WS2	0.0	0.2	20.6	0.0	0.0	0.0	993	0.0	4.55	
04/12/2023	WS3	0.0	0.1	20.7	0.0	0.0	0.0	992	0.0	Nil	
18/12/2023	WS1	0.0	0.0	20.6	0.0	0.0	0.0	1019	0.0		
18/12/2023	WS2	0.0	0.3	20.5	0.0	0.0	0.0	1019	0.0		
18/12/2023	WS3	0.0	0.2	20.3	0.0	0.0	0.0	1019	0.0		
03/01/2024	WS1	0.0	0.0	20.6	0.0	0.0	0.0	982	0.0	4.70	
03/01/2024	WS2	0.0	0.3	20.3	0.0	0.0	0.0	982	0.0	4.25	
03/01/2024	WS3	0.0	0.1	20.5	0.0	0.0	0.0	981	0.0	3.85	
18/01/2024	WS1	0.0	0.0	20.1	0.0	0.0	0.0	1006	0.0	Nil	
18/01/2024	WS2	0.0	0.2	20.0	0.0	0.0	0.0	1007	0.0	4.55	
18/01/2024	WS3	0.0	0.2	20.0	0.0	0.0	0.0	1006	0.0	4.00	
05/02/2024	WS1	0.0	0.0	20.6	0.0	0.0	0.0	1011	0.0		
05/02/2024	WS2	0.0	0.3	20.6	0.0	0.0	0.0	1011	0.0		
05/02/2024	WS3	0.0	0.1	20.5	0.0	0.0	0.0	1011	0.0		

TEST DATE AND CONDITIONS		
Date	07/11/2023	
Atmospheric Pressure	987	mB
Ambient Temperature	19.7	°C
EnviroNics Serial No.	5089	

**GFM436 Final Inspection & Calibration
Check Certificate**

GAS DATA LTD	
Unit D	
Earlplace Business Park	
Fletchamstead Highway	
Coventry	
CV4 9XL	
Tel 02476303311	Fax 02476307711



GAS DATA
ESTABLISHED 1984

Customer	Geoassist Ltd
Certificate Number	124690
Order Number	336437

Serial Number	13237
Software Version	G436-00.0027/0010

Recalibration DUE Date
07/11/24

Instrument Checks					
Keyboard	✓		Display Contrast	✓	
Pump Flow In	500	Accept > 200 cc/min	Pump Flow @ -200mB	300	Accept > 200 cc/min
Clock Set / Running	✓		Labels Fitted	✓	

Gas Checks						
Sensor	CH ₄		CO ₂		O ₂	
	Instrument Gas	True Gas Value %	Instrument Gas	True Gas Value %	Instrument Gas	True Gas Value %
	Readings %		Readings %		Readings %	
	59.5	60	40.4	40	20.9	20.9
	Accept ±3.0		Accept ±3.0		Accept ±0.5	
	5.1	5	5.1	5	6.0	6
	Accept ±0.3		Accept ±0.3		Accept ±0.3	
Zero Reading 100% N ₂	0.0	0	0.0	0	0.0	0
	Accept ±0.0		Accept ±0.0		Accept ±0.1	

Optional Gas Checks						
Applied Gas & Range		Concentration Tested @ (ppm)	Instrument Readings (ppm)			
Gas Type	Range (ppm)		Zero Reading		Instrument Gas Reading	
H ₂ S	5000	1500	0	Accept ±0.0	1500	Accept ±5.0%
CO	2000	1000	0	Accept ±0.0	1000	Accept ±5.0%
Hexane	2.0%	2.0%	0	Accept ±0.0	1.99	Accept ±10.0%

Cross Gas Effects									
Applied Gas (ppm)		Instrument Readings (ppm)							
Gas Type	Concentration	Toxic 1:	H2S	Toxic 2:	CO	Toxic 3:	HEX		
H2S	1500	1500		0		0			
CO	1000	100		1000		0			
Hexane	2.0%	0		0		1.99			

Pressure Checks			
Atmospheric Pressure [AP] (mB)			
Current Atmospheric Pressure (mB)		Instrument Atmospheric Pressure Reading (mB)	
AP Open Ports		987	Accept ± 2.0
AP Port (Internal)	+800 mB	800	Accept ± 5.0
	+1200 mB	1200	Accept ± 5.0

Flow Checks					
Borehole Flow			Differential Pressure		
Applied Reading (l/h)	Instrument Reading (l/h)		Applied Pressure (Pa)	Instrument Reading (Pa)	
-30	-30.7	Accept ± 3.0	-361	-377	Accept ± 50
-3	-3.1	Accept ± 1.0	-17	-18	Accept ± 6.0
0	0.0	Accept ± 0.0	0	0	Accept ± 0.5
3	3.1	Accept ± 0.5	17	18	Accept ± 3.0
30	29.9	Accept ± 3.0	376	374	Accept ± 50
60	59.8	Accept ± 6.0	1156	1148	Accept ± 130
90	91.9	Accept ± 9.0	2275	2375	Accept ± 250

Temperature Checks		
Calibration Temperature	Instrument Temperature Reading $^{\circ}\text{C}$	
Applied Temperature $^{\circ}\text{C}$		
-10	-10.0	Accept ± 2.0
0	0.0	Accept ± 1.0
30	30.0	Accept ± 1.0
50	60.0	Accept ± 1.0
100	100.0	Accept ± 1.0

Technician:
Jack Rutland

Date Tested:
07/11/2023

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015, BS EN ISO14001:2015, BS EN ISO45001:2018 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.

Gas Data Ltd is certified to BS EN ISO9001:2015, BS EN ISO14001:2015, BS EN ISO45001:2018.

Appendix C

C1 Exploratory Hole Logs

GeoAssist Limited		Exploratory Hole Record Sheet					Ref: WS1		
Consultant: (dp)2 Ltd.		Project: Charles Street					Sheet: 1		
		Location: Manchester							
Client: Jadebricks (Charles Street) Ltd		Equipment: Archway Dart Rig with WLS sampling				Ground Level: 31.21 m.AOD			
						Co-ordinates: Easting: 384242.1(m) Northing: 397476.8(m)			
						Dates: 14/11/2023 to 14/11/2023			
Drilling Foreman: M Walton		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests			Field Records	
STRATUM DESCRIPTION					Depth (m) from	to	Sample Type/No		Blow Count N/(U)
Engineer/Geologist: M Benson									
0 Tarmac		0.10	31.11	MG				14/11/2023: Inspection Pit excavated with hand tools to 1.00m depth.	
CONCRETE		0.30	30.91	MG					
Very loose grey sandy gravel - MADE GROUND					0.50	0.60	ES1	1	
		(1.20)		MG	1.00		CP1		
		1.50	29.71		1.50	1.60	ES2		
		(0.50)		MG	2.00		CP2		
2 Loose dark grey sandy silty clay, brick and concrete fragments - MADE GROUND		2.00	29.21	MG	2.30	2.40	ES3 D1	8	
		(0.50)		MG	2.30	2.40			
		2.50	28.71		2.70	2.80	ES4 D2		
		(0.50)		FG	2.70	2.80			
3 Soft grey/brown low strength sandy silty CLAY		3.00	28.21		3.00		CP3	1	
		(0.60)		FG	3.50	3.60	D3		
		3.60	27.61		3.80	3.90	D4		
		(0.70)		FG	4.00		CP4		
4 Loose light brown and grey/brown slightly gravelly silty fine to medium SAND		4.30	26.91		4.50	4.60	D5	6	
		(0.50)		GT	4.90	5.00	D6		
		4.80	26.41		5.00		CP5		
		(0.40)		GT	5.50	5.60	D7		
5 Dense orange/brown silty SAND and GRAVEL		5.20	26.01		6.00		CP6	32	
		(0.80)		GT	6.00				
		6.00	25.21				CP7		
		(1.45)		S1	7.00				
6 Very stiff brown very high strength gravelly sandy silty CLAY with orange/brown sandstone fragments at base								60+	
7 Very dense orange/brown silty fine to medium SAND - completely weathered Sandstone - Interpreted Stratum								60+	
Dynaic probing only from 6.00m		(1.45)		S1				On completion of exploratory hole at 7.45m. Water level at 4.90m depth. 50mm ground gas/groundater monitoring standpipe installed to 5.00m depth with response zone from 1.00 to 5.00m	
Exploratory Hole complete at 7.45m		7.45	23.76						
8									
9									
10									
Remarks:							Logged: M Benson		
The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.							Date: 14/11/2023		
							Checked: M Richardson		
							Date: 30/11/2023		
							Site Ref: 6134/VCM		
							Scale 1:50 nominal		

Remarks:

The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken.
Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.

Logged: M Benson
Date: 14/11/2023
Checked: M Richardson
Date: 30/11/2023
Site Ref: 6134/VCM
Scale 1:50 nominal

GeoAssist Limited		Exploratory Hole Record Sheet				Ref: WS2	
Consultant: (dp)2 Ltd.		Project: Charles Street Location: Manchester				Sheet: 1	
Client: Jadebricks (Charles Street) Ltd		Equipment: Archway Dart Rig with WLS sampling				Ground Level: 30.94 m.AOD Co-ordinates: Easting: 384231.3(m) Northing: 397488.6(m) Dates: 20/11/2023 to 20/11/2023	
Drilling Foreman: M Walton Engineer/Geologist: M Benson		STRATUM DESCRIPTION		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Field Records
				Samples/Tests		Blow Count N/(U)	
				Depth (m) from	to	Sample Type/No	
0 Tarmac		0.10	30.84	MG			20/11/2023: Inspection Pit excavated with hand tools to 1.00m depth.
CONCRETE		0.30	30.64	MG			
Very loose grey/brown sandy gravel - MADE GROUND							
1		(1.70)		MG	1.50	1.60	ES1 CP1 4
					1.50		
2 Loose dark grey sandy gravel with cobbles - MADE GROUND		2.00	28.94		2.00		CP2 8
		(0.50)		MG			
Brown clayey silty sandy GRAVEL		2.50	28.44		2.50	2.60	ES2 D1
		(0.50)		FG	2.60	2.70	
3 Medium dense to dense brown and grey silty sandy GRAVEL with cobbles		3.00	27.94		3.00		CP3 17
					3.10	3.20	ES3
		(1.50)		FG	3.50	3.60	D2
4					4.00		CP4 50
		4.50	26.44				
Stiff grey high strength silty CLAY		4.70	26.24	GT	4.60	4.70	D3
Orange/brown clayey gravelly silty SAND		5.00	25.94	GT			
5 Dense brown clayey silty SAND		(0.40)	25.54	GT	5.00		CP5 31
		5.40					
Very stiff brown very high strength gravelly very sandy silty CLAY		(0.60)		GT	5.70	5.80	D4
		6.00	24.94				
6 Very dense orange/brown silty fine to medium SAND with sandstone fragments - completely weathered Sandstone		(0.45)		S1	6.00	6.45	P1 63
		6.45	24.49				
Exploratory Hole complete at 6.45m							Hand penetrometer at 4.60m - 135kPa
7							
8							
9							
10							
Remarks:						Logged: M Benson Date: 21/11/2023 Checked: M Richardson Date: 30/11/2023 Site Ref: 6134/VCM Scale 1:50 nominal	
The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.							

GeoAssist Limited		Exploratory Hole Record Sheet				Ref: WS3	
Consultant: (dp)2 Ltd.		Project: Charles Street Location: Manchester				Sheet: 1	
Client: Jadebricks (Charles Street) Ltd		Equipment: Archway Dart Rig with WLS sampling				Ground Level: 30.73 m.AOD Co-ordinates: Easting: 384229.1(m) Northing: 397499.6(m) Dates: 17/11/2023 to 17/11/2023	
Drilling Foreman: M Walton Engineer/Geologist: M Benson		STRATUM DESCRIPTION		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Field Records
				Samples/Tests		Blow Count N/(U)	
				Depth (m) from to	Sample Type/No		
0 Tarmac		0.10	30.63	MG			17/11/2023: Inspection Pit excavated with hand tools to 1.00m depth.
CONCRETE		0.30	30.43	MG			
Grey/brown sandy gravel - MADE GROUND		0.50	30.23	MG			
Brown with orange/brown sandy gravel, brick fragments and rubble - MADE GROUND		(0.50)		MG	0.80 0.90	ES2	21
1 Orange/brown silty sandy brick and concrete fragments - MADE GROUND		1.00	29.73	MG	1.00	CP1	
		(0.60)		MG			
Medium dense grey/brown clayey silty sand with brick fragments - MADE GROUND		1.60	29.13	MG	1.70 1.80	ES3	7
2		(0.90)		MG	2.00	CP2	
		2.20	2.30	D1			
Grey/brown sandy silty clay with brick and pottery fragments - MADE GROUND		2.50	28.23	MG	2.70 2.80	ES4	14
3 Medium dense grey/brown slightly silty sandy GRAVEL with cobbles		(0.40)		MG	3.00	CP3	
		2.90	27.83	MG	3.50 3.60	D2	
4 Medium dense orange/brown slightly gravelly silty fine to medium SAND		(1.00)		FG	4.00	CP4	28
		3.90	26.83	FG	4.30 4.40	D3	
		(0.60)		FG			
Very stiff very high strength gravelly sandy silty CLAY		(0.40)		GT	4.70 4.80	D4	116
5 Very dense orange/brown silty fine to medium SAND - completely weathered Sandstone		4.90	25.83	GT	4.90 5.35	P1	
		(0.45)		S1			
Exploratory Hole complete at 5.40m		5.35	25.38	S1			Hand penetrometer at 4.60m - >250kPa P1 at 4.90m - 17,17/25,28,27,36 On completion of exploratory hole at 5.35m. Water level at 4.30m depth. 50mm ground gas/groundwater monitoring standpipe installed to 4.20m depth with response zone from 1.00 to 4.20m
6							
7							
8							
9							
10							
Remarks:						Logged: M Benson Date: 20/11/2023 Checked: M Richardson Date: 30/11/2023 Site Ref: 6134/VCM Scale 1:50 nominal	
The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.							