

Contract:

**Phase 2 Ground
Investigation Report
for the proposed
small office building
at
Hale View Road,
Huyton**

Engineer:

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September 2012

Phase 2 Investigation Report
Proposed small office building, Hale View Road, Huyton
 SEP (Site Engineering Personnel) Limited

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1.0 INTRODUCTION

A ground investigation has been undertaken at Hale View Road, Huyton, Liverpool where it is proposed to construct a small office building with associated carparking.

The report of the investigation includes full records of the fieldwork and laboratory testing carried out together with a discussion on geo-environmental issues affecting the site and foundation options.

2.0 BACKGROUND

A Phase 1 / Desk Study report including a Preliminary Risk Assessment and Conceptual Site Model for the proposed development was produced in April 2012.

This document was submitted to the Local Authority for their approval in particular to confirm the scope of the proposed ground investigation works and subsequent chemical testing for potential ground contamination at the site.

At a subsequent meeting the above items were agreed with in particular

- the addition of testing for SVOCs
- the addition of asbestos screen
- the installation and monitoring of 3No gaswells

The exchange of correspondence on this matter is appended to this report.

3.0 THE SITE

This is located at the eastern end of Hale View Road, Huyton on a small parcel of currently grassed / landscaped land bisected by an existing tarmacked footpath.

More details on the site, its environs and history have been included in the Phase 1 / Desk Study Report which should be considered in conjunction with this document.

4.0 THE PROPOSAL

It is understood that it is proposed to construct a new small two storey office building on the east side of the existing footpath bisecting the site with carparking on the western side.

5.0 FIELDWORK

5.1 Scope of Work

Ground and groundwater conditions were established by drilling boreholes using window sampler techniques, obtaining disturbed soil samples, carrying out in-situ tests and recording measurements of groundwater behavior.

The fieldwork and compilation of this report has been undertaken in general accordance with the recommendations given in BS 5930: 1999 “A Code of Practice for Site Investigations” and relevant strategies for sampling in potentially contaminated ground.

5.2 Window Sampler Boreholes

Four shallow boreholes were sunk using window sampler techniques to depths of between approximately 3.0m and 5.5m below existing ground level on 18 June 2012.

Cone penetration tests were performed at 1.0m depth intervals accompanied by small disturbed soil samples stored in dark glass containers at 0.5m depth intervals.

Full details of the strata encountered established after detailed logging of the recovered samples, sampling and in-situ testing are presented on the Window Sampler Records.

5.3 Instrumentation

On completion of drilling, three of the boreholes were fitted with slotted tubing surrounded by pea gravel for the monitoring of the soil gases and groundwater levels.

Full details of the installations are presented on the Instrumentation Records.

5.4 Rotary Drilling

Two number rotary open hole boreholes were constructed directly adjacent to the footprint of the proposed new building to a maximum depth of 35.00m below existing ground level.

Beneath the surface deposits of made ground and natural superficial soils rockhead was encountered at approximately 5.00m depth.

Solid rock conditions were noted to the full depth of the holes without any traces of coal or intact coal seams.

In addition, during drilling operations there were no indications of voiding / partial collapse such as loss of flush, dropping of drillrods or speed of penetration.

On the basis of the findings of the investigation it is evident that the site is not underlain at shallow depth by coal seams that have been worked in the past and could pose a threat to surface stability in the future.

Therefore, no special measures need to be taken in the design of the proposed structure with respect to overall ground stability from this source.

6.0 LABORATORY TESTING

After detailed logging of the recovered soil samples, representative samples of the near surface potentially contaminated ground were submitted for chemical testing to cover the following:

- i) Metal suite
- ii) Speciated polyaromatic hydrocarbons
- iii) SVOC and VOC suites
- iv) Other including cyanide, phenol, sulphate and asbestos

Full details of the results of the chemical tests are appended to this report.

7.0 GROUND AND GROUNDWATER CONDITIONS

7.1 Preliminary Information

From the results of the desk study for the site it was anticipated that the site would be underlain at relatively shallow depth by rocks of the Westphalian or Coal Measures of Carboniferous age.

It was unclear if there was a covering of natural superficial deposits of recent origin although the site history suggested the likelihood of a near surface veneer of made ground.

7.2 Sub-Soil Profile

The results from the borehole investigation indicate that the site is initially underlain by a veneer of ash type made ground approximately 1.5m thick.

This material is in turn underlain by either further deposits of made ground principally comprising of clay fill and/or natural superficial deposits.

Bedrock was encountered at between 3.0m and 4.0m below existing ground level.

In two of the holes there is a stratum of peat directly overlying bedrock up to a maximum of 0.5m thick.

On the basis that the upper veneer of ash type material relates to the construction of the former railway line across the site, it is unclear if the deeper deposits of made ground are related to backfilled former excavations or simply placed to build up ground levels across uneven ground.

Monitoring of the well installations indicates that some groundwater is perched within the made ground and / or normal superficial soils overlying the bedrock materials.

8.0 TEST RESULTS

8.1 Ground Contamination

Although the boreholes indicated that parts of the site are underlain by up to around 3.5m thickness of made ground, significant ground contamination is likely to be concentrated in the uppermost stratum of principally ash and cinder fill whereas the underlying deposits of made ground are generally clay fill materials.

On this basis, three samples of the ash and cinder fill from across the site were chosen for detailed chemical testing and the results may be summarised as follows

a) Metal Suite

Considering only those metals for which elevated concentrations were measured, the results are tabulated below:

Metal	Range mg/kg	Average mg/kg	Guideline mg/kg
Arsenic	34 - 38	35	500 (20) *
Copper	400 - 430	420	71700 (2330)**
Lead	210 - 240	227	750 (450)*
Nickel	64 - 67	66	5000 (50)*
Vanadium	85 – 160	92	3160 (75)**
Zinc	380 - 450	417	665000 (3750)**

- Soil Guideline Value published by CLEA

**** Generic Assessment Criteria as published by LQM**

In all cases the main quoted guideline value is for commercial development with that for residential uses in brackets.

The results indicate that the measured average concentrations of all the metals are very significantly below the guideline values for commercial development and with the exceptions of arsenic, nickel and vanadium below the values for residential uses.

b) Speciated Polyaromatic Hydrocarbons

The test results only indicate traces of these compounds.

c) Speciated Total Petroleum Hydrocarbons

There would appear to be an absence of BTEX determinands and only traces of heavier TPHs above C₁₂ both aliphatic and aromatic.

d) SVOC and VOC suites

The test results indicate the absence of such compounds.

e) Other

Asbestos was not detected in any of the samples and despite relatively high total sulphate contents, the values of soluble sulphate are extremely low.

8.2 SOIL GASES

Prior to the start of the ground investigation works, it was agreed that the gaswells would be monitored on six occasions over a period of three months although subject to review after the initial monitoring over a period of 1 month.

Monitoring to date indicates the following:

- No detectable gas flow or differential pressure.

PHASE 2 INVESTIGATION REPORT – Hale View Road, Huyton

- Only traces of methane
- Significant concentrations of carbon dioxide up to a maximum of approximately 10%
- Compensating reductions in the concentration of oxygen

There is a consistency in the individual measurements when viewed as a whole.

9.0 RISK ASSESSMENT

With reference to the potential hazards and risks identified on the preliminary Conceptual Site Model as detailed in the phase 1 report, these can now be amplified as follows.

■ Contaminants within the made ground

As noted in section 8.1 above, the principal potential problem related to the made ground is the presence of elevated concentrations of metals with in practical terms the absence of significant concentrations of PAHs and TPHs.

Although the recorded values of the metallic contaminants do not preclude the incorporation of the made ground within the development this does not mean that there are no risks associated with this material particularly during construction works.

For example it will be required that

1. The contractor for the groundworks must take account of the recorded levels of contamination in the made ground and make adequate and suitable arrangements in terms of health and safety for those in potential contact with the material which is likely to require measures such as protective clothing and washing facilities.
2. The ash and cinder type materials generated as surplus during groundworks should be stockpiled separately and only be taken to a licensed landfill facility capable of accepting such material and in this the test results should be used to approach tip operators.

3. Adequate measures should be taken to control the generation of dust together with wheel cleaning of vehicles on / off site to minimise any impact on adjacent land users.

■ Mobile contaminants in the made ground

Such risks principally relate to the potential harmful effects on controlled waters including both surface water and groundwater.

Although the chemical testing undertaken to date does not include leachability testing this must be viewed in the following context.

1. There is no existing surface water feature within close proximity to the site
2. Although the rocks beneath the site are classified as Secondary A Aquifer, this designation in practice refers to the more permeable sandstone horizons within the overall rock succession whereas the investigation has proved the presence of very low permeability mudstone bedrock.
3. In any event the bedrock has a protective covering of clay fill and / or natural superficial clay to significantly inhibit the downward transmission of any potentially contaminated groundwater.

In addition, the metallic contaminants in ash type material are normally of only very low / low leachability.

On this basis, there are no perceived potentially significant risks to controlled waters at this site.

■ Vapours from Volatile Contaminants

Initially this was not viewed as a significant risk.

However, it was suggested that tanks shown on the former BICC site may have contained solvents and the adjacent land had during redevelopment encountered ground contamination due to the presence of solvents.

As a result, specific testing for SVOC / VOCs was undertaken for this particular development which indicated that there was no risk from this potential source.

■ Soil Gases

From the monitoring results discussed in Section 8.2 above, it appears that the near surface ground beneath the site contains a significantly elevated concentration of carbon dioxide.

In the context of the site it is possible that this gas could be generated in - situ, have migrated from adjacent landfill sites or migrated upwards from old mine workings.

However, the precise origin is to a large extent irrelevant as the monitoring results essentially indicate a stagnant pool of carbon dioxide sat within the made ground.

Referring to current CIRIA guidelines for the protection of new buildings from hazardous gases in the ground, it is not only the concentrations of such gases that need to be considered but also the rate of flow expressed as the Gas Screening Value which is the product of the gas concentration x rate of flow.

At this site the lack of a detectable gas flow could be argued to suggest that the situation is “very low” risk and that the proposed new structure does not require the incorporation of any specific protection measures.

However, this situation could be restricted to sites where the concentration of carbon dioxide does not exceed 5.0% and with recorded maximum values of around 10% then consideration should be given to increasing the risk to “low”.

This would involve a sub-structure for the new building to include underfloor venting.

As will be discussed later in this report in section 11, the need for piled foundations will make this a simple item to be incorporated in the overall design.

- Aggressive Ground Conditions
- Ground Stability

Both of these items will be discussed further in Section 11 of this report.

10.0 REMEDIATION STRATEGY

On the basis of the updated risk assessment discussed in section 9.0 above it is envisaged that the principal actions will include the following.

i) During groundworks adequate attention is paid to dealing with the ash type made ground which forms an upper veneer across the site in terms of safe working practices, stockpiling of materials and their off site disposal if surplus to requirements.

If during groundworks any other type of contaminated ground is encountered this should be notified to the relevant parties and may require additional chemical testing, different methods of working or alternative disposal options.

ii) The new building itself should incorporate a vented sub-floor void such that significant concentrations of harmful gases cannot accumulate beneath the proposed structure.

Service connections, particularly water, to buildings in contaminated ground can require in certain circumstances particular procedures for example laying in pre dug trenches filled with clean imported material or specific types of pipe and individual service providers should be consulted for other precise requirements.

11.0 GEOTECHNICAL ISSUES

11.1 Foundations

The combination of variable made ground, weak superficial deposits of peat, indicate that it will be necessary to support the proposed structure on piled foundations end bearing on the bedrock at relatively shallow depth across the site.

In this situation it will be necessary to provide a fully suspended floorslab which can be designed to incorporate underfloor venting.

Chemical test results indicate a classification of ACI for buried concrete at the site in accordance with current BRE guidelines.

11.2 Carparking

After stripping to formation level the made ground should be proof rolled with replacement of only very weak areas with imported granular fill prior to the subsequent placement of an increased thickness of subbase to combat any potential variations in the behaviour of the made ground.

Furthermore the incorporation of a geogrid type reinforcement in the overall pavement design should be considered.

In any event it should be recognised that there could still be some small longterm movement requiring ongoing maintenance.

11.3 GROUND STABILITY

As discussed in Section 5.4 of this report there is no risk to the proposed new structure due to shallow mineworkings.

12.0 SUMMARY

The Phase 2 investigation has shown that the upper veneer of ash type made ground which maybe considered to be contaminated can be dealt with by the adoption of relatively simple methods of working during construction.

By virtue of the new structure requiring piled foundations it is practical to incorporate simple gas protection measures.

In addition, the investigations have indicated that there are no potential problems relating to overall ground stability due to old coal workings.

All comments in this report must be considered as advisory only and design decisions are the responsibility of others.

Appendix A

Window Sampler Boreholes

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>						Site Hale View Road, Huyton		Number WS1	
Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 12-474	
		Location		Dates 18/06/2012		Engineer SEP (Site Engineering Personnel) Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10	DG					MADE GROUND : medium dense black soil, ash and cinder fill with fragments of broken brick			
0.50	DG				(1.40)				
1.00-1.45 1.00-1.45	SPT(C) N=16 DG		3,3/4,4,4,4		1.40				
1.50	DG					Soft / firm to firm brown sandy / very sandy CLAY			
2.00-2.45 2.00-2.45	SPT(C) N=8 DG		0,1/2,2,2,2		(2.20)				
2.50	DG								
3.00-3.45 3.00-3.45	SPT(C) N=3 DG		0,1/0,1,1,1						
3.50	DG					Very loose / loose grey / brown clayey silty medium SAND / soft sandy / very sandy CLAY			
4.00-4.45 4.00-4.45	SPT(C) N=7 DG		1,0/1,2,2,2		(1.85)				
4.50	DG								
5.00-5.45 5.00 5.00-5.45	SPT(C) N=1 DG DG		1,0/0,1,0,0		5.45	Complete at 5.45m			

Remarks
Groundwater seepages from 3.00 - 4.00m
Services inspection pit excavated by hand to 1.00m

Scale (approx)
1:50

Logged By
J.Crook

Figure No.
12-474.WS1

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>						Site Hale View Road, Huyton		Number WS2	
Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 12-474	
		Location		Dates 18/06/2012		Engineer SEP (Site Engineering Personnel) Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10	DG				(0.20)	TOPSOIL			
0.50	DG				0.20	MADE GROUND : very loose black ash and cinder fill with fragments and pieces of broken brick			
1.00-1.45	SPT(C) N=1		1,0/0,1,0,0		(1.10)				
1.00-1.45	DG				1.30	MADE GROUND : firm brown clay fill with occasional fine sub-rounded gravel			
1.50	DG				(0.60)				
2.00-2.45	SPT(C) N=7		2,1/2,2,1,2		1.90	MADE GROUND : soft to soft / firm brown sandy / very sandy clay			
2.00-2.45	DG				(1.60)				
2.50	DG								
3.00-3.45	SPT(C) N=14		2,2/3,4,4,3		3.50	Soft black PEAT with pieces of decaying wood			
3.00-3.45	DG				(0.50)				
3.50	DG				4.00	Very weak grey MUDSTONE			
4.00-4.45	SPT(C) N=55		4,5/5,9,16,25		(0.45)				
4.00-4.45	DG				4.45				
						Complete at 4.45m			

Remarks
Services inspection pit excavated by hand to 1.00m
Groundwater seepages from 3.00 - 4.00m

Scale (approx)
1:50

Logged By
J.Crook

Figure No.
12-474.WS1

Geo-Ventures (UK) Limited

Geotechnical and Environmental Services

Site
Hale View Road, Huyton

Number
WS3

Excavation Method
Drive-in Window Sampler

Dimensions

Ground Level (mOD)

Client

Job
Number
12-474

Location

Dates
18/06/2012

Engineer
SEP (Site Engineering Personnel) Limited

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10	DG				(0.20)	MADE GROUND : brown soil, clay and sand fill			
0.50	DG				0.20	MADE GROUND : loose black ash and cinder fill with fragments of broken brick			
1.00-1.45	SPT(C) N=5		1,2/1,1,2,1		(1.30)				
1.00-1.45	DG								
1.50	DG				1.50	MADE GROUND : firm brown clay fill with occasional fine sub-rounded gravel			
2.00-2.45	SPT(C) N=10		2,3/3,2,2,3		(1.10)				
2.00-2.45	DG								
2.50	DG				2.60	Soft black PEAT			
2.70	DG		8,13/18,25		(0.30)				
2.90-3.35	SPT(C) N=43				2.90	Very weak grey MUDSTONE			
2.90	DG				(0.50)				
2.95-3.40	DG				3.40	Complete at 3.40m			

Remarks
Groundwater seepages from 2.00 - 3.00m
Services inspection pit excavated by hand to 1.00m

Scale (approx)
1:50
Logged By
J.Crook
Figure No.
12-474.WS1

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>					Site Hale View Road, Huyton		Number WS4		
Excavation Method Drive-in Window Sampler		Dimensions		Ground Level (mOD)		Client		Job Number 12-474	
		Location		Dates 18/06/2012		Engineer SEP (Site Engineering Personnel) Limited		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description		Legend	Water
0.10	DG					MADE GROUND : loose black soil, ash and cinder fill. Clayey in parts.			
0.50	DG				(1.60)				
1.00-1.45 1.00-1.45	SPT(C) N=8 DG		2,1/2,2,2,2						
1.50	DG				1.60	MADE GROUND : firm to firm / stiff brown sandy clay with traces of ash and pieces of broken sandstone			
2.00-2.45 2.00-2.45	SPT(C) N=12 DG		2,2/3,3,3,3		(1.40)				
2.50	DG								
3.00-3.15 3.00-3.15	SPT(C) DG		4,25/		3.00 (0.15) 3.15	Very weak grey MUDSTONE			
						Complete at 3.15m			
Remarks No groundwater encountered during drilling operations Services inspection pit excavated by hand to 1.00m									
								Scale (approx) 1:50	Logged By J.Crook
								Figure No. 12-474.WS1	

Appendix B

Instrumentation Records

[illegible]

Geo-Ventures (UK) Limited

Geotechnical and Environmental Services

Site
Hale View Road, Huyton

Borehole
Number
WS2

Installation Type
Single Installation

Dimensions
Internal Diameter of Tube [A] = 35 mm
Diameter of Filter Zone = 70 mm

Client

Job
Number
12-474

Location

Ground Level (mOD)

Engineer

SEP (Site Engineering Personnel) Limited

Sheet
1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling										
				0.10	Concrete	Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)	
					Bentonite Seal						5 min	10 min	15 min	20 min		
				0.50												
				Groundwater Observations During Drilling												
				Date	Start of Shift					End of Shift						
					Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)		
				Instrument Groundwater Observations												
				Inst. [A] Type : Slotted Standpipe												
				Date	Instrument [A]			Remarks								
Time	Depth (m)	Level (mOD)														

Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site
Hale View Road, Huyton

Borehole
Number
WS3

Installation Type
Pneumatic Piezometer

Dimensions
Internal Diameter of Tube [A] = 35 mm
Diameter of Filter Zone = 70 mm

Client

Job
Number
12-474

Location

Ground Level (mOD)

Engineer

SEP (Site Engineering Personnel) Limited

Sheet
1/1

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling															
				0.10	Concrete	Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)						
											5 min	10 min	15 min	20 min							
						Groundwater Observations During Drilling															
						Date	Start of Shift					End of Shift									
							Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)					
						Instrument Groundwater Observations															
						Inst. [A] Type : Slotted Standpipe															
						Date	Instrument [A]			Remarks											
							Time	Head (m)	Level (mOD)												
				1.00	Bentonite Seal																
						Groundwater Observations During Drilling															
						Date	Start of Shift					End of Shift									
							Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)					
						Instrument Groundwater Observations															
						Inst. [A] Type : Slotted Standpipe															
						Date	Instrument [A]			Remarks											
							Time	Head (m)	Level (mOD)												
				2.50	Well Screen																
						Instrument Groundwater Observations															
						Inst. [A] Type : Slotted Standpipe															
						Date	Instrument [A]			Remarks											
							Time	Head (m)	Level (mOD)												
										3.40	Bentonite Seal										
												Instrument Groundwater Observations									
												Inst. [A] Type : Slotted Standpipe									
												Date	Instrument [A]			Remarks					
Time	Head (m)	Level (mOD)																			

Remarks

Appendix C

Standard Penetration Test Results

Site : Hale View Road, Huyton

Job Number

12-474

Client :

Sheet

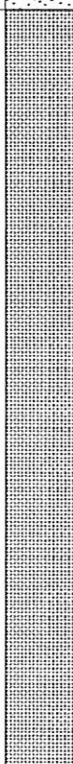
Engineer: SEP (Site Engineering Personnel) Limited

1 / 1

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
WS1	1.00	1.15	1.45	CPT	3	3	4	4	4	4	N=16	
WS1	2.00	2.15	2.45	CPT	0	1	2	2	2	2	N=8	
WS1	3.00	3.15	3.45	CPT	0	1	0	1	1	1	N=3	
WS1	4.00	4.15	4.45	CPT	1	0	1	2	2	2	N=7	
WS1	5.00	5.15	5.45	CPT	1	0	0	1	0	0	N=1	
WS2	1.00	1.15	1.45	CPT	1	0	0	1	0	0	N=1	
WS2	2.00	2.15	2.45	CPT	2	1	2	2	1	2	N=7	
WS2	3.00	3.15	3.45	CPT	2	2	3	4	4	3	N=14	
WS2	4.00	4.15	4.45	CPT	4	5	5	9	16	25	N=55	
WS3	1.00	1.15	1.45	CPT	1	2	1	1	2	1	N=5	
WS3	2.00	2.15	2.45	CPT	2	3	3	2	2	3	N=10	
WS3	2.90	3.05	3.35	CPT	8	13	18	25			N=43	
WS4	1.00	1.15	1.45	CPT	2	1	2	2	2	2	N=8	
WS4	2.00	2.15	2.45	CPT	2	2	3	3	3	3	N=12	
WS4	3.00	3.15	3.15	CPT	4	25						

Appendix D

Rotary Open Hole Boreholes

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Hale View Road, Huyton		Borehole Number BHR1	
Machine : Flush : Core Dia: mm Method :			Casing Diameter 125mm cased to 5.00m		Ground Level (mOD)		Client		Job Number 12-474	
			Location		Dates 23/08/2012		Engineer SEP (Site Engineering Personnel) Limited		Sheet 1/4	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MADE GROUND : black / brown ash and clay fill		
							1.50	Red brown SAND (Weathered Sandstone?)		
							4.80	Grey MUDSTONE onto grey SANDSTONE with mudstone bands		
Remarks Water flush from 5.00 - 35.00m								Scale (approx) 1:50		Logged By Drill Crew
								Figure No. 12-474.BHR1		

Geo-Ventures (UK) Limited

Geotechnical and Environmental Services

Site
Hale View Road, Huyton

Borehole
Number
BHR1

Machine :	Casing Diameter	Ground Level (mOD)	Client	Job Number
Flush :	125mm cased to 5.00m			12-474
Core Dia: mm	Location	Dates	Engineer	Sheet
Method :		23/08/2012	SEP (Site Engineering Personnel) Limited	2/4

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water

Remarks	Scale (approx)	Logged By
	1:50	Drill Crew
	Figure No.	
	12-474.BHR1	

Geo-Ventures (UK) Limited
Geotechnical and Environmental Services

Site
Hale View Road, Huyton

Borehole
Number
BHR1

Flush :

Method :

Method :

125mm cased to 5.00m

Dates 23/08/2012

SEP (Site Engineering Personnel) Limited

Sheet
3/4

Dates 23/08/2012

SEP (Site Engineering Personnel) Limited

Sheet
3/4

TCR

SCR

ROD

FI

Fi

Records

Level
(mOD)

Depth
(m)
(Thickness)

Description

Legend

ater

$$(30.20)$$

Scale (approx)

Logged
By

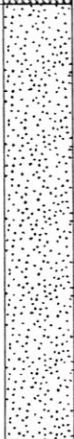
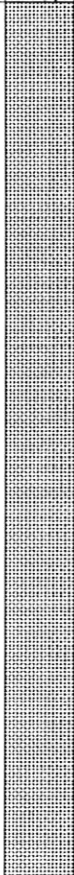
1:50

Drill Crew

Figure No.

12-474.BHR1

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Hale View Road, Huyton		Borehole Number BHR1	
Machine : Flush : Core Dia: mm Method :			Casing Diameter 125mm cased to 5.00m		Ground Level (mOD)		Client		Job Number 12-474	
			Location		Dates 23/08/2012		Engineer SEP (Site Engineering Personnel) Limited		Sheet 4/4	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							 (30.20)			
							35.00	Complete at 35.00m		
Remarks								Scale (approx) 1:50	Logged By Drill Crew	
								Figure No. 12-474.BHR1		

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Hale View Road, Huyton		Borehole Number BHR2	
Machine : Flush : Core Dia: mm Method :			Casing Diameter 125mm cased to 4.00m		Ground Level (mOD)		Client		Job Number 12-474	
			Location		Dates 23/08/2012		Engineer SEP (Site Engineering Personnel) Limited		Sheet 1/3	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
								MADE GROUND : black / brown ash and clay fill		
							1.00	Red brown SAND (Weathered Sandstone?)		
							(3.00)			
							4.00	Grey MUDSTONE onto grey SANDSTONE with mudstone bands		
Remarks Water flush from 4.00 - 30.00m									Scale (approx) 1:50	Logged By Drill Crew
									Figure No. 12-474.BHR1	

Geo-Ventures (UK) Limited

Geotechnical and Environmental Services

Site
Hale View Road, Huyton

Borehole
Number
BHR2

Machine :	Casing Diameter	Ground Level (mOD)	Client	Job Number
Flush :	125mm cased to 4.00m			12-474
Core Dia: mm	Location	Dates	Engineer	Sheet
Method :		23/08/2012	SEP (Site Engineering Personnel) Limited	2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water

Remarks

Scale (approx)
1:50
Logged By
Drill Crew
Figure No.
12-474.BHR1

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>								Site Hale View Road, Huyton		Borehole Number BHR2	
Machine : Flush : Core Dia: mm Method :			Casing Diameter 125mm cased to 4.00m			Ground Level (mOD)		Client		Job Number 12-474	
			Location			Dates 23/08/2012		Engineer SEP (Site Engineering Personnel) Limited		Sheet 3/3	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
							 (26.00)				
							30.00				
Remarks									Scale (approx) 1:50		Logged By Drill Crew
									Figure No. 12-474.BHR1		

Appendix E

Laboratory Testing - Chemicals



Scientific Analysis Laboratories is a
limited company registered in England and
Wales (No 2514788) whose address is at
Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 284819-1

Date of Report: 05-Jul-2012

Customer: Geo-Ventures (UK) Ltd
70 Riverside Close
Waterside
Howley
Warrington. CHESHIRE
WA1 2JD

Customer Contact: Mr John Crook

Customer Job Reference:

Date Job Received at SAL: 27-Jun-2012

Date Analysis Started: 29-Jun-2012

Date Analysis Completed: 04-Jul-2012

The results reported relate to samples received in the laboratory
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs



Report checked
and authorised by :
Mr Ross Walker
Customer Services Manager
(Land)

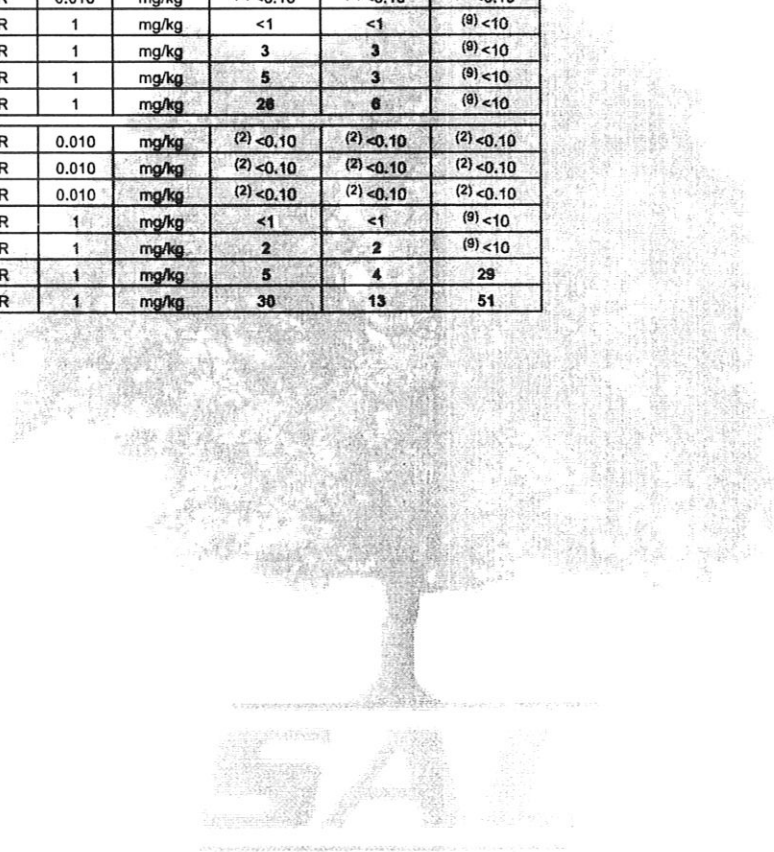
Issued by :
Mr Ross Walker
Customer Services Manager
(Land)

SAL Reference: 284819							
Customer Reference:							
Soil		Analysed as Soil					
MCERTS Preparation							
SAL Reference		284819 001		284819 002		284819 003	
Customer Sample Reference		WS1 0.5		WS2 0.5		WS3 0.5	
Depth		0.5		0.5		0.5	
Date Sampled		18-JUN-2012		18-JUN-2012		18-JUN-2012	
Type		Sandy Soil		Sandy Soil		Sandy Soil	
Determinand	Method	Test Sample	LOD	Units			
Moisture	T277	AR	0.1	%	15	15	13
Moisture @ 105 C	T162	AR	0.1	%	13	17	18

SAL Reference: 284819							
Customer Reference:							
Soil				Analysed as Soil			
Suite A							
SAL Reference				284819 001	284819 002	284819 003	
Customer Sample Reference				WS1 0.5	WS2 0.5	WS3 0.5	
Depth				0.5	0.5	0.5	
Date Sampled				18-JUN-2012	18-JUN-2012	18-JUN-2012	
Type				Sandy Soil	Sandy Soil	Sandy Soil	
Determinand	Method	Test Sample	LOD	Units			
Arsenic	T6	M40	2	mg/kg	34	38	34
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1
Cadmium	T6	M40	1	mg/kg	<1	<1	<1
Copper	T6	M40	1	mg/kg	430	400	430
Lead	T6	M40	1	mg/kg	230	240	210
Mercury	T6	M40	1	mg/kg	<1	<1	<1
Nickel	T6	M40	1	mg/kg	67	66	64
Selenium	T6	M40	3	mg/kg	<3	<3	<3
Vanadium	T6	M40	1	mg/kg	91	100	85
Zinc	T6	M40	1	mg/kg	450	380	420

SAL Reference: 284819							
Customer Reference:							
Soil		Analysed as Soil					
Miscellaneous							
SAL Reference		284819 001		284819 002		284819 003	
Customer Sample Reference		WS1 0.5		WS2 0.5		WS3 0.5	
Depth		0.5		0.5		0.5	
Date Sampled		18-JUN-2012		18-JUN-2012		18-JUN-2012	
Type		Sandy Soil		Sandy Soil		Sandy Soil	
Determinand	Method	Test Sample	LOD	Units			
Asbestos ID	T27	AR			N.D.	N.D.	N.D.
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1
SO4(Total)	T6	M40	0.01	%	0.25	0.24	0.21
SO4(2:1)	T6	AR	0.1	g/l	<0.1	<0.1	<0.1

SAL Reference: 284819								
Customer Reference:								
Soil			Analysed as Soil					
TPH (CWG)								
SAL Reference					284819 001	284819 002	284819 003	
Customer Sample Reference					WS1 0.5	WS2 0.5	WS3 0.5	
Depth					0.5	0.5	0.5	
Date Sampled					18-JUN-2012	18-JUN-2012	18-JUN-2012	
Type					Sandy Soil	Sandy Soil	Sandy Soil	
Determinand	Method	Test Sample	LOD	Units				
Benzene	T54	AR	1	µg/kg	(13,2) <10	(2,13) <10	(2,13) <10	
Toluene	T54	AR	1	µg/kg	(2) <10	(2) <10	(2) <10	
EthylBenzene	T54	AR	1	µg/kg	(2) <10	(2) <10	(2) <10	
M/P Xylene	T54	AR	1	µg/kg	(2) <10	(2) <10	(2) <10	
O Xylene	T54	AR	1	µg/kg	(2) <10	(2) <10	(2) <10	
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	(2) <10	(2) <10	(2) <10	
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	(2) <0.10	(2) <0.10	(2) <0.10	
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	(2) <0.10	(2) <0.10	(2) <0.10	
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	(2) <0.10	(2) <0.10	(2) <0.10	
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	<1	<1	(9) <10	
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	3	3	(9) <10	
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	5	3	(9) <10	
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg	28	6	(9) <10	
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	(2) <0.10	(2) <0.10	(2) <0.10	
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	(2) <0.10	(2) <0.10	(2) <0.10	
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	(2) <0.10	(2) <0.10	(2) <0.10	
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	<1	<1	(9) <10	
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	2	2	(9) <10	
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	5	4	29	
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	30	13	51	



Value	Description
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
AR	As Received
N.D.	Not Detected
9	LOD raised due to dilution of sample
13	Results have been blank corrected.
2	LOD Raised Due to Matrix Interference
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Method Index

Value	Description
T6	ICP/OES
T546	Colorimetry (CF)
T8	GC/FID
T277	Grav (1 Dec) (40 C)
T27	PLM
T209	GC/MS(Head Space)(MCERTS)
T207	GC/MS(MCERTS)
T54	GC/MS (Headspace)
T162	Grav (1 Dec) (105 C)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Asbestos ID	T27	AR			SU	001-003
Cyanide(Total)	T546	AR	1	mg/kg	M	001-003
Phenols(Mono)	T546	AR	1	mg/kg	M	001-003
SO4(Total)	T6	M40	0.01	%	N	001-003
SO4(2:1)	T6	AR	0.1	g/l	N	001-003
Moisture	T277	AR	0.1	%	N	001-003
Moisture @ 105 C	T162	AR	0.1	%	N	001-003
1,2,4-Trichlorobenzene	T207	M105	0.1	mg/kg	M	001-003
1,2-Dichlorobenzene	T207	M105	0.1	mg/kg	M	001-003
1,3-Dichlorobenzene	T207	M105	0.1	mg/kg	M	001-003
1,4-Dichlorobenzene	T207	M105	0.1	mg/kg	M	001-003
2,4,5-Trichlorophenol	T207	M105	0.1	mg/kg	U	001-003
2,4,6-Trichlorophenol	T207	M105	0.1	mg/kg	U	001-003
2,4-Dichlorophenol	T207	M105	0.1	mg/kg	U	001-003
2,4-Dimethylphenol	T207	M105	0.1	mg/kg	U	001-003
2,4-Dinitrophenol	T207	M105	0.1	mg/kg	U	001-003
2,4-Dinitrotoluene	T207	M105	0.1	mg/kg	M	001-003
2,6-Dinitrotoluene	T207	M105	0.1	mg/kg	U	001-003
2-Chloronaphthalene	T207	M105	0.1	mg/kg	M	001-003
2-Chlorophenol	T207	M105	0.1	mg/kg	M	001-003
2-methyl phenol	T207	M105	0.1	mg/kg	M	001-003
2-Methylnaphthalene	T207	M105	0.1	mg/kg	M	001-003
2-Nitroaniline	T207	M105	0.1	mg/kg	M	001-003
2-Nitrophenol	T207	M105	0.1	mg/kg	U	001-003
3-Nitroaniline	T207	M105	0.1	mg/kg	U	001-003
3/4-Methylphenol	T207	M105	0.1	mg/kg	M	001-003
4-Bromophenyl phenylether	T207	M105	0.1	mg/kg	M	001-003
4-Chloro-3-methylphenol	T207	M105	0.1	mg/kg	M	001-003
4-Chloroaniline	T207	M105	0.1	mg/kg	U	001-003
4-Chlorophenyl phenylether	T207	M105	0.1	mg/kg	M	001-003
4-Nitroaniline	T207	M105	0.1	mg/kg	U	001-003
4-Nitrophenol	T207	M105	0.1	mg/kg	U	001-003
Acenaphthene	T207	M105	0.1	mg/kg	M	001-003
Acenaphthylene	T207	M105	0.1	mg/kg	U	001-003
Anthracene	T207	M105	0.1	mg/kg	U	001-003
Azobenzene	T207	M105	0.1	mg/kg	M	001-003

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001-003
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001-003
Benzo(b/k)Fluoranthene	T207	M105	0.1	mg/kg	M	001-003
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001-003
Bis (2-chloroethoxy) methane	T207	M105	0.1	mg/kg	M	001-003
Bis (2-chloroethyl) ether	T207	M105	0.1	mg/kg	M	001-003
Bis (2-chloroisopropyl) ether	T207	M105	0.1	mg/kg	M	001-003
Bis (2-ethylhexyl)phthalate	T207	M105	0.1	mg/kg	M	001-003
Butyl benzylphthalate	T207	M105	0.1	mg/kg	U	001-003
Carbazole	T207	M105	0.1	mg/kg	U	001-003
Chrysene	T207	M105	0.1	mg/kg	M	001-003
Di-n-butylphthalate	T207	M105	0.1	mg/kg	M	001-003
Di-n-octylphthalate	T207	M105	0.1	mg/kg	M	001-003
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001-003
Dibenzofuran	T207	M105	0.1	mg/kg	M	001-003
Diethyl phthalate	T207	M105	0.1	mg/kg	U	001-003
Dimethyl phthalate	T207	M105	0.1	mg/kg	U	001-003
Fluoranthene	T207	M105	0.1	mg/kg	M	001-003
Fluorene	T207	M105	0.1	mg/kg	M	001-003
Hexachlorobenzene	T207	M105	0.1	mg/kg	M	001-003
Hexachlorobutadiene	T207	M105	0.1	mg/kg	M	001-003
Hexachlorocyclopentadiene	T207	M105	0.1	mg/kg	U	001-003
Hexachloroethane	T207	M105	0.1	mg/kg	U	001-003
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001-003
Isophorone	T207	M105	0.1	mg/kg	U	001-003
Naphthalene	T207	M105	0.1	mg/kg	M	001-003
Nitrobenzene	T207	M105	0.1	mg/kg	M	001-003
Pentachlorophenol	T207	M105	0.1	mg/kg	U	001-003
Phenanthrene	T207	M105	0.1	mg/kg	M	001-003
Phenol	T207	M105	0.1	mg/kg	M	001-003
Pyrene	T207	M105	0.1	mg/kg	M	001-003
Arsenic	T6	M40	2	mg/kg	M	001-003
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-003
Cadmium	T6	M40	1	mg/kg	M	001-003
Copper	T6	M40	1	mg/kg	M	001-003
Lead	T6	M40	1	mg/kg	M	001-003
Mercury	T6	M40	1	mg/kg	M	001-003
Nickel	T6	M40	1	mg/kg	M	001-003
Selenium	T6	M40	3	mg/kg	M	001-003
Vanadium	T6	M40	1	mg/kg	M	001-003
Zinc	T6	M40	1	mg/kg	M	001-003
Benzene	T54	AR	1	µg/kg	U	001-003
Toluene	T54	AR	1	µg/kg	U	001-003
EthylBenzene	T54	AR	1	µg/kg	U	001-003
M/P Xylene	T54	AR	1	µg/kg	U	001-003
O Xylene	T54	AR	1	µg/kg	U	001-003
Methyl tert-Butyl Ether	T54	AR	1	µg/kg	U	001-003
TPH (C5-C6 aliphatic)	T54	AR	0.010	mg/kg	N	001-003
TPH (C6-C8 aliphatic)	T54	AR	0.010	mg/kg	N	001-003
TPH (C8-C10 aliphatic)	T54	AR	0.010	mg/kg	N	001-003
TPH (C10-C12 aliphatic)	T8	AR	1	mg/kg	N	001-003
TPH (C12-C16 aliphatic)	T8	AR	1	mg/kg	N	001-003
TPH (C16-C21 aliphatic)	T8	AR	1	mg/kg	N	001-003
TPH (C21-C35 aliphatic)	T8	AR	1	mg/kg	N	001-003
TPH (C6-C7 aromatic)	T54	AR	0.010	mg/kg	N	001-003
TPH (C7-C8 aromatic)	T54	AR	0.010	mg/kg	N	001-003
TPH (C8-C10 aromatic)	T54	AR	0.010	mg/kg	N	001-003
TPH (C10-C12 aromatic)	T8	AR	1	mg/kg	N	001-003
TPH (C12-C16 aromatic)	T8	AR	1	mg/kg	N	001-003
TPH (C16-C21 aromatic)	T8	AR	1	mg/kg	N	001-003
TPH (C21-C35 aromatic)	T8	AR	1	mg/kg	N	001-003
1,1,1,2-Tetrachloroethane	T209	M105	50	µg/kg	M	001-003
1,1,1-Trichloroethane	T209	M105	50	µg/kg	M	001-003
1,1,2,2-Tetrachloroethane	T209	M105	50	µg/kg	U	001-003
1,1,2-Trichloroethane	T209	M105	50	µg/kg	M	001-003
1,1-Dichloroethane	T209	M105	50	µg/kg	M	001-003
1,1-Dichloroethylene	T209	M105	50	µg/kg	M	001-003
1,1-Dichloropropene	T209	M105	50	µg/kg	M	001-003
1,2,3-Trichloropropane	T209	M105	50	µg/kg	U	001-003
1,2,4-Trimethylbenzene	T209	M105	50	µg/kg	M	001-003

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
1,2-dibromoethane	T209	M105	50	µg/kg	M	001-003
1,2-Dichlorobenzene	T209	M105	50	µg/kg	M	001-003
1,2-Dichloroethane	T209	M105	50	µg/kg	M	001-003
1,2-Dichloropropane	T209	M105	50	µg/kg	M	001-003
1,3,5-Trimethylbenzene	T209	M105	50	µg/kg	M	001-003
1,3-Dichlorobenzene	T209	M105	50	µg/kg	M	001-003
1,3-Dichloropropane	T209	M105	50	µg/kg	M	001-003
1,4-Dichlorobenzene	T209	M105	50	µg/kg	M	001-003
2,2-Dichloropropane	T209	M105	50	µg/kg	U	001-003
2-Chlorotoluene	T209	M105	50	µg/kg	U	001-003
4-Chlorotoluene	T209	M105	50	µg/kg	U	001-003
Benzene	T209	M105	10	µg/kg	M	001-003
Bromobenzene	T209	M105	50	µg/kg	M	001-003
Bromochloromethane	T209	M105	50	µg/kg	M	001-003
Bromodichloromethane	T209	M105	50	µg/kg	M	001-003
Bromoform	T209	M105	50	µg/kg	M	001-003
Bromomethane	T209	M105	50	µg/kg	U	001-003
Carbon tetrachloride	T209	M105	50	µg/kg	M	001-003
Chlorobenzene	T209	M105	50	µg/kg	M	001-003
Chlorodibromomethane	T209	M105	50	µg/kg	M	001-003
Chloroethane	T209	M105	50	µg/kg	M	001-003
Chloroform	T209	M105	50	µg/kg	M	001-003
Chloromethane	T209	M105	50	µg/kg	U	001-003
Cis-1,2-Dichloroethylene	T209	M105	50	µg/kg	M	001-003
Cis-1,3-Dichloropropene	T209	M105	50	µg/kg	M	001-003
Dibromomethane	T209	M105	50	µg/kg	M	001-003
Dichlorodifluoromethane	T209	M105	50	µg/kg	M	001-003
Dichloromethane	T209	M105	50	µg/kg	U	001-003
Ethylbenzene	T209	M105	10	µg/kg	M	001-003
Isopropyl benzene	T209	M105	50	µg/kg	M	001-003
M/P Xylene	T209	M105	10	µg/kg	M	001-003
n-Propylbenzene	T209	M105	50	µg/kg	M	001-003
O Xylene	T209	M105	10	µg/kg	M	001-003
p-Isopropyltoluene	T209	M105	50	µg/kg	M	001-003
S-Butylbenzene	T209	M105	50	µg/kg	M	001-003
Styrene	T209	M105	50	µg/kg	U	001-003
T-Butylbenzene	T209	M105	50	µg/kg	M	001-003
Tetrachloroethene	T209	M105	50	µg/kg	M	001-003
Toluene	T209	M105	10	µg/kg	M	001-003
Trans-1,2-Dichloroethene	T209	M105	50	µg/kg	M	001-003
Trans-1,3-Dichloropropene	T209	M105	50	µg/kg	M	001-003
Trichloroethene	T209	M105	50	µg/kg	M	001-003
Trichlorofluoromethane	T209	M105	50	µg/kg	M	001-003
Vinyl chloride	T209	M105	50	µg/kg	M	001-003



Appendix F

Gas / Groundwater Monitoring Records

Ground Gas Monitoring Record

[illegible]

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by: Weather : Equipment used: Visible signs of vegetation stress: Boreholes sampled for laboratory analysis: Other comments / observations:	J. Crook Dry / Cloudy LMS Type G3 xi Gas Meter	Contract: Hale View Road, Huyton Date: 25/06/12 Job No. Sheet No. 1
--	--	--

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD

Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

[illegible]

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by:

Weather :

Equipment used:

Visible signs of vegetation stress:

Boreholes sampled for laboratory analysis:

Other comments / observations:

J. Crook

Driv

LMS Type G3 xi Gas Meter

Contract:

Hale View Road, Huyton

Date: _____

02/07/12

Job No.

100

Sheet No.

2

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD

Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

[illegible]

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by:

Weather :

Equipment used:

Visible signs of vegetation stress:

Boreholes sampled for laboratory analysis:

Other comments / observations:

J. Crook

Dry

LMS Type G3 xi Gas Meter

Contract:

Hale View Road, Huyton

Date:

09/07/12

Job No. _____

0000

Sheet No.

3

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD

Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

[illegible]

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by:

Weather :

Equipment used:

Visible signs of vegetation stress:

Boreholes sampled for laboratory analysis:

Other comments / observations:

J. Crook

Cloudy and showers

LMS Type G3 xi Gas Meter

Contract:

Hale View Road, Huyton

Date:

16/07/12

Job No.

Sheet No.

4

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD

Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

[illegible]

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by:

Weather :

Equipment used:

Visible signs of vegetation stress:

Boreholes sampled for laboratory analysis:

Other comments / observations:

J. Crook

Cloudy and breezy

LMS Type G3 xi Gas Meter

Contract:

Hale View Road, Huyton

Date:

16/08/12

Job No.

Sheet No.

5

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Howley, Warrington, Cheshire WA1 2JD

Tel. 01925 240476 email: paul.platt@geoventures.co.uk

Ground Gas Monitoring Record

[illegible]

Notes:

Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.

* LEL = Explosive Limit = 5%v/v

ND - Not Detected

Relevant Information at times of monitoring

Monitored by:

Weather :

Equipment used:

Visible signs of vegetation stress:

Boreholes sampled for laboratory analysis:

Other comments / observations:

J. Crook

D7V

LMS Type G3 xi Gas Meter

Contract:

Hale View Road, Huyton

Date:

24/08/12

Job No.:

Sheet No.

6

Geo-Ventures (UK) Limited

70 Riverside Close, Waterside, Warrington, Cheshire WA1 2JD

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Appendix G

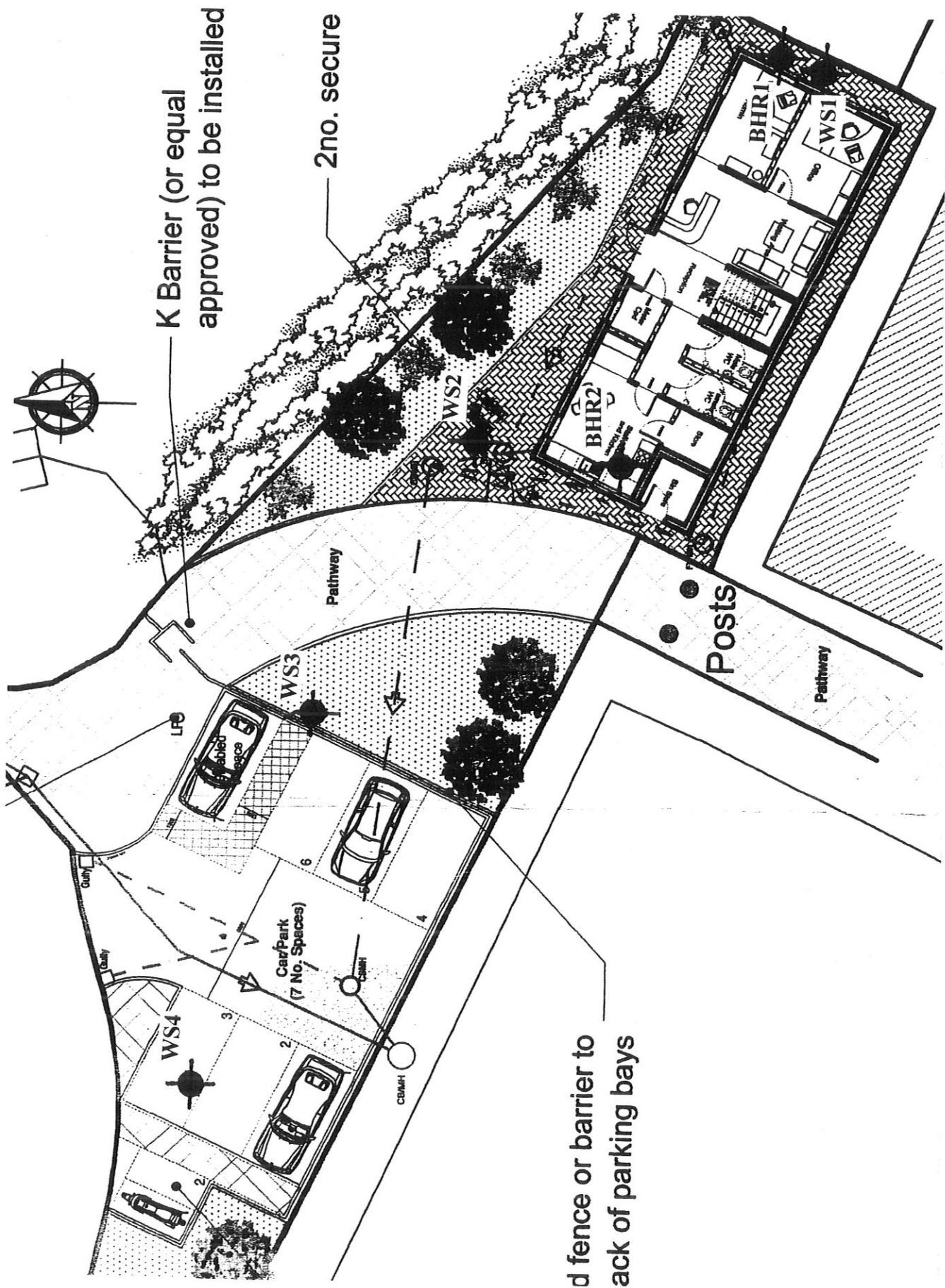
Borehole Location Plan

Contract:

Hale View Road, Huyton

Scale:

Not to Scale



BOREHOLE LOCATION PLAN

Fig No.

Appendix H

General Reporting Conditions

GENERAL REPORTING CONDITIONS

1. All reports are for advisory purposes only and all design decisions are the ultimate responsibility of others.
2. Unless stated otherwise the investigation has been undertaken in general accordance with the recommendations given in BS5930 : 1999 "*A Code of Practice for Site Investigation*" and the laboratory testing has been carried out in accordance with BS1377 : 1990 "*Methods of test for civil engineering purposes*".
3. Soil and rock descriptions are generally based on the scales of strength and relative density within BS5930 although it should be noted that in certain circumstances descriptions are based on drillers records or a qualitative assessment without the benefit of in-situ or laboratory test results.
4. With particular respect to the state of recovery of rock cores, it should be noted that open bedding plane partings are included in the Fracture Index and where the core is completely broken it is described as "non intact".
5. The assessment of ground conditions given in this report is based on the results of the fieldwork and laboratory testing carried out and there may be other conditions at the site not encountered by these works which have not been taken into account.
6. The scope of the investigation and information provided may not necessarily reflect all the geotechnical and environmental aspects related to the site, and the omission of certain items does not mean that the site is unaffected by such problems.
7. It should be noted that groundwater levels can vary and may at times be significantly different to those recorded during the investigation and attention is drawn to BS5930 which indicates that measurements may be necessary over an extended period of time to investigate changes in groundwater levels due to seasonal, tidal and other causes.
8. Any recommendations on construction methods within this report are for initial guidance only and all design proposals remain the responsibility of the appropriate contractor / consultant.
9. Further assessment, investigation, construction activities or time may reveal conditions that were not found during the period of investigation and, therefore, could not have been taken into account in the preparation of the report and where such information might impact upon the stated opinions Geo-Ventures (UK) Ltd request the opportunity to review such information and modify the report if necessary.
10. Where information has been obtained from sources other than the direct findings of the investigation, Geo-Ventures (UK) Ltd cannot and does not guarantee the authenticity or reliability of this information.
11. Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by Geo-Ventures (UK) Ltd for the effects of any future changes to such guidelines and legislation.
12. This report has been prepared on the instructions and to the requirements of the named client and any unauthorised party using this information for any purpose does so at his own risk and any duty of care to that party is excluded.
13. It should be noted that any information within this report remains the sole property of Geo-Ventures (UK) Ltd, and as such should not be used for any purposes, until full payment has been received.