Providing Ground Solutions

Walsh Associates

Camden Lock Village, London

Geotechnical and Geoenvironmental Interpretative Report

January, 2015

Card Geotechnics Limited
4 Godalming Business Centre, Woolsack Way,
Godalming, Surrey, GU7 1XW
Telephone: 01483 310 600
www.cgl-uk.com

Author	James Morrice, Engineer *MSc BEng (Hons) MCSM*		
Checked	Dan Matthews, Associate Director *BEng CSci CEnv MIEnvSc*		
Approved	Nick Langdon, Director *MSc BEng DIC CEnv CEng CMgr FICE FGS FCMI MIoD*		
Reference	CG/18067A	Revision 0	Issue Date January 2015

Contents

FIGURES

APPENDICES

EXECUTIVE SUMMARY

Card Geotechnics has been commissioned by Walsh Associates to undertake a Geotechnical and Geoenvironmental Interpretative Report for a site at Camden Lock Village, London. The site currently comprises a car park, office buildings, retail units and market stalls. It is proposed to demolish the existing buildings and construct a number of mixed use multi-storey residential buildings with associated hardstanding and communal garden areas.

The historical development of the site was previously investigated by RPS in their October 2009 and November 2009. In summary, the site comprised open fields until the *Regent's Canal* was constructed in the early 1800s, with associated wharf buildings and residential properties constructed across the site. These buildings were subsequently redeveloped or were demolished during construction of the North London Overground Railway viaducts in the mid-1800s. No further significant changes were noted at the site.

The area experienced intensive bombing during the Second World War, with a number of properties along Torbay Street suffering serious blast damage. A detailed unexploded ordnance (UXO) risk assessment was undertaken by 6 Alpha Associates Limited in September 2014 which noted that there is a low to medium risk due to UXO across the northern and eastern part of the site and a medium to high risk across the southwestern part.

Local geotechnical mapping indicates that the site is directly underlain by the London Clay Formation. This is supported by historical BGS records from the surrounding area. An intrusive investigation, comprising six cable percussion boreholes to a maximum depth of 39.5mbgl (-12.14mOD), six window sampler boreholes to a maximum depth of 5mbgl (20.79mOD) was undertaken from 28th October to 18th November 2014. An additional investigation, comprising three rotary boreholes to a maximum depth of 30mbgl (-4mOD), was undertaken from 24th November to 17th December 2014. Ground gas and groundwater monitoring wells were installed in the boreholes.

The investigation encountered limited Made Ground (0.5m to 3.0m) underlain by the London Clay Formation. No groundwater strikes were encountered during the investigation; however slight seepage was noted in a number of boreholes when drilling through the Made Ground and shallow Weathered London Clay. Groundwater was encountered during monitoring at levels ranging between 26.6mOD to 1.5mOD.

Negligible concentrations and flow of ground gas were recorded during the subsequent monitoring visits and a gas screening value of 0.0611l/hr has been calculated for the site. The site therefore conforms to Characteristic Situation 1 (NHBC 'Green') and no ground gas protection measures are therefore considered to be required in the development.

In order to mitigate the potential risk to human health due to contaminant exceedances encountered in samples from the Made Ground, a capping layer is recommended across the site. For communal landscaped areas, the capping layer may comprise hardstanding or a minimum of 150mm topsoil over 300mm subsoil and a geotextile membrane.

A preliminary assessment of the Topsoil/Made Ground for waste classification purposes indicates that the majority of this material may be classified as 'not hazardous' with respect to waste disposal. However, two samples were found to be 'hazardous' due to elevated pH and PAHs. Waste acceptance criteria (WAC) testing demonstrates that the 'not hazardous' samples may be disposed of in an inert landfill and that the 'hazardous' samples may be disposed of as 'stable non-reactive waste in non-hazardous landfill'. Asbestos screens confirmed loose fibres of chrysotile asbestos to be presented in two samples of Made Ground (BH6 at 0.3mbgl and BH10 at 0.5mbgl) tested. Quantification testing should be undertaken to confirm the appropriate disposal route should the material in these regions of the site require offsite disposal.

Piled foundations are considered suitable for the proposed development of the site. A preliminary assessment of pile working loads demonstrates that a range of capacities from 240kN to 6,320kN is achievable using piles 0.45m to 1.5m in diameter and 10m to 25m in length, respectively, with the piles being driven from ground level, 21.7mOD or 11.7mOD, depending on the depth of the proposed on site. The final pile design should be undertaken by the specialist piling contractor engaged to undertake the works.

The London Clay Formation has a high volume change potential and floor slabs should therefore be designed as suspended in order to mitigate potential damage due to heave. It is anticipated that shallow excavations will remain stable in the short term.

Buried concrete within the London Clay Formation should be designed to DS-4 and AC-3s if disturbed during construction (i.e. during basement excavation), or DS-3 and AC-2s if undisturbed during construction, for example where piled foundations are employed. The basement slab will be protected by the presence of heave board. Buried concrete within the Made Ground should be designed to DS-1 and AC-1.

1. INTRODUCTION

CGL has been commissioned by Walsh Associates to undertake a geotechnical and geoenvironmental intrusive investigation to assess the ground conditions at a site proposed for development at Camden Lock Village, London.

The proposed development of the site is divided into two sections; the 'School Site', which comprises the northeastern part of the wider site, and the remainder of the site. A separate report[1] has been produced for the School Site area.

The objectives of this report are to:

- provide a summary of the site history and environmental setting;
- provide information on the ground conditions;
- provide an assessment and recommendations relating to the potential for soil and groundwater contamination and ground gas; and
- provide geotechnical recommendations to assist with foundation, floor slab and pavement design.

The site has been the subject of a number of previous reports, including;

- Phase 1 Environmental Risk Assessment (RPS 2009)[2]
- Archaeological Desk Based Assessment (RPS 2009)[3]

Pertinent information within these reports is summarised in Section 2, but the reports should be referred to for further details.

[1] CGL (2014) Camden Lock, London – Proposed School Site. *Geotechnical and Geoenvironmental Interpretative Report.* Ref: CG/18067. December 2014
[2] RPS (2009) Camden Lock Village London Borough of Camden. *Phase 1 – Environmental Risk Assessment*. Ref: HLEI4880/001R. October 2009
[3] RPS (2009) Camden Lock Village London Borough of Camden. *An Archaeological Desk Based Assessment*. Ref: JLK0617 RO1. November 2009

2. SITE LOCATION AND DESCRIPTION

2.1 Site location

The site is situated off Torbay Street in Camden, northwest London. The Ordnance Survey grid reference for the approximate centre of the site is 528813N, 184210E.

A site location plan is presented as Figure 1.

2.2 Site description and proposed development

The wider site is bordered by Hawley Road to the north, residential properties and Kentish Town Road to the east, the *Grand Union Towpath* and *Regent's Canal* to the south and Camden High Street and Castlehaven Road to the west.

The site is naturally split into four sections by the National Rail viaducts which cross the site. The sections of the site are shown on Figure 2 and are detailed below, along with the proposed development in each area;

2.2.1 Building A

Building A is situated in the southwest of the site and was subject to Phase 3 of the ground investigation. At the time of the investigation, the area was occupied by Camden Lock Village Market, which comprised a large number of single storey wooden market stalls with additional retail premises situated in the arches beneath the railway viaducts.

The development in Building A is proposed to comprise the demolition of the existing structures and construction of three multi storey buildings, comprising market and retail areas, office space and restaurant areas.

2.2.2 Building C

Building C occupies the western and central parts of the site, between the two National Rail viaducts. This area was investigated as part of the Phase 2 ground investigation. At the time of the ground investigation, this area comprised an office building with associated car parking, a waste transfer depot and vehicle maintenance and repair workshops, situated in the arches beneath the railway viaduct.

The proposed development in Building C comprises two multi storey buildings with basement levels and communal landscaped areas. The upper floors of the buildings will comprise residential properties and the lower floors and basement levels will predominantly comprise retail units, office space and leisure facilities.

2.2.3 Building D

Building D is situated in the southeast of the site and was also investigated during the Phase 2 ground investigation. At the time of the ground displacement, the area comprised office buildings with associated car parking.

The proposed development in Building D comprises a multi storey building with a basement and communal landscaping. The upper floors of the building will comprise residential properties, with office space and a restaurant on the ground and basement levels.

2.2.4 Buildings X and W

Buildings X and W are situated in the northern part of the site and was investigation as part of the Phase 1 ground investigation. During the investigation, the site was noted to comprise a car park with associated temporary office buildings, a number of mid-19th century residential properties and vehicle maintenance and repair businesses, predominantly situated in the arches beneath the railway viaducts.

The proposed development at Buildings X and W will comprise the demolition of the existing structures and construction of two multi storey residential buildings, with communal landscaped areas.

2.3 Historical Development

The historical development of the site was established by RPS in their October 2009[2] and November 2009[3] reports and is summarised below.

The site consisted of open fields until the *Regent's Canal* was constructed in the early 1800s, with associated wharf buildings and residential properties constructed across the site. A number of these buildings were subsequently demolished during construction of the North London Overground Railway viaducts in the mid-1800s. No further significant changes were noted at the site.

2.4 Bomb damage and unexploded ordnance

The area experienced intensive bombing during the Second World War, with a number of properties being destroyed or damaged beyond repair.

A detailed unexploded ordnance (UXO) risk assessment[4] was undertaken by 6 Alpha Associates Limited in September 2014. The report notes that the risk posed by UXO at the site is 'low to medium' for basements and excavations within Buildings C, D, X and W and 'medium to high' in Building A.

2.5 Anticipated ground conditions

2.5.1 Published and unpublished geology

The British Geological Survey map sheet 256 indicates that the site is directly underlain by the London Clay Formation, which consists of stiff blue grey silty clay, weathering to brown silty clay.

The BGS holds records of a number of historical ground investigations within 300m of the site. Selected logs are summarised in Table 1 and are included in Appendix A.

[4] 6 Alpha Associates Limited (2014) *Detailed Unexploded Ordnance (UXO) Risk Assessment*. Ref: P4063. September 2014

Table 1 - Summary of BGS historical borehole records

BH record reference	Distance (m)	Direction	Base of BH (mbgl)	Ground water level (mbgl)	Depth to top of stratum (mbgl)				
					MG	London Clay Formation	Lambeth Group	Thanet Sand	Chalk
TQ28SE5	90	S	91.4	NR	-	0.0	42	NR	64
TQ28SE1203	300	SE	18.7	1.1	0.0	1.5	-	-	-
TQ28SE1204	300	SE	18.4	NR	0.0	0.9	-	-	-
TQ28SE1206	300	SE	9.6	1.1	0.0	2.1	-	-	-
TQ28SE1208	300	SE	9.4	NR	0.0	1.37	-	-	-
TQ28SE1239	180	NW	3.0	-	0.0	0.63	-	-	-
TQ28SE1240	180	NW	3.0	-	0.0	0.5	-	-	-
TQ28SE1241	180	NW	3.0	-	0.0	0.8	-	-	-
TQ28SE1242	180	NW	3.0	-	0.0	0.6	-	-	-
TQ28SE1491	190	SE	198.7	91.7	0.0	6.7	44.8	53.9	125.0
TQ28SE2272	257	SW	1.1	-	0.0	1.08	-	-	-

2.5.2 Hydrogeology and hydrology

The Environment Agency[5] has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for superficial and bedrock geology and are based on the importance of aquifers for potable water supply and their role in supporting surface water bodies and wetland ecosystems.

The underlying London Clay Formation is classified as an 'Unproductive Strata' and the site is not within a Groundwater Source Protection Zone (SPZ)

The Environment Agency indicates that the site is not at risk from flooding. The nearest surface water to the site is the *Regent's Canal*, situated approximately 3m south of the site. Additionally, the historical *River Fleet* is noted to run some 60m west and 8m north of the site.

[5] www.environment-agency.gov.uk (September 2014)

2.6 Environmental setting

The previous report by RPS[2] provides information on the environmental setting of the site and possible sources of soil and groundwater contamination. The key points are summarised below:

- There are no recorded landfill sites within 500m of the site. However, there are two waste transfer sites, located 120m southwest and 130m south of the site.
- No 'major' or 'significant' pollution incidents are noted within 500m of the site.
- There is the potential for arsenic and lead contamination to be present within the soils at the site, resulting from the spreading of ash in private gardens during the pre-Victorian period to the 1950s.
- There are eleven industrial activities within 500m of the site, including vehicle respraying, petrol stations and dry cleaners.
- The site is not in a radon affect area

2.7 Preliminary risk assessment

The October 2009 RPS report[2] included a preliminary risk assessment, the key points of which are summarised below:

- It is likely that contamination is present within the soils due to historical land use on site and in the surrounding area.
- The potential pathways to human health receptors include dermal contact, inhalation and ingestion of contaminants. Due to the underlying London Clay Formation, there is not considered to be a pathway for contaminants to reach the underlying Chalk aquifer.
- Overall, RPS considered the risk associated with potential contamination within the Made Ground to be low due to the absence of a source-pathway-receptor linkage (hardstanding across the site).

In addition to the potential risks identified by RPS, due to the age of the buildings on site, it is considered that there is the potential for asbestos-containing material to be present within the building fabric.

3. CURRENT GROUND INVESTIGATION

3.1 Fieldwork

Intrusive investigation was undertaken at Buildings X and W (Phase 1 of the ground investigation) from 21st October to 6th November 2014, with subsequent investigation at Blocks C and D (Phase 2) from 31st October to 18th November 2014 and at Building A (Phase 3) from 24th November to 17th December 2014.

The investigation at Buildings C, D, X and W comprised six cable percussive boreholes (BH2 to BH7) to a maximum depth of 39.5mbgl (-12.14mOD) and six window sampler boreholes (WS4 to WS9) to a maximum depth of 5mbgl (20.79mOD). The investigation at Building A comprised three rotary boreholes (BH8 to BH10) to depths of between 25mbgl to 30mbgl (2.07mOD and -4mOD).The investigation was broadly undertaken in accordance with the requirements of BS 5930:1999[6].

The borehole arisings were recorded and representatively sampled by a suitably qualified geotechnical engineer from CGL in order to obtain samples for laboratory testing, and to characterise the near surface ground conditions across the site. Soil samples were obtained for chemical and geotechnical laboratory analysis. Standpipes were installed in all boreholes to enable subsequent gas and groundwater monitoring to be undertaken.

A plan showing the exploratory locations is presented as Figure 2 and the borehole logs are included as Appendix B.

3.2 Monitoring

A programme of fortnightly ground gas and groundwater monitoring visits is being undertaken at the standpipes installed across the site. The monitoring commenced on 5th November 2014 following completion of the ground investigation at Buildings X and W. Five visits have been undertaken to date, on 5th and 19th November 2014, 1st and 18th December 2014 and 8th January 2015. Copies of the monitoring records to date are included as Appendix C.

[6] BS 5930:1999*; Code of practice for site investigations, Incorporating Amendment 2*, British Standards Institute. 1999.

3.3 Laboratory testing

3.3.1 Chemical

Representative soil samples and one groundwater samples were submitted to i2 Analytical Limited (a UKAS and MCERTS accredited laboratory) for chemical testing. The analysis included the following determinants.

- Soil Organic Matter (SOM);
- Heavy metals including; arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc;
- Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH);
- Total Monohydric Phenols;
- Total Cyanide;
- Sulfate;
- Asbestos identification; and
- pH determination.

The laboratory analysis results are presented in Appendix D.

3.3.2 Geotechnical

Soil samples were sent for geotechnical laboratory analysis at Geolabs Limited. The analysis included:

- Moisture Content;
- Atterberg Limits and;
- Quick Undrained Triaxial testing.

The results of the analysis are presented in Appendix E.

4. GROUND AND GROUNDWATER CONDITIONS

4.1 Summary

The ground conditions encountered on site broadly corresponded to published geology and are summarised in Table 2. The borehole and window sampler logs are included as Appendix B.

Table 2. Summary of ground conditions (whole site)

Stratum	Level to top of stratum (mOD) [mbgl]	Typical thickness (m)
MADE GROUND Concrete overlying soft dark brown sandy gravelly silt. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick, flint and occasional concrete.	25.79 to 28.64 [0.0]	0.5 to 3.0
Form dark orange brown slightly silty CLAY with occasional fine selenite crystals [WEATHERED LONDON CLAY FORMATION].	22.79 to 27.44 [0.5 to 3.0]	4.6 to 9.8
Stiff closely fissured dark grey silty CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION]	17.56 to 19.12 [8.9 to 11.2]	>29.7 (Base not encountered in boreholes)

The cable percussion boreholes extended to a maximum depth of 39.5m bgl (-12.14mOD), the window sampler boreholes extended to a maximum depth of 5m bgl (20.79mOD) and the rotary boreholes extended to a depth of 30m bgl (-4mOD).

The ground conditions encountered during the ground investigation generally correlated with the BGS mapping of the area, with Made Ground directly overlying the London Clay Formation. The upper surface of the London Clay Formation was found to be relatively consistent across the majority of the site.

4.2 Made Ground

The Made Ground at the site was found to be relatively consistent across the majority of the site and comprised concrete or paving slabs overlying soft dark brown sandy gravelly silt or gravelly silty clay. The gravel comprised brick and flint, with occasional concrete. A moderate hydrocarbon odour was noted in the Made Ground in WS4. No other visual or olfactory evidence of contamination was noted in the boreholes.

Deeper Made Ground was encountered at borehole WS9 in the area of Building D (Phase 2 site investigation), possibly due to the construction of the nearby office blocks. It is anticipated that other areas of deeper Made Ground may be present across the site in areas which were inaccessible at the time of the site investigation.

4.3 London Clay Formation

The London Clay Formation was proved to a maximum depth of -12.14mOD. The upper 4.6m to 9.8m of the clay was found to consist of firm silty clay (Weathered London Clay Formation), becoming stiff (unweathered) from 17.56mOD to 19.12mOD. SPT 'N' values in this stratum ranged from 5 to >50. Undrained shear strength values can be derived from these values using established Stroud correlations[7].These values range from 22.5kPa to >225kPa, indicating that the clay is low to very high strength.

Laboratory testing on the London Clay Formation gave undrained shear strength (c_u) values of 47kPa to 533kPa, generally increasing with depth. Plots of SPT 'N' values and undrained shear strength against level (mOD) are presented as Figure 3 and Figure 4 respectively. The moisture content and atterberg limits of the clay are summarised in Table 3.

Table 3. Summary of liquid limits and Atterberg limits

Strata	Moisture content (%)	Liquid limit (%)	Plastic limit (%)	Modified plasticity index, I' (%)
London Clay Formation	20 to 34	48 to 83	20 to 31	28 to 55

These indicate that the material at this site is a high to very high plasticity clay of medium to high volume change potential.

[7] Tomlinson, M.J. (2001) *Foundations Design and Construction (7th Ed.)*. Pearson Prentice Hall

4.4 Groundwater

No groundwater strikes were noted in the cable percussion boreholes during drilling. However, perched groundwater was encountered from 1.0mbgl to 3.0mbgl in WS9, within the Weathered London Clay Formation.

Groundwater was noted in all boreholes during the subsequent monitoring visits. The groundwater levels noted during the visits are summarised in Table 4. Due to the nature of the site, some positions were not accessible during monitoring visits due to parked vehicles.

Table 4. Summary of groundwater monitoring undertaken to date

Borehole [surface level (mOD)]	**Level of groundwater (mOD) [Level of base of well (mOD)]**					
	05/11/14	**19/11/14**	**01/12/14**	**18/02/14**	**8/01/15**	**13/01/15**
BH2 [26.16]	NR	NR	18.56 [16.23]	19.44 [16.16]	20.02 [16.19]	21.39 [16.19]
BH3 [26.2]	22.06 [21.06]	22.85 [21.10]	23.36 [21.11]	23.93 [21.07]	24.24 [21.16]	24.23 [21.10]
BH4 [27.37]	*	NR	26.19 [18.39]	26.01 [19.17]	25.94 [19.95]	23.31 [19.15]
BH5 [27.36]	*	NR	22.57 [19.80]	23.78 [20.31]	25.78 [20.31]	24.71 [20.31]
BH6 [27.96]	*	NR	NR	19.86 [19.51]	20.06 [19.56]	20.26 [19.43]
BH7 [25.79]	*	18.34 [18.29]	18.55 [18.27]	18.78 [18.24]	NR	18.69 [18.26]
BH8 [28.64]	*	*	*	12.12 [2.64]	18.29 [5.51]	18.39 [3.38]
BH9 [28.12]	*	*	*	1.54 [-2.73]	20.35 [-1.36]	20.42 [-1.96]
BH10 [27.07]	*	*	*	26.64 [4.64]	27.04 [4.42]	27.12 [4.44]
WS4 [26.29]	25.37 [24.99]	25.64 [24.99]	25.62 [24.99]	25.61 [25.00]	25.60 [25.00]	25.76 [25.00]
WS5 [26.14]	23.99 [23.47]	23.88 [23.55]	24.11 [23.47]	24.07 [23.47]	24.20 [23.46]	24.97 [23.46]
WS6 [27.06]	*	26.44 [25.00]	26.41 [24.97]	26.51 [25.97]	26.44 [25.00]	19.36 [24.96]
WS7 [27.06]	*	NR	25.79 [24.98]	26.01 [25.03]	26.20 [24.99]	26.28 [24.96]
WS8 [26.99]	*	26.53 [24.93]	26.48 [24.93]	NR	NR	26.76 [24.96]
WS9 [25.79]	*	24.59 [22.96]	24.54 [23.01]	NR	24.63 [23.07]	24.71 [22.99]

** - Borehole not completed at time of visit*

NR – Borehole not accessible at time of visit due to obstruction

Further visits are to be undertaken and the results will be reported in a revision to this report.

The monitoring records indicate that standing groundwater recorded in monitoring wells across the site range from between approximately 0.55mbgl to 8.1mbgl. Due to the recorded variability in rest groundwater level, this is considered unlikely to represent a continuous water body across the site. It is considered that the groundwater in the boreholes during monitoring is likely to be due to water seepage at the interface between the Made Ground and London Clay Formation and also potentially due to very slow seepage within the silty sandy layers/pockets within the upper weathered London Clay Formation .

The above was confirmed during bailing dry of a number of boreholes during monitoring visits which confirmed that the infiltration rate is very slow.

4.5 Sulfate and pH conditions

At the time of writing, a total of 28 soil samples from across the site had been tested for pH and sulfate conditions. The results of the testing are summarised in Table 5. Further tests have been scheduled on samples obtained during the Phase 3 investigation, which will be incorporated into a revised version of this report once available.

Table 5. Summary of sulphate and pH conditions

Borehole	Depth (mbgl)	Strata	Water soluble sulfate (g/l)	Acid soluble sulfate (%)	Total sulfur (%)	Total potential sulfate (%)	pH
WS4	0.3	Made Ground	0.28	0.055	-	-	7.6
WS7	0.6	Made Ground	0.099	0.02	-	-	7.7
WS8	0.6	Made Ground	0.22	0.043	-	-	8.1
WS9	2.0	Made Ground	0.28	0.055	-	-	8.9
BH9	1.2	Made Ground	0.51	0.1	-	-	7.1
BH2	1.5	London Clay Formation	0.11	0.11	0.039	0.12	7.7
BH2	3.5	London Clay Formation	2.4	0.64	0.27	0.81	7.6
BH2	6	London Clay Formation	2.7	1.1	0.41	1.23	7.6

Borehole	Depth (mbgl)	Strata	Water soluble sulfate (g/l)	Acid soluble sulfate (%)	Total sulfur (%)	Total potential sulfate (%)	pH
BH2	15	London Clay Formation	0.4	0.086	0.32	0.96	7.7
BH3	2.5	London Clay Formation	2.3	2.9	1.0	3.0	7.5
BH3	4.5	London Clay Formation	2.4	1.5	0.59	1.77	7.5
BH3	7.5	London Clay Formation	0.72	0.18	0.41	0.42	7.6
BH3	13.5	London Clay Formation	0.65	0.15	0.64	1.92	7.7
BH4	4.5	London Clay Formation	0.85	0.18	0.071	0.033	7.5
BH4	19.5	London Clay Formation	0.43	0.087	0.43	1.203	7.9
BH5	3.5	London Clay Formation	0.061	0.049	0.017	0.002	7.9
BH5	9	London Clay Formation	0.81	0.21	0.42	1.05	7.8
BH5	18	London Clay Formation	0.36	0.086	0.72	2.074	8.1
BH6	4.5	London Clay Formation	2.8	1.9	0.62	0.04	7.9
BH6	16.5	London Clay Formation	0.42	0.094	0.44	1.226	8.1
BH7	4.5	London Clay Formation	0.77	0.16	0.071	0.053	7.2
BH7	22.5	London Clay Formation	0.28	0.056	0.85	2.494	8.3
BH8	24.0	London Clay Formation	1.1	0.23	0.56	1.68	7.8
BH9	7.0	London Clay Formation	3.5	0.7	0.36	1.08	7.6
BH9	9.0	London Clay Formation	3.4	0.68	0.35	1.05	7.5
BH10	2.8	London Clay Formation	2.7	0.54	0.24	0.72	8.2
BH10	7.0	London Clay Formation	3.1	0.53	0.33	0.99	7.9
BH10	20.5	London Clay Formation	1.7	0.33	0.59	1.77	7.5

The implications of these results are discussed in further detail in Section 7.7.

5. CONTAMINATION ASSESSMENT

5.1 Risks to human health (long-term chronic risks)

Soil Guideline Values (SGVs) have not been issued by the Environment Agency for the "*Residential (without plant uptake)*" land-use category. The soil results have therefore been compared to *Generic Assessment Criteria* (GACs) that have been derived in-house by CGL using the *Contaminated Land Exposure Assessment (CLEA)* model[8] and version 1.06 of the CLEA software to assess the risk to human health from chemical contamination in the soils.

The GACs represent conservative screening criteria and have been calculated using the default parameters for the standard land use scenario set out in the CLEA technical report and toxicological inputs in line with the requirements of *Science Report SC050021/SR2*[9] and, in the case of petroleum hydrocarbons, Science *Report P5-080/TR3*[10]. In the case of selenium, mercury, arsenic, nickel and the BTEX compounds, SGVs have been issued by the Environment Agency for other land-use categories and the physical-chemical and toxicological inputs have been taken from the published SGV reports.

The GACs have been generated assuming a sandy loam soil type and a Soil Organic Matter of 1%, which are suitable assumptions for the site in question. More detailed information on the derivation of the CGL GACs can be provided upon request.

[8] Environment Agency. (January 2009). *Updated technical background to the CLEA model*. Science Report SC050021/SR3.
[9] Environment Agency. (January 2009). *Human health toxicological assessment of contaminants in soil*. Science Report SC050021/SR2.
[10] Environment Agency. (February 2005). *The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils*. Science Report P5-080/TR3.

The results of the assessment are set out below in Table 6 to Table 9. Assessment against the SGVs and GACs is carried out at the 95th percentile on the sample mean (designated US_{95}), which is considered to represent a reasonable worst-case scenario. Statistical assessment of the results has been completed in accordance with the recommendations set out in the recently published CL:AIRE guidance[11]. In this regard, an assessment of the normality of the data has been undertaken. Where datasets are normally distributed the *one sample t-test* has been applied to calculate the US_{95}. In the case of non-parametric datasets, the Chebychev Theorem has been applied. The Grubbs Test has also been used to identify potential outliers within datasets. Copies of the relevant statistical analysis are available on request.

In March 2014, the Department for Environment, Food and Regional Affairs (DEFRA) issued SP1010 Development of Category 4 Screening Levels (C4SLs) for assessment of land affected by contamination - Policy companion document[12], along with the results of the work by the C4SLs development team[13]. This includes a set of C4SL values for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead for sandy loam soil with SOM =6%.

These values are primarily to support site assessment with respect to Part IIA of the Environmental Protection Act 1990, being indicative of low health risk and therefore of a site not determinable under Part2A. This is in comparison with the SGVs and GACs which represent minimal risk. The C4SLs are based on revised slightly less conservative exposure models and toxicology based on Low Level of Toxicological Concern (LLTC) rather than the Heath Criteria Values (HCV) on which the SGVs/GACs are based. The difference in risk level between HCV (minimal risk) and LLTC (low risk) is slight, and it is noted that both are still within the Category 4 level and below the Category 3/4 level boundary considered by DEFRA to be the likely de facto minimum standard chosen by developers. The C4SLs are still strongly conservative in accordance with the Contaminated Land Regulations and meet the objectives of the NPPF that:

[11] J. Lowe et al. (May 2008). *Guidance on comparing soil contamination data with a critical concentration*. CL:AIRE, CIEH & SAGTA.
[12] DEFRA (March 2014) *SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document*
[13] CL:AIRE (March 2014) *SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*

- *the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation; and*

- *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990.*

On this basis CGL considers it is appropriate to use C4SLs for the published contaminants. In the event impacts are identified on a site above the GAC/SGV level for these contaminants, CGL will utilise the C4SLs to assess whether these pose a low risk to developments and Public Open Space applications.

It is noted that the BGS has published background levels for a number of organic and inorganic constituents. In the event that the C4SL or a GAC is found to be exceeded, the risk may still be considered to be low, unlikely to meet the definition of contaminated land under Part IIA and potentially suitable for use from a development perspective, if the contaminant concentrations are below local background levels, assuming no other contributing factors.

It is noted that the SGV for lead has been withdrawn and that the C4SL for lead will be used in its place, based on latest toxicology research.

Table 6. Summary of soil contamination (risks to human health) - Made Ground

Contaminant	SGV or GAC @ 1% SOM for Residential (without plant uptake) land-use (mg/kg)	Notes on soil saturation limits (SSL)[1]	Measured range (mg/kg)	US_{95} (mg/kg)	US_{95} > Assessment Criteria? (Y/N) #- outlier detected
SOM (%)	*[2]		<0.1 to 3.2	*	*
Arsenic	35[3]	-	7.4 to 48.0	30.95	N
Cadmium	85[3]	-	<0.2 to 1.0	0.59	N#
Chromium (total)	38	-	13.0 to 52.0[8]	37.69	N
Lead	310[7]	-	**29.0 to 1,100.00**	**729.02**	**Y**
Mercury (inorganic)	240[3]	-	<0.3 to 8.5	3.57	N#
Selenium	600[3]	-	<1.0	1.0	N
Boron	*		<0.2 to 10.0	5.20	*
Copper	6,700	-	30.0 to 320.0	183.03	N
Nickel	130[3]	-	11.0 to 77.0	52.72	N
Zinc	20,000	-	43.0 to 680.0	425.0	N
Barium	*		53.0 to 370.0	234.24	*
Beryllium	26	-	0.3 to 4.7	2.80	N
Vanadium	210	-	28.0 to 200.0	116.15	N#
Phenols[4]	310[3]	-	<1.0	1.0	N
Cyanide	*		<1.0	1.0	*
BTEX compounds					
Benzene	0.27[5]	-	<0.001	0.001	N
Toluene	610[5]	-	<0.001	0.001	N
Ethyl benzene	170[5]	-	<0.001	0.001	N
m-xylene[6]	55[5]	-	<0.001	0.001	N
o-xylene[6]	60[5]	-	<0.001	0.001	N
p-xylene[6]	53[5]	-	<0.001	0.001	N

Notes:

1. - = green; (a) = amber i.e. GAC set to model output, [SSL provided in square brackets] ; (b) = red i.e. SSL exceeded & considered to affect interpretation. GAC calculated in accordance with the CLEA Software Handbook ; (c) = based on direct contact; (d) GAC limited to SSL.
2. * = no value currently defined
3. Based on the published Soil Guideline Value (Environment Agency, 2009), adjusted for no plant uptake and 1% SOM
4. GAC relates to Phenol (C_6H_5OH) only.
5. Based on the published SGVs for BTEX at 6% SOM (Environment Agency, 2009), adjusted for 1% SOM without plant uptake
6. Concentrations for total xylenes should be compared to the value for m-xylene for fresh spills and to o-xylene for all other cases.
7. Published C4SL for lead (DEFRA, 2014)
8. Exceedances are for Total Chromium. Further analysis indicates that the exceedances are due to Chromium III and the concentrations of the more toxic Chromium VI are below the assessment criteria.

Table 7. Summary of soil contamination (risks to human health) - Made Ground cont.

Contaminant	SGV or GAC @ 1% SOM for Residential (without plant uptake) land-use (mg/kg)	Notes on soil saturation limits (SSL)[1]	Measured range (mg/kg)	US_{95} (mg/kg)	US_{95} > Assessment Criteria? (Y/N) #- outlier detected
Total Petroleum Hydrocarbons (TPH)					
TPH aliphatic EC5-6	24	-	<0.1 to 0.4	0.26	N#
TPH aliphatic EC>6-8	49	-	<0.1 to 0.3	0.18	N#
TPH aliphatic EC>8-10	10	-	<0.1	0.10	N
TPH aliphatic EC>10-12	540	(b)	<1.0 to 20.0	8.27	N#
TPH aliphatic EC>12-16	1,500	(b)	<2.0 to 64.0	25.83	N#
TPH aliphatic EC>16-35	89,000	(b)	<16.0 to 121.0	63.32	N#
TPH aromatic EC5-7	0.27	-	<0.1	0.10	N
TPH aromatic EC>7-8	610	-	<0.1	0.10	N
TPH aromatic EC>8-10	17	-	<0.1	0.10	N
TPH aromatic EC>10-12	88	-	<1.0 to 2.9	1.90	N#
TPH aromatic EC>12-16	1,500	(b)	<2.0 to 51.0	24.77	N#
TPH aromatic EC>16-21	1,300	(b)	<10.0 to 490.0	218.0	N#
TPH aromatic EC>21-35	1,300 [4.8]	(a)	<10.0 to 650.0	279.6	N#
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	4,500	(b)	<0.1 to 8.4	3.54	N#
Anthracene	24,000	(b)	<0.1 to 30.0	13.68	N#
Benzo(a)anthracene	7.7 [1.7]	(a)	**<0.1 to 78.0**	**33.73**	**Y**
Benzo(a)pyrene	2.3 [0.9]	(a)	**<0.1 to 64.0**	**28.11**	**Y**
Benzo(b)fluoranthene	22 [1.2]	(a)	**<0.1 to 73.0**	**31.86**	**Y**
Benzo(g,h,i)perylene	240 [0.02]	(a)	<0.05 to 29.0	13.40	N
Benzo(k)fluoranthene	23 [0.7]	(a)	<0.1 to 31.0	13.94	N
Chrysene	170 [0.4]	(a)	<0.05 to 54.0	24.50	N
Dibenzo(a,h)anthracene	2.1 [0.004]	(a)	**<0.1 to 5.5**	**2.67**	**Y#**
Fluoranthene	3,100 [19]	(a)	<0.1 to 160.0	71.45	N
Fluorene	3,100	(b)	<0.1 to 11.0	5.40	N#
Indeno(1,2,3-cd)pyrene	21 [0.06]	(a)	<0.1 to 28.0	13.01	N
Naphthalene	1.6	-	<0.05 to 1.6	0.66	N#
Pyrene	2,300 [2.2]	(a)	<0.1 to 1300	58.15	N

Notes:

1. - = green; (a) = amber i.e. GAC set to model output, [SSL provided in square brackets] ; (b) = red i.e. SSL exceeded & considered to affect interpretation. GAC calculated in accordance with the CLEA Software Handbook ; (c) = based on direct contact; (d) GAC limited to SSL.

Table 8. Summary of soil contamination (risks to human health) - natural soil

Contaminant	SGV or GAC @ 1% SOM for Residential (without plant uptake) land-use (mg/kg)	Notes on soil saturation limits (SSL)[1]	Measured range (mg/kg)	Measured range > Assessment Criteria? (Y/N)
SOM (%)	*[2]		<0.1 to 0.2	*
Arsenic	35[3]	-	13.0 to 14.0	N
Cadmium	85[3]	-	<0.2 to 0.6	N
Chromium (total)	38	-	**37.0 to 47.0**	**Y[8]**
Chromium (III)	1,100	-	37.0 to 47.0	N
Chromium (VI)	4.2	-	<1.2	N
Lead	310[7]	-	14.0 to 20.0	N
Mercury (inorganic)	240[3]	-	<0.3	N
Selenium	600[3]	-	<1.0	N
Boron	*		0.5 to 4.4	*
Copper	6,700	-	22.0 to 31.0	N
Nickel	130[3]	-	30.0 to 45.0	N
Zinc	20,000	-	59.0 to 87.0	N
Barium	*		35.0 to 130.0	*
Beryllium	26	-	1.4 to 1.7	N
Vanadium	210	-	69.0 to 87.0	N
Phenols[4]	310[3]	-	<1.0	N
Cyanide	*		<1.0	*
BTEX compounds				
Benzene	0.27[5]	-	<0.001	N
Toluene	610[5]	-	<0.001	N
Ethyl benzene	170[5]	-	<0.001	N
m-xylene[6]	55[5]	-	<0.001	N
o-xylene[6]	60[5]	-	<0.001	N
p-xylene[6]	53[5]	-	<0.001	N

Notes:

1. - = green; (a) = amber i.e. GAC set to model output, [SSL provided in square brackets] ; (b) = red i.e. SSL exceeded & considered to affect interpretation. GAC calculated in accordance with the CLEA Software Handbook ; (c) = based on direct contact; (d) GAC limited to SSL.
2. * = no value currently defined
3. Based on the published Soil Guideline Value (Environment Agency, 2009), adjusted for no plant uptake and 1% SOM
4. GAC relates to Phenol (C_6H_5OH) only.
5. Based on the published SGVs for BTEX at 6% SOM (Environment Agency, 2009), adjusted for 1% SOM without plant uptake
6. Concentrations for total xylenes should be compared to the value for m-xylene for fresh spills and to o-xylene for all other cases.
7. Published C4SL for lead (DEFRA, 2014)
8. Exceedance is for Total Chromium. Further analysis indicates that the exceedance is due to Chromium III and the concentration of the more toxic Chromium VI is below the assessment criteria.

Table 9. Summary of soil contamination (risks to human health) - natural soil cont.

Contaminant	SGV or GAC @ 1% SOM for Residential (without plant uptake) land-use (mg/kg)	Notes on soil saturation limits (SSL)[1]	Measured range (mg/kg)	Measured range > Assessment Criteria? (Y/N)
Total Petroleum Hydrocarbons (TPH)				
TPH aliphatic EC5-6	24	-	<0.1	N
TPH aliphatic EC>6-8	49	-	<0.1	N
TPH aliphatic EC>8-10	10	-	<0.1	N
TPH aliphatic EC>10-12	540	(b)	<1.0	N
TPH aliphatic EC>12-16	1,500	(b)	<2.0	N
TPH aliphatic EC>16-35	89,000	(b)	<16	N
TPH aromatic EC5-7	0.27	-	<0.1	N
TPH aromatic EC>7-8	610	-	<0.1	N
TPH aromatic EC>8-10	17	-	<0.1	N
TPH aromatic EC>10-12	88	-	<1.0	N
TPH aromatic EC>12-16	1,500	(b)	<2.0	N
TPH aromatic EC>16-21	1,300	(b)	<10.0	N
TPH aromatic EC>21-35	1,300 [4.8]	(a)	<10.0 to 20.0	N
Polycyclic Aromatic Hydrocarbons (PAH)				
Acenaphthene	4,500	(b)	<0.1 to 0.18	N
Anthracene	24,000	(b)	<0.1 to 0.17	N
Benzo(a)anthracene	7.7 [1.7]	(a)	<0.1 to 0.33	N
Benzo(a)pyrene	2.3 [0.9]	(a)	<0.1 to 0.3	N
Benzo(b)fluoranthene	22 [1.2]	(a)	<0.1 to 0.3	N
Benzo(g,h,i)perylene	240 [0.02]	(a)	<0.05	N
Benzo(k)fluoranthene	23 [0.7]	(a)	<0.1 to 0.21	N
Chrysene	170 [0.4]	(a)	<0.05 to 0.36	N
Dibenzo(a,h)anthracene	2.1 [0.004]	(a)	<0.1	N
Fluoranthene	3,100 [19]	(a)	<0.1 to 0.87	N
Fluorene	3,100	(b)	<0.1 to 0.2	N
Indeno(1,2,3-cd)pyrene	21 [0.06]	(a)	<0.1	N
Naphthalene	1.6	-	<0.05 to 0.45	N
Pyrene	2,300 [2.2]	(a)	<0.1 to 0.69	N

Notes:

2. - = green; (a) = amber i.e. GAC set to model output, [SSL provided in square brackets] ; (b) = red i.e. SSL exceeded & considered to affect interpretation. GAC calculated in accordance with the CLEA Software Handbook ; (c) = based on direct contact; (d) GAC limited to SSL.

The contaminant concentrations in the natural soils were below the acceptable limit for all contaminants tested. Although the testing indicated that concentrations of total chromium recorded in the London Clay were above the assessment criteria (which is based chromium VI), further testing of these samples indicates that the concentrations of total chromium were both due to chromium III, with the recorded concentrations of the more toxic chromium VI being below the laboratory limit of detection and assessment criterion. Therefore the concentrations of chromium recorded are not considered to present an unacceptable risk to human health.

The statistical assessment has indicated that the representative concentration (US_{95}) for lead and a number of PAHs exceed the applicable human health assessment criteria. Further details of the locations where the concentrations of these contaminants were above the assessment criteria are presented in Table 10. In addition, an asbestos screen was undertaken on 14 samples of Made Ground. Loose fibres of chrysotile asbestos were detected in two samples (BH6 at 0.3mbgl and BH10 at 0.5mbgl), which are also included in Table 10.

Table 10. Summary of contaminant exceedances (Made Ground)

Borehole	**Depth (mbgl)**	**Contaminants which exceed acceptable limit**	**Contaminant concentration (mg/kg)**	**Acceptable limit for the *Residential (without plant uptake)* land use (mg/kg)**
BH2	0.2	Lead	570	310
BH6	0.3	Lead	340	310
		Benzo(a)anthracene	78	7.7
		Benzo(b)fluoranthene	73	22.0
		Benzo(a)pyrene	64	2.3
		Dibenzo(a,h)anthracene	5.5	2.1
		Asbestos (chrysotile fibres)	Present	No fibres detected
WS5	0.2	Lead	1,100.0	310
		Benzo(a)pyrene	5.8	2.3
WS6	0.7	Benzo(a)pyrene	3.7	2.3
WS9	0.3	Benzo(a)anthracene	29	7.7
		Benzo(b)fluoranthene	28	22.0
		Benzo(a)pyrene	26	2.3
		Dibenzo(a,h)anthracene	3.4	2.1
BH10	0.5	Asbestos (chrysotile fibres)	Present	No fibres detected

5.2 Risks to plant growth

As indicated in Section 5.1, concentrations of phytotoxic chemicals are below the human health assessment criteria prescribed by the Sludge Regulations. The risks to plant growth are therefore considered to be low.

5.3 Ground gas assessment

Five rounds of ground gas monitoring have been completed to date on 5th and 19th November 2014, 1st and 18th December 2014 and 8th and 13th January 2015, during atmospheric pressures in the range of 999mb to 1019mb. The local pressure system was noted to be rising during all visits, aside from the fifth and sixth, which were noted to be falling and steady, respectively. The monitoring records are presented in Appendix C and are summarised below:

- Maximum carbon dioxide concentration: 4.7 % v/v;
- Maximum methane concentration: <0.1 % v/v;
- Maximum flow rate: 1.3 l/hr;
- Minimum oxygen concentration: 7.7 % v/v.

Based on these findings, and with reference to CIRIA guidance[14], a gas screening value (GSV) of 0.0611l/hr has been calculated for the site, corresponding to a Characteristic Situation 1 (NHBC 'Green') site.

Higher values of carbon dioxide (5.3% and 5.4%) and flow rate (2.2l/hr) were encountered in boreholes WS6 and BH3, respectively. These values were not sustained and are considered to be anomalous. Further, NHBC guidance recommends that steady state conditions are used when assessing carbon dioxide. Given that these values were not sustained it is considered appropriate to use the more representative conditions presented within the bullets above within the ground gas assessment. Additional monitoring visits are to be undertaken and the results will be used to confirm the gas regime at the site and reported within a revised version of this report.

[14] CIRIA (2007) *Assessing the risks posed by hazardous ground gases to buildings*

6. REFINED RISK ASSESSMENT

6.1 Introduction

In accordance with Contaminated Land Report (CLR) 11[15], the conceptual site model has been updated based on the information gathered during the intrusive investigation and the potential pollutant linkages have been evaluated through a semi-quantitative risk assessment. The risks ratings identified have been assigned in accordance with the DEFRA and Contaminated Land Report (CLR) 6[16], site prioritisation and categorisation rating system which is summarised in Table 11.

Table 11. Risk Rating Terminology

Risk Rating	Description
High Risk	Contaminants very likely to represent an unacceptable risk to identified targets Site probably not suitable for proposed use Enforcement action possible, Urgent action required
Medium Risk	Contaminants likely to represent an unacceptable risk to identified targets Site probably not suitable for proposed use Action required in the medium term
Low Risk	Contaminants may be present but unlikely to create unacceptable risk to identified targets Site probably suitable for proposed use Action unlikely to be needed whilst site remains in current use
Negligible Risk	If contamination sources are present they are considered to be minor in nature and extent Site suitable for proposed use No further action required

Based on the terminology within this table, a refined assessment of the risks posed by the potential pollutant linkages at the site is outlined in Table 12. A diagrammatic representation of the conceptual site model is provided in Figure 5.

[15] The Environment Agency. (2004). *Model Procedures for the Management of Land* Contamination. CLR 11.
[16] M.J. Carter Associates. (1995*). Prioritisation and Categorisation Procedure for Sites which may be Contaminated*. Department of the Environment. CLR 6

Table 12. Semi-quantitative risk assessment

Source/Medium	Receptor	Potential Exposure Route	Risk Rating
Organic/inorganic contaminants within Made Ground	Construction workers	Direct ingestion of soil & dust, inhalation of particulates & vapours and dermal contact	Medium *(due to concentrations of lead and benzo(a)pyrene recorded in Made Ground)*
	Future site occupiers	Direct ingestion of soil & dust, inhalation of particulates & vapours, indirect ingestion by means of vegetable uptake and dermal contact	Medium *(where soil is exposed due to concentrations of lead and benzo(a) pyrene recorded in Made Ground)*
	Vegetation and plants	Root uptake	Low
	Buildings & structures	Direct contact and migration & accumulation within building spaces. Damage to water supply pipes.	Low *(assumes appropriate concrete design and agreement of water pipe materials)*
	Groundwater or surface water	Leaching and vertical migration of contaminants	Low
Explosive / asphyxiating gases from Made Ground on site, if present.	Internal building spaces & future occupiers	Migration of gases through the surface and via permeable soils	Negligible *(based on the results of the three rounds of monitoring)*
Asbestos in existing building fabric.	Construction workers	Direct ingestion of dust and inhalation of particulates	Medium

6.1.1 Risks to human health

The risk to future site occupiers is considered to be medium, given the elevated contaminant concentrations encountered in the Made Ground on site and the limited areas of communal landscaping proposed in the development. No private gardens are proposed.

The risk to construction workers from the Made Ground and possible asbestos containing material within the fabric of the existing buildings is considered to be medium. It is considered that the potential risks can be controlled through site working practices, including PPE.

6.1.2 Risks to controlled waters

The site is not situated above an aquifer and therefore the risk to groundwater is considered to be negligible. The nearest surface water receptor (*Regent's Canal*) is some 3m south of the site and consists of a clay-lined man-made canal. Given the generally low concentrations of contaminants and cohesive nature of the underlying London Clay Formation, the risk to controlled waters is considered to be low.

6.1.3 Risks to buildings and structures

Due to the generally limited nature of the Made Ground and low concentrations of contaminants recorded, the risk to buildings and structures is considered to be low. The design of buried concrete should take into consideration the pyritic nature of the London Clay Formation and the resultant risk of sulfate attack on the concrete.

6.1.4 Risks to vegetation and plants

No exceedances of phytotoxic chemicals were noted at the site and only limited soft landscaping is proposed. Therefore, the risk to vegetation and plants is considered to be low.

7. GEOTECHNICAL RECOMMENDATIONS

7.1 General

The following sections provide recommendations for the proposed development with regard to geotechnical aspects, based on the information obtained during the intrusive investigation and the laboratory results.

7.2 Geotechnical design parameters

Geotechnical design parameters are recommended based on the available information from the intrusive investigation and published information. These are summarised in Table 13. The values are unfactored (Serviceability Limit State) parameters and are considered to be characteristic values for the local soils.

Table 13. Geotechnical parameters

Stratum	γ (kN/m^3)	ϕ' (°)	Cu (kPa) [c']	Eu (MPa) [E']
Made Ground	18	30[a]	30 [0]	18[b] [13.5[c]]
London Clay Formation	20	24[d]	50+6z[e] [5]	30+3.6z [22.5+2.7z]

a. Burland et. al (Eds) (2001) Building response to tunnelling, CIRIA Special Publication 200, CIRIA
b. Based on 600c_u
c. Based on 0.75Eu
d. BS 8002:1994 Code of practice for Earth retaining structures, British Standards institution.
e. z = depth below surface of London Clay

7.3 Foundations

It is understood that a piled foundation solution is the preferred option for the proposed development of the site.

Where basements are proposed at the site, the piles will be driven from basement level. Where no basements are proposed, the piles will be installed from ground level.

Indicative pile working loads (kN) are shown below for Buildings C, D, X and W, based on pile diameters of 0.45m to 1.5m and pile lengths of 10m to 25m. An overall design factor of safety of 2.6 and adhesion factor of 0.5 have been assumed. These factors may be modified based on the design approach adopted, the piling methodology, the further ground investigation and on the results of pre-construction pile testing.

These calculations are based on the geotechnical design parameters presented in Table 13.

7.3.1 Building C

The proposed development at Building C includes a basement to some 15mbgl and piles will therefore be installed from basement formation level (11.7mOD). Indicative working loads (kN) for this Block are shown in Table 14 and are presented graphically in Figure 6.

Table 14. Indicative pile working loads (kN) – piled from basement level at Building C (11.7mOD)

Pile Length (m)	Pile diameter (m)					
	0.45	0.6	0.75	0.9	1.2	1.5
10	510	730	970	1,230	1,820	2,510
15	800	1,100	1,480	1,860	2,690	3,640
20	1,150	1,590	2,070	2,570	3,680	4,910
25	1,530	2,110	2,720	3,370	4,780	6,320

7.3.2 Blocks A and D

The proposed development at Blocks A and D include a basement to some 5mbgl and piles will therefore be installed from basement formation level (21.7mOD). Indicative working loads (kN) for this Block are shown in Table 15 and are presented graphically in Figure 7.

Table 15. Indicative pile working loads (kN) – piled from basement level at Blocks A and D (21.7mOD)

Pile Length (m)	Pile diameter (m)					
	0.45	0.6	0.75	0.9	1.2	1.5
10	530	750	990	1,250	1,850	2,530
15	800	1,110	1,450	1,820	2,620	3,522
20	1,100	1,520	1,970	2,440	3,470	4,610
25	1,430	1,960	2,530	3,130	4,410	5,810

7.3.3 Buildings X and W

No basements are proposed for Buildings X and W and piles will therefore be installed from ground level, taken as 26.7mOD. Indicative working loads (kN) for this Block are shown in Table 16 and are presented graphically in Figure 8.

Table 16. Indicative pile working loads (kN) – piled from ground level at Buildings X and W (26.7mOD)

Pile Length (m)	Pile diameter (m)					
	0.45	0.6	0.75	0.9	1.2	1.5
10	240	350	460	600	900	1,250
15	420	590	780	990	1,450	1,980
20	640	900	1,170	1,470	2,130	2,860
25	910	1,260	1,640	2,040	2,910	3,880

7.4 Excavations and retaining structures

7.4.1 Building C

A 15m deep basement is proposed at Building C and it is proposed to adopt contiguous piled walls as the support system. In order to control ground movements, a 'top-down' construction sequence is recommended. Preliminary retaining wall analysis has been undertaken by CGL and is presented in a separate report[17].

Additionally, a Basement Impact Assessment (BIA) will be undertaken by CGL in accordance with Camden Council's guidance for basement construction to assess the impact of the basement on adjacent roads, buildings and infrastructure.

7.4.2 Blocks A and D

Blocks A and D are to include single storey basements to a maximum depth of 5mbgl. A 'bottom-up' construction methodology is recommended, utilising temporary berms and/or propping during installation of the contiguous piled wall.

A BIA is to be undertaken by CGL for these blocks to assess the impact on adjacent roads, buildings, the canal and infrastructure.

[17] CGL (2014) *Camden Lock – Preliminary Piled Wall Analysis*. Ref: CG/18067A. December 2014

7.4.3 Buildings X and W

No basements are proposed for Buildings X and W and the piled foundations are to be installed from surface.

It is anticipated that shallow excavations within the Made Ground and London Clay Formation will remain stable over the short term if dry. Where water is encountered in excavations, such as perched water within Made Ground or surface run-off, temporary sidewall support and dewatering (sump pumping) may be required to maintain excavation stability.

No operatives should enter unshored or otherwise protected excavations identified as unstable by a competent person, however shallow they are, in accordance with the guidelines presented in CIRIA Report 97[18].

7.5 Floor slabs and pavement design

The underlying London Clay Formation has been found to have a high volume change potential. Floor and basement slabs should therefore be designed as suspended in order to prevent damage due to heave movements.

Recommendations for the design of the basement slabs in relation to the design groundwater level and calculation of the potential heave movements will be included within the Basement Impact Assessments for Blocks A, C and D. These assessments will also include recommendations for heave protection for the basement slabs.

Based on the geotechnical testing undertaken at the site, a design CBR of 2.5% is recommended for pavement design.

7.6 Drainage

Soakaway drainage is not considered suitable for the site, given the cohesive nature of the underlying ground.

[18] CIRIA (1992). *Trenching Practice (Second Edition).* Construction Industry Research and Information Association Report 97.

7.7 Buried concrete

The availability of total potential sulfate (TPS) in pyritic soils is dependent on the extent to which the soils are disturbed, and the level to which the soils may oxidise, resulting in sulfate ions that may reach the concrete. In this regard, BRE SD1 guidance states that *"Concrete in pyritic ground which is initially low in soluble sulfate does not have to be designed to withstand a high potential sulfate class unless it is exposed to ground which has been disturbed to the extent that contained pyrite might oxidise and the resultant sulfate ions reach the concrete. This may prompt redesign of the structure or change to the construction process to avoid ground disturbance; for example, by using precast or cast-in-situ piles instead of constructing a spread footing within an excavation"*.

On this basis, the appropriate DS and ACEC class for the pyritic soils, i.e. based on water soluble sulfate (WSS) or total potential sulfate (TPS), should be adopted dependant on the extent to which the soils will be disturbed during construction.

Where open excavations will be required into the London Clay (i.e. during basement excavations), the soils may be disturbed to the extent that contained pyrite might oxidise and allow the resultant sulfate ions to reach the concrete, and as such the TPS DS and ACEC classes should be adopted. However, where cast-in-situ piles are adopted, as Blocks A, C and D of this site, the WSS DS and ACEC classes may be adopted.

The results of pH and sulfate testing undertaken at this site indicate that buried concrete within the London Clay Formation should be designed to Design Class DS-4 and ACEC Class AC-3s if disturbed (based on TPS) and Design Class DS-3 and ACEC Class 2s if undisturbed (based on WSS).

It is anticipated that the basement slabs will not be able to oxidise as they will not be in direct contact with the underlying ground due to the layer of heave protection which is to be installed.

The Made Ground at the site is not pyritic and buried concrete in this stratum should be designed to Design Class DS-1 and ACEC Class AC-1.

8. GEOENVIRONMENTAL RECOMMENDATIONS

8.1 Contamination and remediation

Due to the contaminant exceedances noted in the Made Ground across the site, it is recommended that a capping layer is installed to prevent the migration of contaminants. For communal landscaped areas, the capping layer may comprise hardstanding or a minimum of 150mm topsoil over 300mm subsoil and a geotextile membrane. Alternatively, the Made Ground across the site may be removed and disposed of off-site at an appropriate facility.

Based on the results of the six ground gas monitoring visits undertaken to date, the site conforms to Characteristic Situation 1 and no ground gas protection measures are therefore required in the development.

8.2 Material management

A preliminary assessment of the results of analysis of Made Ground for waste classification purposes indicates that the majority of this material may be classified as 'not hazardous' with respect to waste disposal.

However, samples at 0.7mbgl from WS6 and 0.3mbgl from BH6 were found to be 'hazardous' with respect to waste disposal due to elevated pH and PAHs. In addition, the sample from 0.3mbgl at BH6 was found to contain loose fibres of chrysotile asbestos, which will require further consideration with respect to waste classification, as described below.

Waste acceptance criteria (WAC) testing demonstrates that the 'not hazardous' samples may be disposed of in an inert landfill and that the 'hazardous' samples may be disposed of as 'stable non-reactive waste in non-hazardous landfill'.

If asbestos-containing material, such as cement-bound asbestos, is visibly noted within the soil matrix, the material will be classified as *hazardous.* Hand picking of the asbestos containing material should be undertaken to reduce the volume of hazardous waste and potentially allow the residual soils to be disposed of to a non-hazardous facility, subject to the volume of fibres (categorised as *not hazardous* only if asbestos fugitive fibres comprise less than 0.1% of soil by weight and therefore asbestos quantification analysis would be required to confirm the appropriate disposal route). If asbestos-containing material is noted, the Environment Agency should be notified. Removal of impacted material should

only be undertaken by trained operatives with appropriate PPE, including respirators and dust suppression and the material removed from site should be double bagged.

Uncontaminated natural soils, as encountered at the site, can be disposed of at an inert landfill as listed inert waste.

It should be noted that in May/June 2012 HMR&C issued Briefs 15/12 and 18/12 clarifying how construction spoil and excess soils will be assessed for landfill tax purposes. Detailed accurate descriptions of waste are required for all wastes to support the landfill tax assessment. Uncontaminated naturally occurring soils will remain inert by default and eligible for the lower rate of landfill tax. Similarly 'reworked soils' and demolition 'stone' comprising ONLY materials listed in the Schedule of the Landfill Tax (Qualifying Material) Order 2011 (SI 2011/1017) will also be eligible for the lower rate of landfill tax. However, Made Ground containing soil and foreign objects such as timber, plastic, rubber, metal, paper, plasterboard, asbestos, etc., regardless of the results of chemical analysis for waste classification purposes, will be eligible for the standard (higher) rate of landfill tax. Therefore, to maximise eligibility for lower rate landfill tax on waste construction spoil/ reworked ground, careful waste segregation and controls are necessary.

All material intended for offsite disposal should be transported and disposed in accordance with the Environmental Protection (Duty of Care) Regulations, 1991 and the Landfill (England and Wales) Regulations, 2002 (as amended). Waste legislation stipulates that hazardous and not hazardous waste should be pre-treated prior to disposal. Pre-treatment can be undertaken either at the site of origin or may be carried out at a licensed off-site facility and can include selective segregation of soils conducted on site.

8.3 Buried services

Based on the measured concentrations of contaminants within the Made Ground, it is anticipated that PE or PVC pipes will be suitable for use at the site. However, it is recommended that the water supply company is contacted to confirm this recommendation is acceptable to them.

8.4 Discovery Strategy

The investigation was limited by the presence of buildings across the majority of the site. A watching brief should therefore be undertaken by the Contractor during earthworks and construction works. Should areas of unexpected contamination be encountered or suspected, a qualified geoenvironmental engineer should be informed and the risk associated with the contamination assessed. Where necessary, an appropriate remediation strategy will be devised and implemented. The regulators will be informed of any additional areas of contamination so identified and will be provided with the risk assessment and proposed remediation methodology for agreement before undertaking such works. Appropriate verification works to be completed if remedial measures are required will also be identified and agreed.

The following nominal discovery strategy is recommended:

1. Work to cease in that area.

2. Notify geoenvironmental engineer, to attend site and sample material. Notify Environmental Health Officer at Camden Council.

3. Geoenvironmental engineer to supervise the excavation of contaminated material, which should be placed in a bunded area and covered to prevent rainwater infiltration.

4. Soil samples should be obtained by the geoenvironmental engineer from both the excavated material and the soils in the sides and base of the excavation to demonstrate that the full area of contamination has been excavated. If appropriate, in-situ testing should be undertaken on the sides and base of the excavation to assess the presence of residual contamination in the soils.

5. On receipt of chemical test results, the soils may be appropriately classified for treatment or disposal, and dealt with accordingly.

6. Detailed records, including photographs and duty of care records, of the excavations, stockpile sizes, source and location should be kept and regularly updated to allow materials to be easily tracked from excavation until disposal off site.

7. Backfilling to be undertaken with material certificated as suitable for the proposed end land use.

8.5 Health and safety

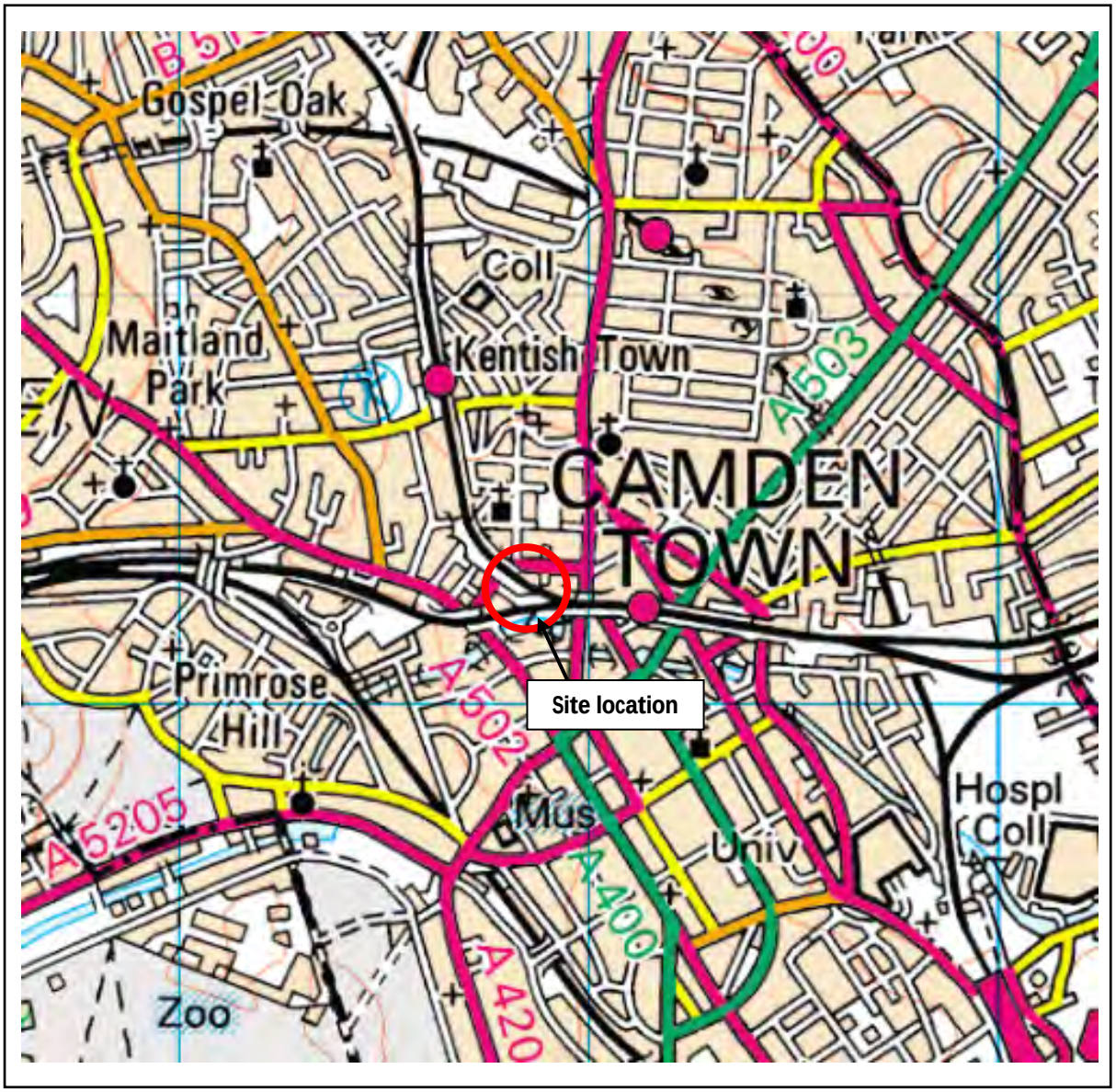
Precautions should be taken to minimise exposure of workers and the general public to any potentially harmful substances during earthworks.

The risks to construction workers can be controlled through the implementation of site safety procedures and the use of suitable personal protective equipment (PPE). Attention should also be paid to restricting possible off-site nuisance such as dust and odour emissions. All work should be carried out in accordance with the Contractor's Construction Health and Safety Plan.

Precautions will include but not be limited to:

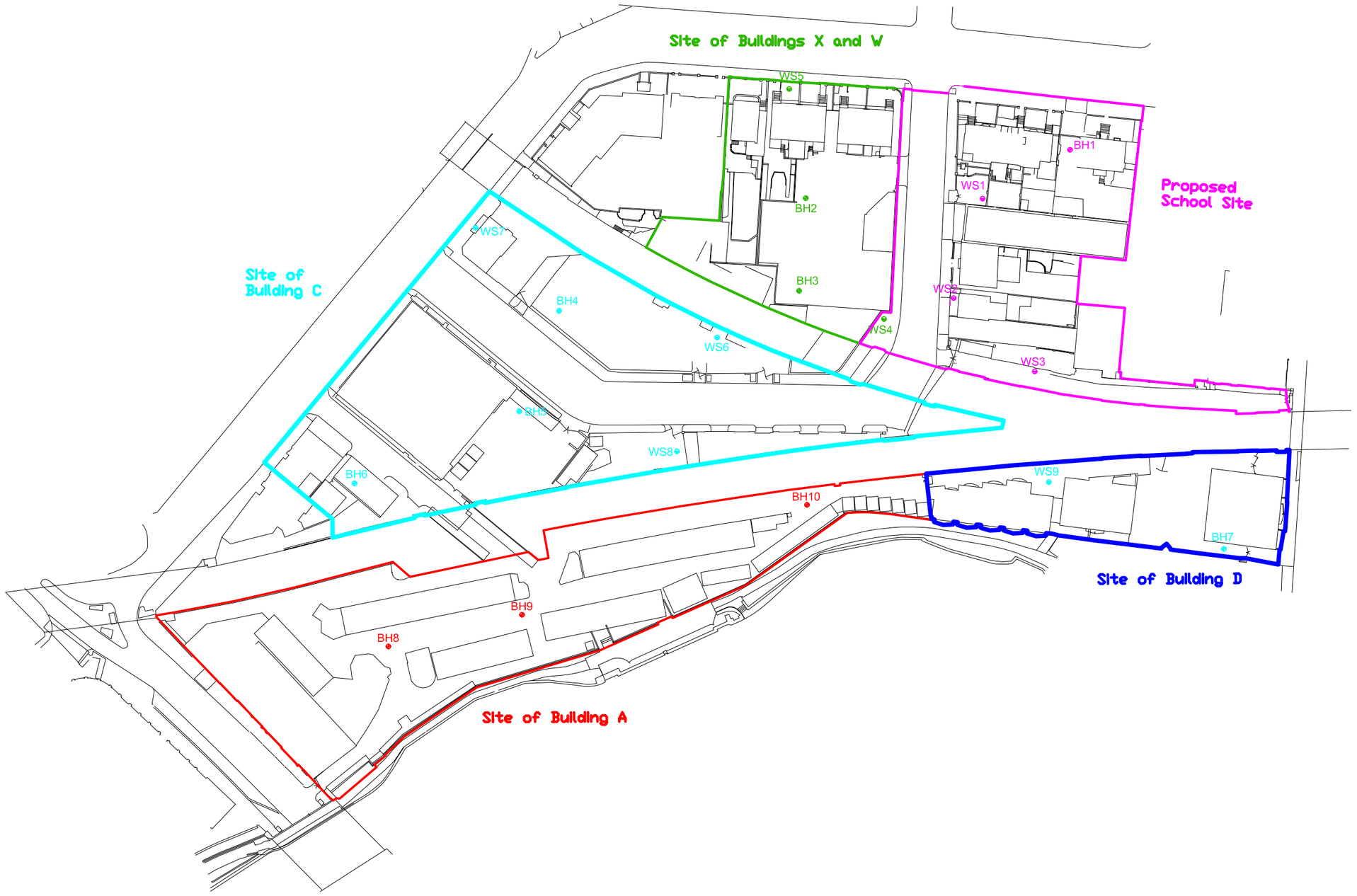
- Personal hygiene, washing and changing procedures.
- Adequate personal protective equipment.
- Dust and vapour suppression methods, including damping down, minimising the working face exposed and covering stockpiles, where required.
- Regular cleaning of all site roads, access roads and the public highway.
- Safe storage of fuel and other potentially polluting liquids and the provision of spill control and clean up facilities.
- Positive collection and disposal of on-site run-off.

FIGURES



N

Client	Project	Job No
Walsh Associates	**Camden Lock Village, London**	**CG/18067A**
CGL	Title **Site location plan**	**Figure 1**

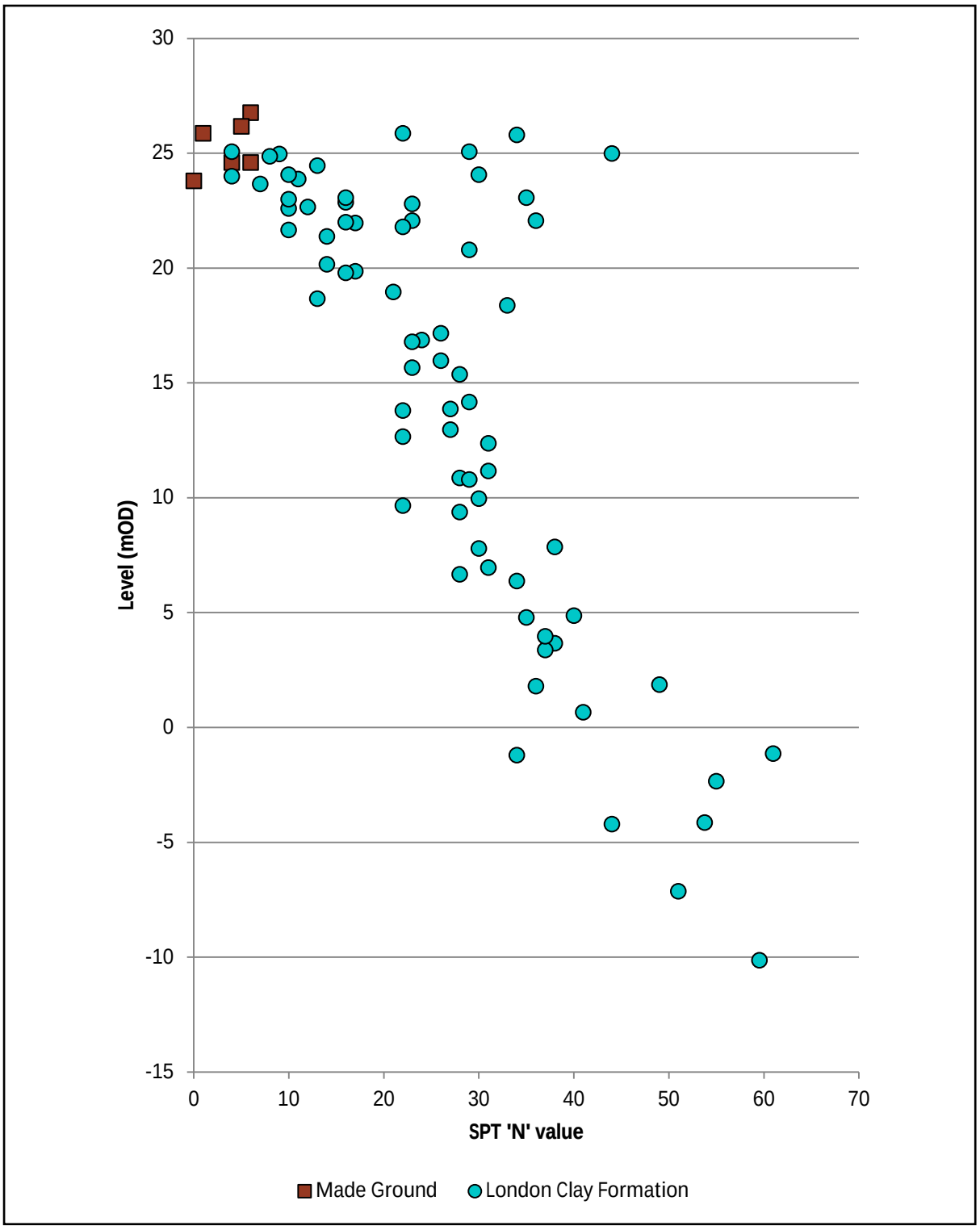


Borehole ID	SI Phase	Maximum depth (m)
BH1	1	15
WS1 - WS3	1	3.15
BH2	1	30
BH3	1	15
WS4 - WS5	1	5
BH4 & BH6	2	25
BH5	2	40
BH7	2	30
WS6 - WS9	2	5
BH8 & BH10	3	25
BH9	3	30

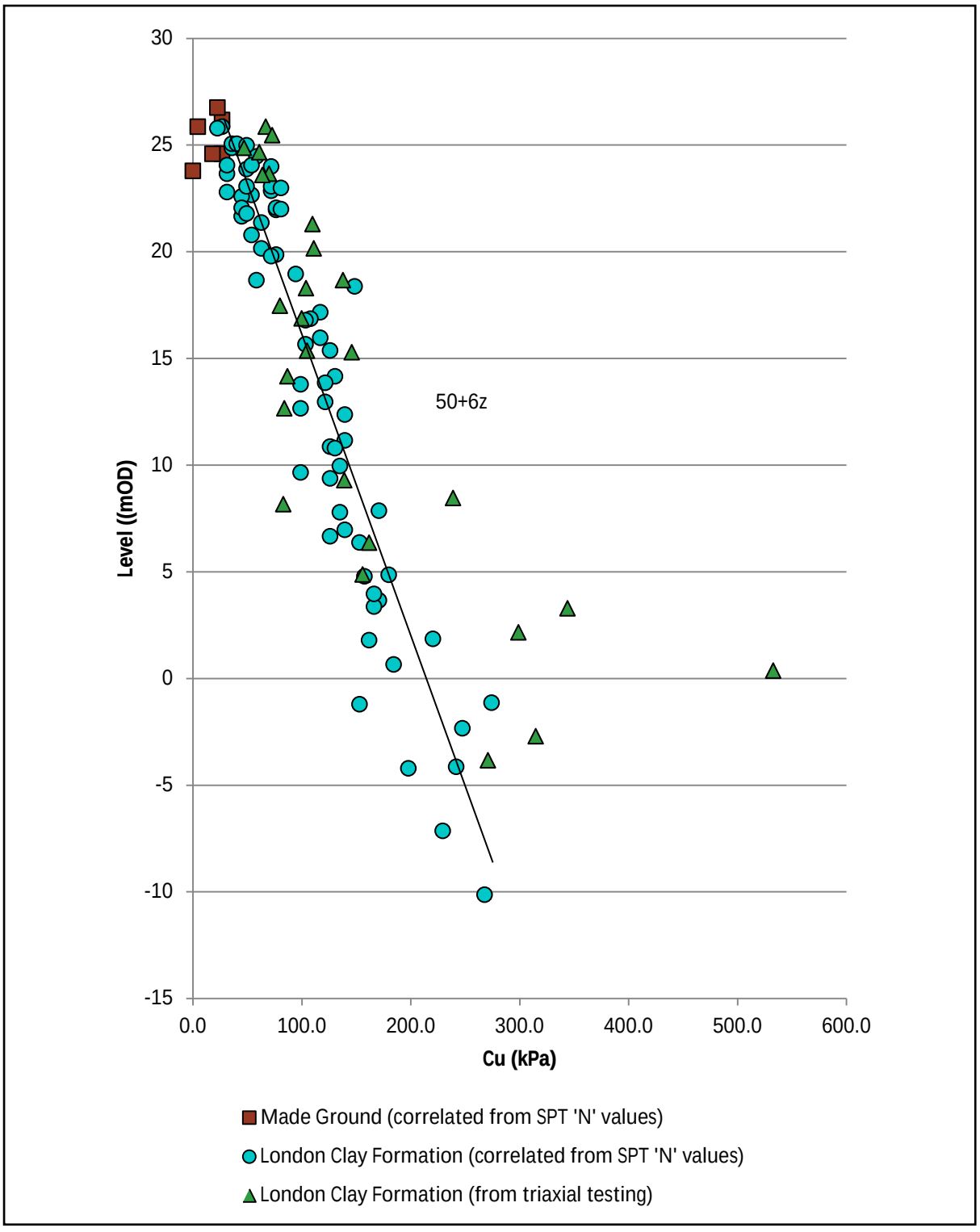
Proposed location of BH1 moved	15/10/14
	Date:

Card Geotechnics Ltd.
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW
T: 01483 310600

		Date:	Project: Camden Lock Village, London	Scale: NTS
Dwn.	JLA	7/10/14	Client: Walsh Associates	
Ckd.	DWM	9/01/15	Title: Figure 2: Site layout and exploratory hole location plan	
Appr.	NJL	12/1/15		
Job No.: CG/18067A			Drw.no.: CG/18067A-001	Rev.: C



Client	Project	Job No
Walsh Associates	**Camden Lock Village, London**	**CG/18067A**
CGL	Title **Plot of SPT 'N' values against level**	**Figure 3**



Client	Project	Job No
Walsh Associates	**Camden Lock Village, London**	**CG/18067A**
CGL	Title: **Plot of c_u against level**	**Figure 4**

Source

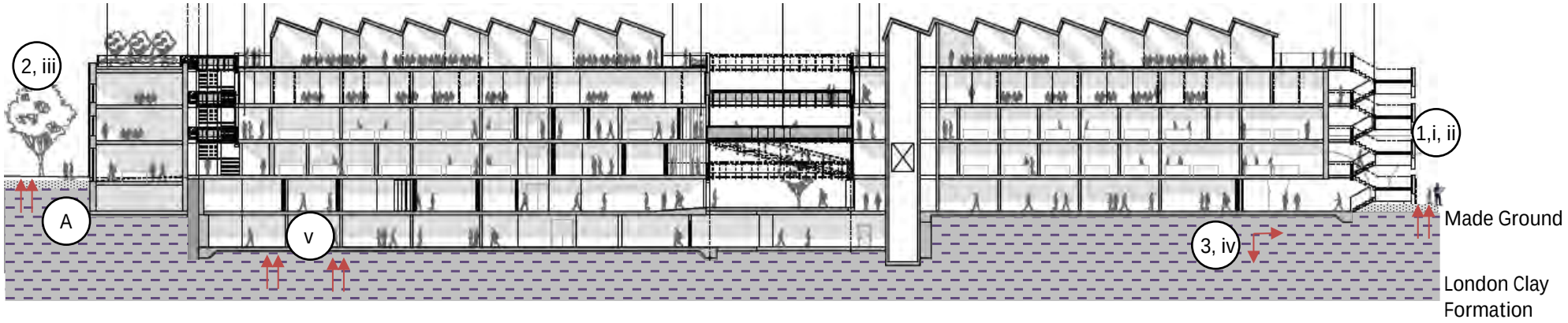
A. Contamination within Made Ground, including explosive gases or asbestos from building fabric.

Pathway

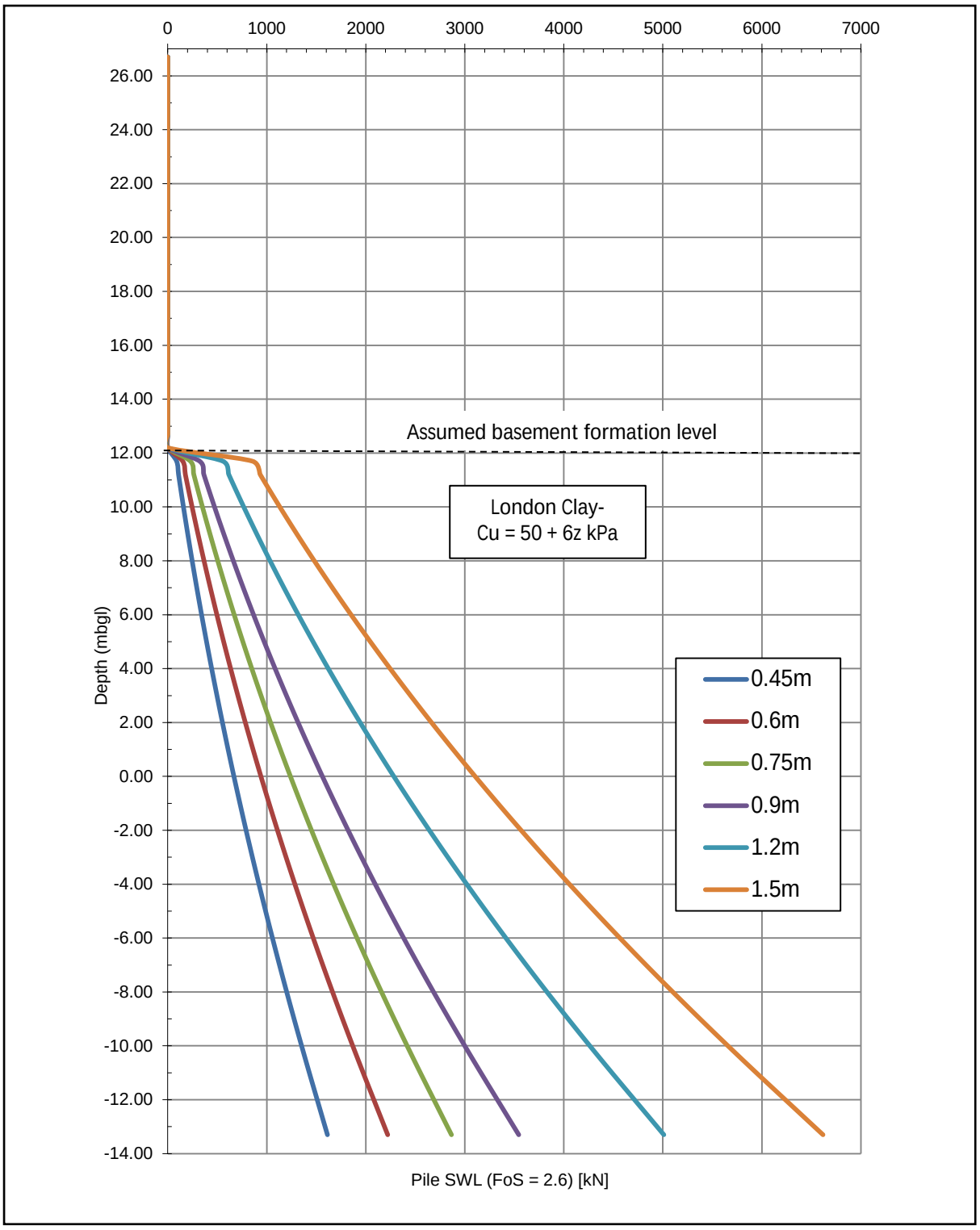
1. Ingestion, inhalation and direct contact
2. Root uptake
3. Vertical and lateral migration

Receptor

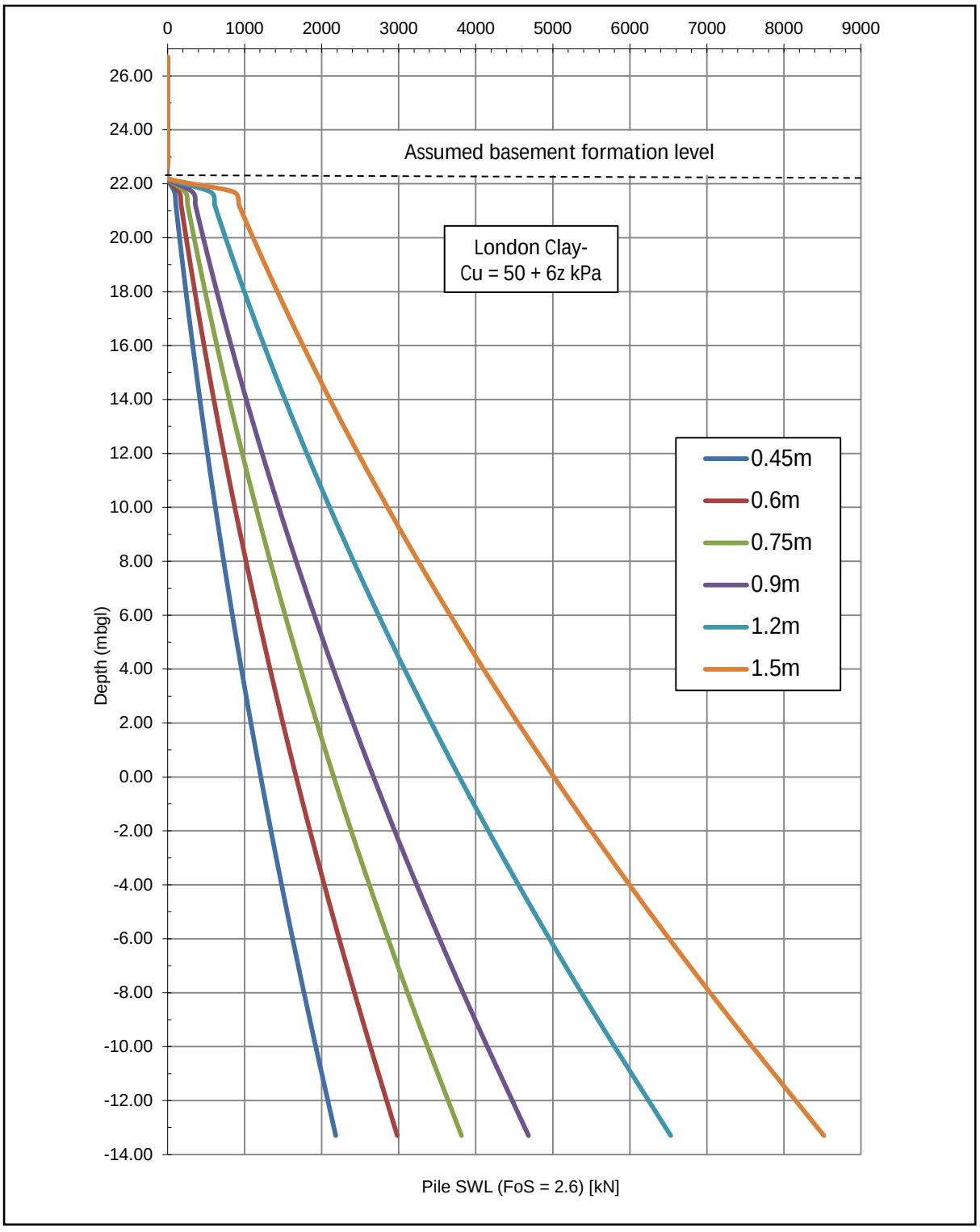
i. Current/future occupants
ii. Construction workers
iii. Vegetation and plants
iv. Groundwater or surface water
v. Buildings and structures



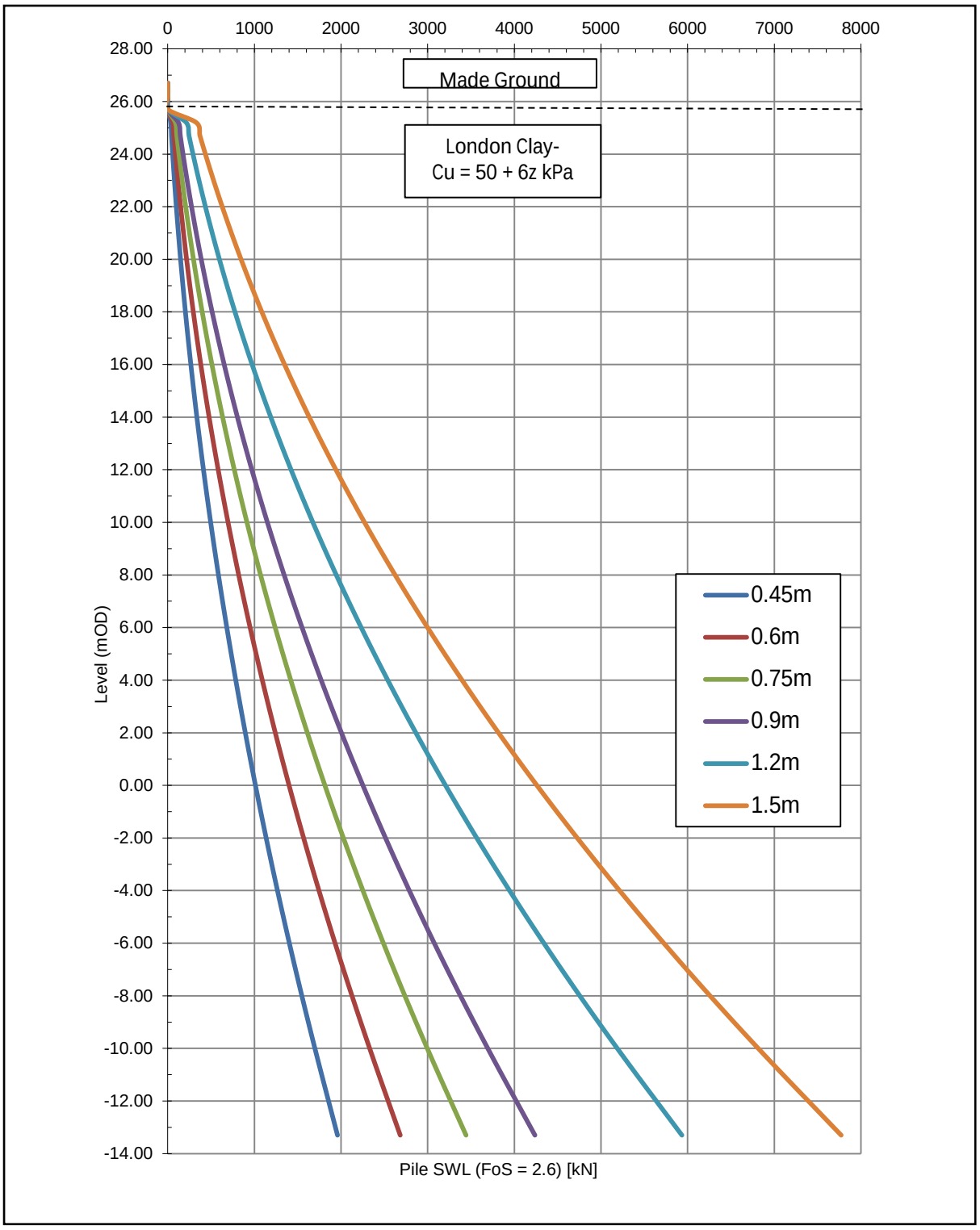
Client	Project	Job No
Walsh Associates	**Camden Lock Village, London**	**CG/18067A**
CGL	Title: **Conceptual site model**	**Figure 5**



Client	Project	Job No
Walsh Associates	**Camden Lock Village, London**	**CG/18067A**
CGL	Title **Plot of safe working load against level (15m deep basement)**	**Figure 6**



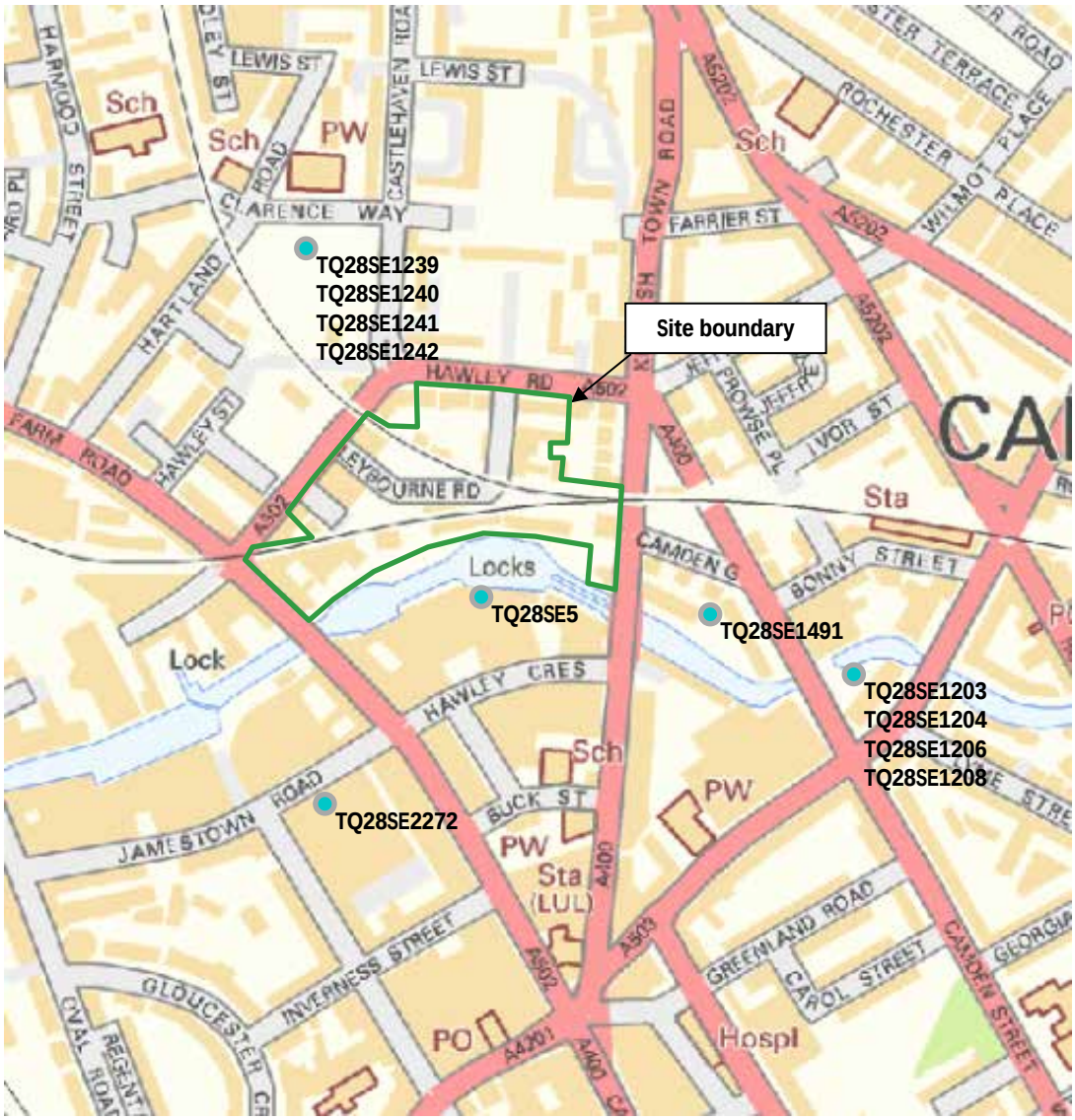
Client	Project	Job No
Walsh Associates	**Camden Lock Village, London**	**CG/18067A**
CGL	Title **Plot of safe working load against level (5m deep basement)**	**Figure 7**



Client	Project	Job No
Walsh Associates	**Camden Lock Village, London**	**CG/18067A**
CGL	Title **Plot of safe working load against level (no basement)**	**Figure 8**

APPENDIX A

Historical BGS boreholes logs



N

Base figure taken from BGS online
Not to scale

Client	Project	Job No
Walsh Group	**Camden Lock Village, London**	**CG/18067A**
CGL	Title **BGS borehole location plan**	**Appendix A**

Project: ARLINGTON HOUSE, 220 ARLINGTON ROAD, CAMDEN, LONDON	Client: [redacted]	Trial Pit Excavation Methods: BRADFORD WATTS HAND PIT	Hole No. **TH8A**
	Engineer: [redacted]	Pit Dimensions: Length - 1.80 m Width - 1.40 m	Sheet 1 of 1
Ground Level: 25.33 m.A.O.D.	Coordinates: m.E. m.N.	Orientation: Length -	Job No **10482**

WATER		STRATA				SAMPLING/IN SITU TEST			LAB TESTING				
Date/Time at Depth	Depth to Water m	Description	Legend	Level m.A.O.D.	Depth m	Depth m	Type & No.	Test Result	% <425	W %	W_P %	W_L %	OTHER TESTS AND NOTES
		Made Ground (Brickwork wall)				0.20	D1						TH8A logged from north west face of Trial hole CLEA screen with speciated polyaromatic hydrocarbons (D1)
						0.50	D2		100	34	27	75	No groundwater recorded during fieldwork
				24.60	0.73								
30/10/06	DRY C	Made Ground (Concrete)											Water in hole from Diamond Drilling corehole in wall above pit
				24.25	1.08								
													Trial pit complete at 1.09m

Pit Stability, Shoring, etc.

No collapse of sides of trial pit

Water Level observations during digging, depths below GL.					
Strike	Depth Obs.	Depth after 5min	10 min	15 min	20 min

WATER

- ▼ 1 First Strike
- ▽ 2 Subsequent Strike
- N - Overnight Depth
- C- Completion Depth
- S Seepage not rising

SAMPLE AND TEST KEY

- D Small disturbed sample
- B Bulk disturbed sample
- W Water sample
- U Undisturbed sample
- K Percolation Test
- PP Perth Penetrometer Test
- HV Hand shear vane test
- SRD Sand replacement density test
- CBR In situ CBR test
- PB Plate Bearing Test

TEST RESULT

- Np = Np Value
- V = Average Hand Shear Vane Strength - kN/m^2
- BD = In-Situ Bulk Density - Mg/m^3
- CBR = California Bearing Ratio - %

Fieldwork By	GJB	Sheet 1 of 1
Dates	30/10/03	TH8A
Log	GJB	

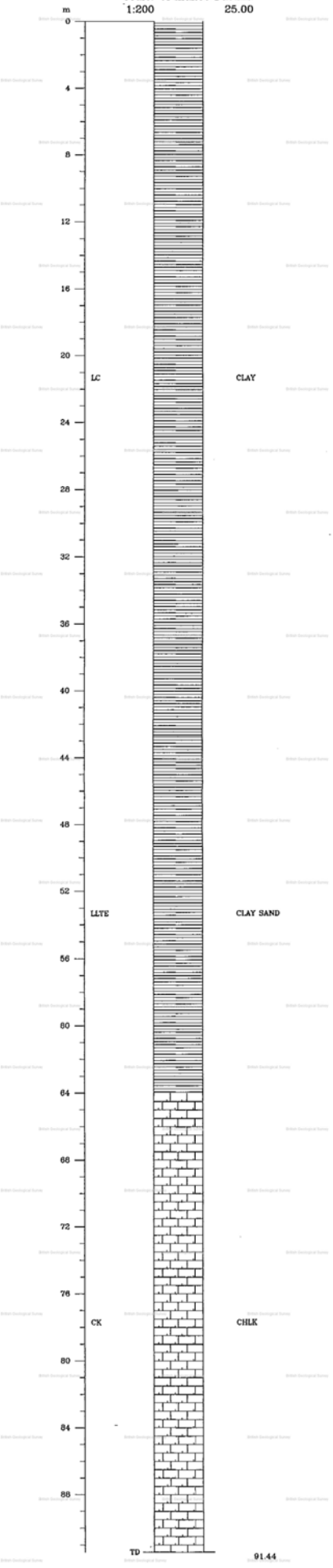
RSA GEOTECHNICS LTD (01449) 723723

5 TQ28SE 5

N-WHITAKERS BREWERY HAMPSTEAD

Grid Reference: 28850 84138

Scale: 1:200 Ordnance Datum: 25.00



TERRESEARCH LIMITED

BOREHOLE NO. 1 TQ28SE 1203

Contract Name Camden Town
Report No. S. 808/15
Client S. Bottis Ltd.
Site Address Corner of Camden Street and Camden Road
Engineers: Leonard & Partners, 344 - 360 South Lambeth Rd, London S.W.8.
2708 8'40

Standing Water Level 55'0" 17.6.65. 30'0" 21.6.65.
Diameter 8"
Water Struck 3'6"
Method of Boring Shell/Auger
Ground Level 78.49
Start 14.6.65. Finish 16.6.65.
Remarks:

Description of Strata	Thickness	Depth	Disturbed Samples	'U' Cores and 'N' P. Test
Made ground (sand, bricks stones etc.)	1'0"	1'0"	J2101 0'6"	
Soft brown mottled clay	2'6"	3'6"	J2102 2'6"	
Brown sandy clay with gravel	5'0"	8'6"	B2103 5'0" J2104 7'6"	5'0" N=14
Stiff brown mottled clay with layers of silt and sulphate crystals	8'0"	16'6"	J2106 12'6"	U2105 10'0" U2107 14'0"
Stiff fissured brown clay with sulphate crystals	5'6"	22'0"	J2108 17'6"	U2109 19'0"
Hard fissured grey silty clay with traces of organic material	6'0"	28'0"	J2110 22'6" J2112 27'6"	U2111 24'0"
Hard fissured silty grey clay	10'0"	38'0"	J2114 32'6" J2116 37'6"	U2113 29'0" U2115 34'0"
Hard fissured grey clay with layers of silt and occasional sulphate crystals	23'6"	61'6"	J2118 42'6" J2120 47'6" J2122 52'6" J2124 57'6"	U2117 39'0" J2119 45'0" U2121 49'0" U2123 54'0" U2125 60'0"
			W2126	
TOTALS	61'6"	61'6"		

NOTES: 1. Descriptions are given in accordance with the B.S. Civil Engineering Code of Practice C.P.2001 "Site Investigations"
2. J indicates Jar Samples.
B " Bulk Samples.
W " Water Samples.
U " Undisturbed Core Samples. These are nominal 4 in. diam. and 18 in. long. Depths shown are top of sample.
N " Number of blows per ft. penetration with Standard Penetration Tests.

TERRESEARCH LIMITED

BOREHOLE NO. 2 TQ28SE

Contract Name Camden Town — Report No. S. 808/15 1204

Client H. Britin Ltd. — Site Address Corner of Camden Street.

Engineers: Leonard & Partners, — and Camden Road.

344 - 360 South Lambeth Rd., — London N.W.1.

London S.W.8. — 270, 3406

Standing Water Level None — Diameter 8"

Water Struck None — Method of Boring Shell/Auger

Ground Level 78.23 — Start 19.6.65. Finish 21.6.65.

Remarks:

Description of Strata	Thickness	Depth	Disturbed Samples	'U' Cores and 'N' P. Test
Made ground (concrete, grey silty clay with bricks)	3'0"	3'0"	J3724 2'6"	
Brown sandy clay with gravel	2'6"	5'6"	B3725 5'0"	
Stiff fissured mottled brown clay with occasional sulphate crystals and layers of silt	17'6"	23'0"	J3727 8'6" J3729 12'6" J3731 17'6" J3733 22'6"	U3726 6'0" U3728 10'0" U3730 14'0" U2732 19'0"
Hard silty mottled grey clay with sulphate crystals	5'0"	28'0"	J3735 27'6"	U3734 24'0"
Stiff to hard fissured grey silty clay with layers of light grey silt. Small crystalline aggregates of pyrites towards the base	32'6"	60'6"	J3737 32'6" J3739 37'6" J3741 42'6" J3743 47'6" J3745 52'6" J3747 57'6"	U3736 29'0" U3738 34'0" U3740 39'0" U3742 44'0" U3744 49'0" U3746 54'0" U3748 59'0"
TOTALS	60'6"	60'6"		

Notes: 1. Descriptions are given in accordance with the B.S. Civil Engineering Code of Practice C.P.2001 "Site Investigations"

2. J indicates Jar Samples.
   B " Bulk Samples.
   W " Water Samples.
   U " Undisturbed Core Samples. These are nominal 4 in. diam. and 18 in. long. Depths shown are top of sample.
   N " Number of blows per ft. penetration with Standard Penetration Tests.

TERRESEARCH LIMITED

BOREHOLE NO. 4 TQ28SE

Contract Name Camden Town
Client: G. Baltin Ltd.,
Engineers: Leonard & Partners.
344-360 South Lambeth Rd.
London. S.W.8.

Report No. S. 808/15 1206
Site Address Corner of Camden Street, and Camden Road
2910, 8410

Standing Water Level 25'0" 17.6.65.
25'9" 21.6.65.
Water Struck 3'6"
Ground Level 79.60

Diameter 8"
Method of Boring Shell/Auger
Start 16.6.65 Finish 16.6.65

Remarks:

Description of Strata		Thickness	Depth	Disturbed Samples	'U' Cores and 'N' P. Test
MADE GROUND	Sand bricks and stones etc.	0'9"	0'9"		
	Brown sandy clay with bricks and stones	2'9"	3'6"	J2127 2'6"	
Grey silty clay		7'0"	10'6"	B2128 5'0" J2129 7'6"	U2130 9'0"
Brown mottled clay		12'6"	23'0"	J2131 12'6" J2133 17'6" J2135 22'6"	U2132 14'0" U2134 19'0"
Grey clay		8'6"	31'6"	J3127 27'6"	U2136 24'0" U2138 30'0"
				W2139	
TOTALS		31'6"	31'6"		

NOTES: 1. Descriptions are given in accordance with the B.S. Civil Engineering Code of Practice C.P.2001 "Site Investigations"
2. J indicates Jar Samples.
B " Bulk Samples.
W " Water Samples.
U " Undisturbed Core Samples. These are nominal 4 in. diam. and 18 in. long. Depths shown are top of sample.
N " Number of blows per ft. penetration with Standard Penetration Tests.

TERRESEARCH LIMITED

BOREHOLE NO. 6 TQ28 SE

Contract Name Camden Town Report No. S. 808/15 1208

Client LL Baltic Ltd. Site Address Corner of Camden Street,

Engineers Halliwell and Partners, and Camden Road

344-360 South Lambeth Rd.

London, S.W.8. 2913, 8411

Standing Water Level Diameter 8"

Water Struck None Method of Boring Shell/Auger

Ground Level 76.27 Start 17.6.65 Finish 17.6.65

Remarks: 2 men breaking out concrete from ground level to 6" and pitting to 1'6".

Description of Strata		Thickness	Depth	Disturbed Samples	'U' Cores and 'N' P. Test
MADE GROUND	Concrete	0'6"	0'6"		
	Cobble stones	1'0"	1'6"		
Brown mottled silty clay clay		4'6"	6'0"	J3712 2'6" J3713 5'0"	
Mottled brown clay clay		14'0"	20'0"	J3714 7'6" J3716 12'6" J3718 17'6"	U3715 9'0" U3717 15'0" U3719 19'6"
Grey clay clay		4'0"	24'0"	J2720 22'6"	
Grey clay with layers of silt		7'0"	31'0"	J3722 27'6"	U3721 25'0" U3723 29'6"
TOTALS		31'0"	31'0"		

NOTES: 1. Descriptions are given in accordance with the B.S. Civil Engineering Code of Practice C.P.2001 "Site Investigations"

2. J indicates Jar Samples.
B " Bulk Samples.
W " Water Samples.
U " Undisturbed Core Samples. These are nominal 4 in. diam. and 18 in. long. Depths shown are top of sample.
N " Number of blows per ft. penetration with Standard Penetration Tests.

Terresearch

Contract: Hawley Road, Camden

Client: Materials Science Consultants Ltd

Borehole No. 1

Sheet No. 1 Of 1.
Depth 0 to 5 metres.

Equipment and Methods
Hand Auger 100mm diameter

Orientation : Vertical

Ground Level : m.O.D.

Coordinates : 287, 843

Job Number : S91/191
Location : TP28SE 1239
Dates : 20/11/91

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
					0.00			
					0.05		MADE GROUND (tarmac)	
					0.15		MADE GROUND (concrete)	
				J 12	(0.48)		Firm greyish brown silty CLAY with scattered gravel traces	
				J 13	0.63		Firm to stiff brown slightly silty CLAY with occasional blue-grey reduction zones and traces of selenite crystals	
				U 14				
				J 15				
					(2.37)			
				U 16				
				J 17				
				J 18				
				U 19				
20/11					3.00		End of Borehole	

Operator
NF

General Remarks:

Appendix
1

Scale
5m/sheet

Sheet No.
1

Terresearch Limited, Taywood Road, Northolt, Middlesex UB5 6RL. Tel: 081 575 4901 Fax: 081 575 4462

Terresearch

Contract: Hawley Road, Camden

Client: Materials Science Consultants Ltd

Borehole No. 2

Sheet No. 1 Of 1.
Depth 0 to 5 metres.

Equipment and Methods
Hand Auger 100mm diameter

Orientation : Vertical

Ground Level : m.O.D.

Coordinates : 287,483

Job Number : S91/191

Location : TQ28SE 1240

Dates : 20/11/91

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
					0.00			
					0.05		MADE GROUND (tarmac)	
					0.15		MADE GROUND (concrete)	
					(0.35)		Firm greyish brown silty CLAY	
				J 20	0.50		Firm brown silty CLAY with frequent blue-grey reduction zones, occasional pockets of orange-brown sandy clay and traces of selenite crystals becoming more abundant with depth	
				J 21				
				U*				
				U 22				
				J 23				
					(2.50)			
				U 24				
				J 25				
				J 26				
				U 27				
20/11					3.00		End of Borehole	

Operator
NF

General Remarks:

Appendix
1

Scale
5m/sheet

Sheet No.
2

Terresearch Limited, Taywood Road, Northolt, Middlesex UB5 6RL. Tel: 081 575 4901 Fax: 081 575 4462

Terresearch

Contract: Hawley Road, Camden

Client: Materials Science Consultants Ltd

Borehole No. 3

Sheet No. 1 Of 1.
Depth 0 to 5 metres.

Equipment and Methods
Hand Auger 100mm diameter

Orientation : Vertical

Ground Level : m.O.D.

Coordinates : 287, 843

Job Number : S91/191
TQ 28 SE
Location : 1241
Dates : 19/11/91

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
					0.00			
				J 1	0.05		MADE GROUND (tarmac)	
					0.15		MADE GROUND (concrete)	
					(0.45)		MADE GROUND (dark grey clayey sand with bricks and stones)	
				J 2				
					0.60			
				J 3	(0.20)		MADE GROUND (ash with bricks and stones)	
	19/11			W 11	0.80			
				J 4			Firm brown silty CLAY with occasional blue-grey reduction zones	
				U 5				
				J 6				
					(2.20)			
				U 7				
				J 8				
				J 9				
				U 10				
19/11					3.00		End of Borehole	

Operator
NF

General Remarks:

Appendix
1

Scale
5m/sheet

Sheet No.
3

Terresearch Limited, Taywood Road, Northolt, Middlesex UB5 6RL. Tel: 081 575 4901 Fax: 081 575 4462

Terresearch

Contract: Hawley Road, Camden
Client: Materials Science Consultants Ltd

Borehole No. 4
Sheet No. 1 Of 1.
Depth 0 to 5 metres.

Equipment and Methods
Hand Auger 100mm diameter

Orientation : Vertical

Ground Level : m.O.D.

Coordinates : 287, 843

Job Number : S91/191
Location : TQ28SE 1242
Dates : 20/11/91

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
					0.00			
					0.05		MADE GROUND (tarmac)	
					0.15		MADE GROUND (concrete)	
					(0.45)		MADE GROUND (soft silty sandy brown clay with occasional gravel and brick traces)	
				J 28				
				J 29	0.60			
					(0.55)		Soft to firm dark brownish grey silty CLAY with organic traces	
				U 30				
				J 31	1.15			
				J 32			Firm to stiff brown silty CLAY with some blue-grey reduction zones and occasional organic traces	
				U 33				
				J 34	(1.85)			
				J 35				
				U 36				
20/11					3.00		End of Borehole	

Operator
NF

General Remarks:

Appendix
1

Scale
5m/sheet

Sheet No.
4

Terresearch Limited, Taywood Road, Northolt, Middlesex UB5 6RL. Tel: 081 575 4901 Fax: 081 575 4462

RECORD of WELL or BORING 2 398

Survey No. 256
1" N.S.
1" O.S.

C16

at (Camden Road) Camden Road Bd. No. 2
Town Camden Town NW. St. Pancras. County London
Situation (unless a tracing from a map is supplied, give distance and direction from parish church, cross-roads, or other objects shown on maps). A little S of the SW from Camden Town Stn. (cited sheet 16 Vol 1)
Six-inch map 5 NW
Popular Edition (Sheet of one-inch map. (Square) TQ 28/50

Surface level of ground c 85 ft. above Ordnance Datum. Well or Bore commenced at ...... ft. below surface level of ground.
Sunk 4 ft., diameter ...... ft. Bored ...... ft.; diameter of boring: at top ...... in., at bottom ...... in.
Details of lining tubes (internal diameters preferred) 34' 2" of 16 in. Top. 2' 4" b/o
197' 6" .. 12 .. .. 2' 6" ..

Water struck at depths of (feet) 301, 315, 333. NGR TQ 2902 8412
Rest-level of water below top of well or bore 278 ft. Pumping level 278 ft. Time of recovery ...... hours.
Suction at 598 ft. depth. Yield: (i) on test 7000/8000 galls. per hour, (ii) normal ...... galls. per ......
Quality (attach copy of analysis if available) Hardness Perm. 0° Temp 4° Total 4°
Made by LE GRAND, SUTCLIFF & GELL, LD. for Aerated Bread Co. Ltd Date of boring Aug/Oct, 1934
Information from LE GRAND, SUTCLIFF & GELL, LD. S134/p. 673.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA. (and any additional remarks)	THICKNESS. Feet.	THICKNESS. Inches.	DEPTH. Feet.	DEPTH. Inches.
Made 2	Made ground	2	.	2	.
L.C. 106	Brown clay	20	.	22	.
	Blue clay	28	.	50	.
	Blue clay & stone	25	.	75	.
	Blue clay	33	.	108	.
W.R.B. 50	Mottled clay	39	.	147	.
	Conglomerate	6	.	153	.
	Green loamy sand	5	.	158	.
T.S. 20	Thanet Sand	19	.	177	.
	Green flints	1	.	178	.
CK. 474	Chalk & flints	232	.	410	.
	Hard grey Chalk	242	.	652	.

DB
26:10:38.

Site visited 30th July 1946.
Pumping controlled by demand &
Well top in basement 10' below ground level.

Confidential Water very soft. - have to harden it.

2 July 1946
~~Rec.~~ P.W.L. 300 Yield 10,328 Nov. 1937

Geological Survey and Museum,
South Kensington,
London, S.W. 7.

For Survey use only.

Date received.	G.S.M.	M. of H. notified.	Site marked on 1" map.
Oct 1935			

(11969B) Wt 10256/0175 2,500 9/32 H, J, R & L, Ld

APPENDIX B

CGL borehole logs

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH2**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	29-10-14 30-10-14	26.16	E 528,836.9 N 184,261.6	
Client				Sheet
Walsh Associates				1 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				25.96		0.20	Concrete. [MADE GROUND]	
0.20-0.60	B1							
0.20	D2			25.56		(0.40) 0.60	Soft dark brown slightly sandy gravelly silt. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick and flint. [MADE GROUND]	
0.60	D3						Firm dark orange brown occasionally mottled grey slightly silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
1.50-1.95	U100	14 blows						
2.00	D5							
2.25	D6							
2.50-2.95	D7							
2.50		N7						
3.00-3.50	B8							
3.50-3.95	U100	12 blows						
4.00	D10							
4.25	D11							
4.50-4.95	D12							
4.50		N10				(8.70)		
5.50-5.90	D13						5.50 - 5.90 Mudstone noted.	
6.00-6.45	U100	19 blows						
6.50	D15							
7.00-7.50	B16							
7.50-7.95	D17							
7.50		N13						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental samples, D= disturbed sample, B= bulk sample, N= SPT 'N' value, U100= U100 sample.

3. Installation details: 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-10.0mbgl: slotted pipe with gravel backfill; 10.0-11.0mbgl: bentonite backfill; 11.0-30.5mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Cable percussion	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH2**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	29-10-14 30-10-14	26.16	E 528,836.9 N 184,261.6	
Client				Sheet
Walsh Associates				2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Firm dark orange brown occasionally mottled grey slightly silty CLAY. [WEATHERED LONDON CLAY FORMATION] *(continued)*	
8.50	D18							
9.00-9.45	U100	25 blows		16.86		9.30		
							Stiff dark grey CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION]	
9.50	D20							
10.00	D21							
10.50-10.95	D22							
10.50		N23						
11.50	D23							
12.00-12.45	U100	24 blows						
12.50	D25							
13.00	D26							
13.50-13.95	D27							
13.50		N22						
14.00-15.00	B28							
15.00-15.45	U100	29 blows						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental samples, D= disturbed sample, B= bulk sample, N= SPT 'N' value, U100= U100 sample.

3. Installation details: 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-10.0mbgl: slotted pipe with gravel backfill; 10.0-11.0mbgl: bentonite backfill; 11.0-30.5mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Cable percussion	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH2**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	29-10-14 30-10-14	26.16	E 528,836.9 N 184,261.6	
Client				Sheet
Walsh Associates				3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
15.50	D30						Stiff dark grey CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
16.00	D31							
16.50-16.95 16.50	D32	N22						
17.50	D33							
18.00-18.45	U100	29 blows						
18.50	D35							
19.00	D36							
19.50-19.95 19.50	D37	N28				(21.20)		
20.00-21.00	B38							
21.00-21.45	U100	38 blows						
21.50	D40							
22.00	D41							
22.50-22.95 22.50	D42	N38						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental samples, D= disturbed sample, B= bulk sample, N= SPT 'N' value, U100= U100 sample.

3. Installation details: 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-10.0mbgl: slotted pipe with gravel backfill; 10.0-11.0mbgl: bentonite backfill; 11.0-30.5mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Cable percussion	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH2**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	29-10-14 30-10-14	26.16	E 528,836.9 N 184,261.6	
Client				Sheet
Walsh Associates				4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
23.50	D43						Stiff dark grey CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
24.00-24.45	U100	34 blows						
24.50	D45							
25.00	D46							
25.50-25.95 25.50	D47	N41						
26.00-27.00	B48							
27.00-27.45	U100	40 blows						
27.50	D50							
28.00	D51							
28.50-28.95 28.50	D52	N55						
29.50	D53							
30.00-30.45	U100	34 blows						
				-4.34		30.50		
30.50	D55						*(Borehole terminated at 30.5m)*	

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental samples, D= disturbed sample, B= bulk sample, N= SPT 'N' value, U100= U100 sample.

3. Installation details: 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-10.0mbgl: slotted pipe with gravel backfill; 10.0-11.0mbgl: bentonite backfill; 11.0-30.5mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Cable percussion	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				BH3
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	28-10-14 29-10-14	26.20		
Client				Sheet
Walsh Associates				1 of 2

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				25.90		0.30	Concrete. [MADE GROUND]	
0.30	D1						Loose to medium dense dark brown very sandy gravelly silt. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick. Occasional cobble of brick. Occasional ash noted. [MADE GROUND]	
0.30-0.60	B2			25.60		0.60		
0.40	ES115							
0.60	D3						Firm dark orange brown occasionally mottled grey slightly silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
1.20-1.65	D4							
1.20		N9						
1.80	ES116							
2.00-2.50	B5							
2.50-2.95	U100	16 blows						
3.00	D7							
3.25	D8							
3.50-3.95	D9							
3.50		N12						
4.25	D10							
4.50-4.95	U100	17 blows						
5.00	D12							
5.00-6.00	B13					(9.50)		
6.00-6.45	D14							
6.00		N14						
6.50-6.80	D15						6.50 Mudstone noted.	
7.00	D16							
7.50-7.95	U100	26 blows						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental samples, D= disturbed sample, B= bulk sample, N= SPT 'N' value, U100= U100 sample.

3. Installation details: 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-5.0mbgl: slotted pipe with gravel backfill; 5.0-15.45mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Cable percussion	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH3**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	28-10-14 29-10-14	26.20		
Client				Sheet
Walsh Associates				2 of 2

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
8.00	D18						Firm dark orange brown occasionally mottled grey slightly silty CLAY. [WEATHERED LONDON CLAY FORMATION] *(continued)*	
8.50	D19							
9.00-9.45 9.00	D20	N26						
10.00-10.50	B21			16.10		10.10		
10.50-10.95	U100	29 blows					Stiff dark grey CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION] 10.40 Becoming stiff dark grey CLAY. Frequent fine selenite crystals noted. 10.50 Claystone noted.	
11.00	D23							
11.50	D24							
12.00-12.45 12.00	D25	N29						
13.00	D26					(5.35)		
13.50-13.95	U100	29 blows						
14.00	D28							
14.50	D29							
15.00-15.45 15.00	D30	N31						
				10.75		15.45	*(Borehole terminated at 15.45m)*	

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental samples, D= disturbed sample, B= bulk sample, N= SPT 'N' value, U100= U100 sample.

3. Installation details: 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-5.0mbgl: slotted pipe with gravel backfill; 5.0-15.45mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Cable percussion	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH4**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	17-11-14 18-11-14	27.37	E 528,783.9 N 184,238.5	
Client				Sheet
Walsh Associates				1 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				27.12		0.25	Concrete. No rebar noted. [MADE GROUND]	
0.20	D1						Loose to medium dense dark brown very sandy gravelly silt. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick. Occasional cobbles of brick noted. [MADE GROUND]	
0.20-0.50	B2							
0.50	D3							
0.50-1.20	B4					(1.15)		
1.20-2.95	D5			25.97		1.40		
1.20		N6					Firm dark orange brown slightly silty CLAY. Occasional fine selenite crystals noted. [WEATHERED LONDON CLAY FORMATION]	
2.25-3.00	D6							
2.50-2.95	U100	11 blows						
3.00	D8							
3.00-3.50	B9							
3.50-3.95	D10							
3.50		N11						
4.25	D11							
4.50-4.95	U100	16 blows						
5.00	D13							
5.50-6.00	B14							
6.00-6.45	D15							
6.00		N14				(9.80)		
7.00	D16							
7.50-7.95	U100	21 blows						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.5mbgl: plain pipe with bentonite backfill; 1.5-9.0mbgl: slotted pipe with gravel backfill; 9.0-10.0mbgl: bentonite backfill; 10.0-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH4**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	17-11-14 18-11-14	27.37	E 528,783.9 N 184,238.5	
Client				Sheet
Walsh Associates				2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
8.00	D18						Firm dark orange brown slightly silty CLAY. Occasional fine selenite crystals noted. [WEATHERED LONDON CLAY FORMATION] *(continued)*	
8.50-9.00	B19							
9.00-9.45 9.00	D20	N33						
9.50-9.70	D21							
10.00	D22							
10.50-10.95	U100	25 blows						
11.00	D24			16.17		11.20		
11.50-12.00	B25						Stiff closely fissured dark grey slightly silty CLAY. Occasional fine selenite crystals noted. [LONDON CLAY FORMATION]	
12.00-12.45 12.00	D26	N28						
13.00	D27							
13.50-13.95	U100	27 blows						
14.00	D29							
14.50-15.00	B30							
15.00 15.00	D31	N31						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.5mbgl: plain pipe with bentonite backfill; 1.5-9.0mbgl: slotted pipe with gravel backfill; 9.0-10.0mbgl: bentonite backfill; 10.0-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH4**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	17-11-14 18-11-14	27.37	E 528,783.9 N 184,238.5	
Client				Sheet
Walsh Associates				3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
16.00	D32						Stiff closely fissured dark grey slightly silty CLAY. Occasional fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
16.50-16.95	U100	25 blows						
17.00	D34							
17.50-18.00	B35							
18.00-18.45 18.00	D36	N28				(13.80)		
19.00	D37							
19.50-19.95	U100	27 blows						
20.00	D39							
20.50-21.00	B40							
21.00-21.45 21.00	D41	N34						
22.00	D42							
22.50-22.95	U100	28 blows						
23.00	D44							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.5mbgl: plain pipe with bentonite backfill; 1.5-9.0mbgl: slotted pipe with gravel backfill; 9.0-10.0mbgl: bentonite backfill; 10.0-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH4**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	17-11-14 18-11-14	27.37	E 528,783.9 N 184,238.5	
Client				Sheet
Walsh Associates				4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
23.50-24.00	B45						Stiff closely fissured dark grey slightly silty CLAY. Occasional fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
24.00-24.45 24.00	D46	N37						
				2.37		25.00		
25.00	D47						*(Borehole terminated at 25m)*	

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.5mbgl: plain pipe with bentonite backfill; 1.5-9.0mbgl: slotted pipe with gravel backfill; 9.0-10.0mbgl: bentonite backfill; 10.0-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH5**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14 12-11-14	27.36	E 528,775.3 N 184,211.1	
Client				Sheet
Walsh Associates				1 of 6

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
0.15-0.60	B1					(0.50)	Brick paving over light orange brown fine to medium sand. [MADE GROUND]	
				26.86		0.50		
				26.72		0.64	Loose to medium dense dark green grey slightly sandy gravelly silt. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick. [MADE GROUND]	
0.65-1.00	B2							
1.25	D3						Firm dark orange brown slightly silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
1.50-1.95	U100	16 blows						
2.00	D5							
2.25	D6							
2.50-2.95	D7							
2.50		N8						
3.00-3.50	B8							
3.50-3.95	U100	16 blows						
4.00	D10							
4.25	D11							
4.50-4.94	D12							
4.50		N16						
						(9.16)		
5.50	D13							
6.00-6.45	U100	17 blows						
6.50	D15							
7.00	D16							
7.50-7.95	D17							
7.50		N17						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-7.0mbgl: slotted pipe with gravel backfill; 7.0-8.0mbgl: bentonite backfill; 8.0-39.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH5**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14 12-11-14	27.36	E 528,775.3 N 184,211.1	
Client				Sheet
Walsh Associates				2 of 6

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Firm dark orange brown slightly silty CLAY. [WEATHERED LONDON CLAY FORMATION] *(continued)*	
8.50-9.00	B18							
9.00-9.45	U100	28 blows						
9.50	D20			17.56		9.80		
10.00	D21						Stiff closely fissured dark grey silty CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION]	
10.50-10.95 10.50	D22	N24						
11.50-12.00	B23							
12.00-12.45	U100	24 blows						
12.50	D25							
13.00	D26							
13.50-13.95 13.50	D27	N27						
14.50-15.00	B28							
15.00-15.45	U100	30 blows						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-7.0mbgl: slotted pipe with gravel backfill; 7.0-8.0mbgl: bentonite backfill; 8.0-39.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH5**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14 12-11-14	27.36	E 528,775.3 N 184,211.1	
Client				Sheet
Walsh Associates				3 of 6

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
15.50	D30						Stiff closely fissured dark grey silty CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
16.00	D31							
16.50-16.95 16.50	D32	N28						
17.50-18.00	B33							
18.00-18.45	U100	31 blows						
18.50	D35							
19.00	D36							
19.50-19.95 19.50	D37	N38						
20.50-21.00	B38							
21.00-21.45	U100	28 blows						
21.50	D40							
22.00	D41							
22.50-22.95 22.50	D42	N40						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-7.0mbgl: slotted pipe with gravel backfill; 7.0-8.0mbgl: bentonite backfill; 8.0-39.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH5**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14 12-11-14	27.36	E 528,775.3 N 184,211.1	
Client				Sheet
Walsh Associates				4 of 6

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
23.50-24.00	B43						Stiff closely fissured dark grey silty CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
24.00-24.45	U100	31 blows						
24.50	D45					(29.70)		
24.90-25.20	D46							
25.50-25.95 25.50	D47	N49						
26.50-27.00	B48							
27.00-27.45	U100	47 blows						
27.50	D50							
28.00	D51							
28.50-28.95 28.50	D52	N50/ 246 mm						
29.50-30.00	B51a							
30.00-30.45	U100	44 blows						
30.50	D53							
31.00	D54							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-7.0mbgl: slotted pipe with gravel backfill; 7.0-8.0mbgl: bentonite backfill; 8.0-39.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH5**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14 12-11-14	27.36	E 528,775.3 N 184,211.1	
Client				Sheet
Walsh Associates				5 of 6

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
31.50-31.95 31.50	D55	N50/ 279 mm					Stiff closely fissured dark grey silty CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
32.50-33.00	B56							
33.00-33.45	U100	47 blows						
33.50	D58							
34.00	D59							
34.50-34.95 34.50	D60	N51						
35.50-36.00	B61							
36.00-36.45	U100	48 blows						
37.00	D63							
37.50 37.50	D64	N50/ 252 mm						
38.50-39.00	B65							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-7.0mbgl: slotted pipe with gravel backfill; 7.0-8.0mbgl: bentonite backfill; 8.0-39.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH5**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14 12-11-14	27.36	E 528,775.3 N 184,211.1	
Client				Sheet
Walsh Associates				6 of 6

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
39.00-39.50	U100	56 blows		-12.14		39.50	Stiff closely fissured dark grey silty CLAY. Frequent fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
							(Borehole terminated at 39.5m)	

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-7.0mbgl: slotted pipe with gravel backfill; 7.0-8.0mbgl: bentonite backfill; 8.0-39.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH6**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	13-11-14 14-11-14	27.96	E 528,747.0 N 184,197.8	
Client				Sheet
Walsh Associates				1 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				27.71		0.25	Concrete. No rebar noted. [MADE GROUND]	
0.25 0.25-1.20 0.30	D1 B2 ES220					(1.15)	Loose to medium dense dark brown silty sandy fine to coarse subrounded to subangular gravel of brick. Frequent cobbles of brick noted. [MADE GROUND]	
1.20-1.65 1.20	D3	N5		26.56		1.40	Firm dark orange brown slightly silty CLAY. Occasional fine selenite crystals noted. [WEATHERED LONDON CLAY FORMATION]	
2.00-2.50 2.20	B4 ES221							
2.50-2.95	U100	12 blows						
3.00	D6							
3.25	D7							
3.50-3.95 3.50	D8	N13						
4.00-4.50	B9							
4.50-4.95	U100	20 blows						
5.00	D11							
5.50	D12							
6.00-6.45 6.00	D13	N17				(9.80)		
7.00-7.50	B14							
7.50-7.95	U100	19 blows						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.5mbgl: plain pipe with bentonite backfill; 1.5-8.5mbgl: slotted pipe with gravel backfill; 8.5-9.5mbgl: bentonite backfill; 9.5-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH6**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	13-11-14 14-11-14	27.96	E 528,747.0 N 184,197.8	
Client				Sheet
Walsh Associates				2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
8.00	D16						Firm dark orange brown slightly silty CLAY. Occasional fine selenite crystals noted. [WEATHERED LONDON CLAY FORMATION] *(continued)*	
8.50	D17							
9.00-9.45 9.00	D18	N21						
10.00-10.50	B19							
10.50-10.95	U100	23 blows						
11.00	D21			16.76		11.20		
11.50	D22						Stiff closely fissured dark grey silty CLAY. Occasional fine selenite crystals noted. [LONDON CLAY FORMATION]	
12.00-12.45 12.00	D23	N26						
13.00-13.50	B24							
13.50-13.95	U100	25 blows						
14.00	D25							
14.50	D26							
15.00-15.45 15.00	D27	N27						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.5mbgl: plain pipe with bentonite backfill; 1.5-8.5mbgl: slotted pipe with gravel backfill; 8.5-9.5mbgl: bentonite backfill; 9.5-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH6**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	13-11-14 14-11-14	27.96	E 528,747.0 N 184,197.8	
Client				Sheet
Walsh Associates				3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Stiff closely fissured dark grey silty CLAY. Occasional fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
16.00	B28							
16.50-16.95	U100	22 blows						
17.00	D30							
17.50	D31							
18.00-18.45	D32					(13.80)		
18.00		N30						
19.00-19.50	B33							
19.50-19.95	U100	26 blows						
20.50	D35							
21.00-21.24	D36							
21.00		N31						
22.00-22.50	B37							
22.50-22.95	U100	36 blows						
23.00	D39							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.5mbgl: plain pipe with bentonite backfill; 1.5-8.5mbgl: slotted pipe with gravel backfill; 8.5-9.5mbgl: bentonite backfill; 9.5-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH6**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	13-11-14 14-11-14	27.96	E 528,747.0 N 184,197.8	
Client				Sheet
Walsh Associates				4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
23.50	D41						Stiff closely fissured dark grey silty CLAY. Occasional fine selenite crystals noted. [LONDON CLAY FORMATION] *(continued)*	
24.00-24.45 24.00	D42	N37						
				2.96		25.00		
25.00	D43						*(Borehole terminated at 25m)*	

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-1.5mbgl: plain pipe with bentonite backfill; 1.5-8.5mbgl: slotted pipe with gravel backfill; 8.5-9.5mbgl: bentonite backfill; 9.5-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH7**
Job No: CG/18067A	Date: 31-10-14 04-11-14	Ground Level (m): 25.79	Co-Ordinates (m):	
Client: Walsh Associates				Sheet: 1 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				25.66		0.13	Paving slab over light orange brown fine to medium sand. [MADE GROUND]	
0.13	D1			25.41		0.38	Concrete [MADE GROUND]	
0.38	D2						Soft light brown grey clayey silt with frequent claystone inclusions. [MADE GROUND]	
0.50-1.00	B3					(1.12)		
1.20-1.65	D4							
1.20		N6		24.29		1.50	Firm to stiff light orange brown silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
1.70-2.20	B5							
1.70	D6							
2.20-2.65	U100	12 blows						
2.70	D8							
3.00	D9							
3.20-3.65	D10							
3.20		N10						
4.00-4.50	B11							
4.50-4.95	U100	19 blows				(7.40)		
5.50	D13							
6.00-6.45	D14							
6.00		N16						
6.90-7.40	B15						6.90 - 7.40 Claystone band and seepage	
7.50-7.95	U100	19 blows						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-2.0mbgl: plain pipe with bentonite backfill; 2.0-7.5mbgl: slotted pipe with gravel backfill; 7.5-8.5mbgl: bentonite backfill; 8.5-30.5mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	TOP	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH7**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	31-10-14 04-11-14	25.79		
Client				Sheet
Walsh Associates				2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
8.00	D17						Firm to stiff light orange brown silty CLAY. [WEATHERED LONDON CLAY FORMATION] *(continued)*	
8.50-9.00	B18			16.89		8.90		
9.00-9.45 9.00	D19	N23					Stiff closely fissured dark grey silty CLAY. [LONDON CLAY FORMATION]	
10.00	D20							
10.50-10.95	U100	24 blows						
11.00	D22							
11.50-12.00	B23							
12.00-12.45 12.00	D24	N22						
13.00	D25							
13.50-13.95	U100	31 blows						
14.00	D27							
14.50-15.00	B28							
15.00-15.45 15.00	D29	N29						

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-2.0mbgl: plain pipe with bentonite backfill; 2.0-7.5mbgl: slotted pipe with gravel backfill; 7.5-8.5mbgl: bentonite backfill; 8.5-30.5mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	TOP	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH7**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	31-10-14 04-11-14	25.79		
Client				Sheet
Walsh Associates				3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Stiff closely fissured dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
16.00	D30							
16.50-16.95	U100	30 blows						
17.00	D32							
17.50-18.00	B33							
18.00-18.45	D34							
18.00		N30						
19.00	D41							
19.50-19.95	U100	31 blows				(21.60)		
20.00	D43							
20.50-21.00	B45							
21.00-21.45	D46							
21.00		N35						
22.00	D47							
22.50-22.95	U100	34 blows						
23.00	D49							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-2.0mbgl: plain pipe with bentonite backfill; 2.0-7.5mbgl: slotted pipe with gravel backfill; 7.5-8.5mbgl: bentonite backfill; 8.5-30.5mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	TOP	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH7**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	31-10-14 04-11-14	25.79		
Client				Sheet
Walsh Associates				4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
23.50-24.00	B50						Stiff closely fissured dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
24.00-24.45 24.00	D51	N36						
25.00	D52							
25.50-25.95	U100	31 blows						
26.00	D54							
26.50-27.00	B55							
27.00-27.45 27.00	D56	N34						
28.00	D57							
28.50-28.95	U100	34 blows						
29.00	D59							
29.50	D60							
30.00-30.45 30.00	D61	N44		-4.71		30.50	*(Borehole terminated at 30.5m)*	

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. Down hole magnetrometer testing undertaken at 2m intervals for first 5m of drilling.

3. D= disturbed sample, B= bulk sample, N= SPT 'N' sample, U100= U100 sample.

4. Installation details; 0.0-2.0mbgl: plain pipe with bentonite backfill; 2.0-7.5mbgl: slotted pipe with gravel backfill; 7.5-8.5mbgl: bentonite backfill; 8.5-30.5mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Pilcon	Gary Wheeler Drilling Ltd	TOP	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH8**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	09-12-14 11-12-14	28.64		
Client				Sheet
Walsh Associates				1 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				28.49		0.15	Tarmac.	
				28.34		0.30	[MADE GROUND]	
						(0.90)	Concrete. 60:40 aggregate to cement. No rebar noted. [MADE GROUND] Loose to medium dense dark brown very gravelly sandy silt. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick and occasional tarmac. Frequent cobbles of brick.	
				27.44		1.20	[MADE GROUND]	
1.20-2.50	D1						Firm to stiff dark grey brown silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
2.50-4.00	D2							
2.50-4.00	D3							
						(4.80)		
4.00-4.50	U100							
4.00-5.50	D5							
5.50-7.00	D6							
				22.64		6.00		
							Stiff dark grey silty CLAY. [LONDON CLAY FORMATION]	
7.00-7.50	U100							
7.00-8.50	D8							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-1.8mbgl: plain pipe with bentonite backfill, 1.8-24.5mbgl: slotted pipe with gravel backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH8**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	09-12-14 11-12-14	28.64		
Client				Sheet
Walsh Associates				2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Stiff dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
8.50-10.00	D9							
10.00-10.50	U100							
10.00-11.50	D11							
11.50-13.00	D12							
13.00-13.50	U100							
13.00-16.00	D14							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-1.8mbgl: plain pipe with bentonite backfill, 1.8-24.5mbgl: slotted pipe with gravel backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH8**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	09-12-14 11-12-14	28.64		
Client				Sheet
Walsh Associates				3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
						(19.50)	Stiff dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
16.00-16.50 16.00-19.00	U100 D16							
19.00-19.50 19.00-22.00	U100 D18							
22.00-22.50 22.00-25.00	U100 D20							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-1.8mbgl: plain pipe with bentonite backfill, 1.8-24.5mbgl: slotted pipe with gravel backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH8**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	09-12-14 11-12-14	28.64		
Client				Sheet
Walsh Associates				4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Stiff dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
24.00	ES308							
25.00-25.50	U100							
				3.14		25.50		
							(Borehole terminated at 25.5m)	

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-1.8mbgl: plain pipe with bentonite backfill, 1.8-24.5mbgl: slotted pipe with gravel backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH9**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	11-12-14 17-12-14	28.12		
Client				Sheet
Walsh Associates				1 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				27.92		0.20	Tarmac. [MADE GROUND]	
				27.82		0.30	Concrete. 60:40 aggregate to cement. No rebar noted. [MADE GROUND]	
						(0.90)	Loose to medium dense dark brown silty sandy fine to coarse subrounded to subangular gravel of flint and brick. Sand is fine to coarse. Frequent cobbles of brick and concrete. [MADE GROUND]	
				26.92		1.20		
1.20	ES309					(0.60)	Soft to firm dark grey black to grey brown gravelly silty clay. Gravel is fine to medium subangular to subrounded of brick. Organic odour noted. [MADE GROUND]	
				26.32		1.80		
							Firm to stiff dark grey brown silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
2.30	ES310							
2.50-3.00	U100							
						(7.20)		
5.50-6.00	U100							
7.00	ES311							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-0.8mbgl: plain pipe with bentonite backfill, 0.8-30.0mbgl: slotted pipe with gravel backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH9**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	11-12-14 17-12-14	28.12		
Client				Sheet
Walsh Associates				2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Firm to stiff dark grey brown silty CLAY. [WEATHERED LONDON CLAY FORMATION] *(continued)*	
8.50-9.00 8.50-11.00	U100 D4							
				19.12		9.00		
9.00	ES312						Stiff dark grey silty CLAY. [LONDON CLAY FORMATION]	
11.50-12.00 11.50-14.50	U100 D6							
14.50-15.00 14.50-16.00	U100 D8							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-0.8mbgl: plain pipe with bentonite backfill, 0.8-30.0mbgl: slotted pipe with gravel backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH9**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	11-12-14 17-12-14	28.12		
Client				Sheet
Walsh Associates				3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Stiff dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
16.00-17.50	D9							
17.50-18.00	U100							
17.50-19.00	D11							
19.00-20.50	D12							
						(21.00)		
20.50-22.00	D13							
22.00-23.50	D14							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-0.8mbgl: plain pipe with bentonite backfill, 0.8-30.0mbgl: slotted pipe with gravel backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH9**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	11-12-14 17-12-14	28.12		
Client				Sheet
Walsh Associates				4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
23.50-25.00	D15						Stiff dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
25.00-25.30 25.00-26.50	U100 D17							
				-1.88		30.00		
							(Borehole terminated at 30m)	

GINT STD AGS 3_1.GDT 12/1/15

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-0.8mbgl: plain pipe with bentonite backfill, 0.8-30.0mbgl: slotted pipe with gravel backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

CGL BH LOG CG18067A ALL BH FOR GGEIR.GPJ

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH10**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	03-12-14 08-12-14	27.07		
Client				Sheet
Walsh Associates				1 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				26.87		0.20	Tarmac. [MADE GROUND]	
				26.64		0.43	Concrete. 40:60 aggregate to cement. 8mm and 5mm diameter rebar noted at 0.4mbgl. Day joint at 0.3mbgl. [MADE GROUND]	
						(0.97)	Soft to firm dark orange brown slightly gravelly clay. Gravel is fine to coarse subrounded to subangular of brick and tarmac. [MADE GROUND]	
				25.67		1.40		
							Firm dark orange brown slightly silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
2.50-3.10	U1001							
						(4.60)		
4.00-4.50	U1002							
5.50-6.00	U1003							
				21.07		6.00		
							Stiff dark grey silty CLAY. [LONDON CLAY FORMATION]	
7.00-7.50	U1004							

GINT STD AGS 3_1.GDT 12/1/15

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-0.8mbgl: plain pipe with bentonite backfill, 0.8-24.0mbgl: slotted pipe with gravel backfill, 24.0-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

CGL BH LOG CG18067A ALL BH FOR GGEIR.GPJ

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH10**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	03-12-14 08-12-14	27.07		
Client				Sheet
Walsh Associates				2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Stiff dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
8.50-9.00 8.50-10.00	U1005 D6							
10.00-11.50	D7							
11.50-12.00 11.50-13.00	U1008 D9							
13.00-14.50	D10							
14.50-15.00 14.50-16.00	U10011 D12							
						(19.00)		

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-0.8mbgl: plain pipe with bentonite backfill, 0.8-24.0mbgl: slotted pipe with gravel backfill, 24.0-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH10**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	03-12-14 08-12-14	27.07		
Client				Sheet
Walsh Associates				3 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
							Stiff dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
16.00-17.50	D13							
17.50-18.00	U10014							
17.50-19.00	D15							
19.00-20.50	D16							
20.50-21.00	U10017							
21.00-22.00	D18							
22.00-23.50	D19							

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-0.8mbgl: plain pipe with bentonite backfill, 0.8-24.0mbgl: slotted pipe with gravel backfill, 24.0-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

BOREHOLE LOG

Project				BOREHOLE No
Camden Lock Village, London				**BH10**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	03-12-14 08-12-14	27.07		
Client				Sheet
Walsh Associates				4 of 4

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
23.50-24.00	U10020						Stiff dark grey silty CLAY. [LONDON CLAY FORMATION] *(continued)*	
				2.07		25.00		
							(Borehole terminated at 25m)	

Boring Progress and Water Observations

Date	Comment	Strike Depth	Casing Depth	Casing Dia. mm	Standing Depth

General Remarks

1. Drilled using rotary open hole.
2. ES=Environmental Sample, U100= U100 Sample, D= Disturbed Sample.
3. No groundwater encountered during drilling.
4. Installation details; 0.0-0.8mbgl: plain pipe with bentonite backfill, 0.8-24.0mbgl: slotted pipe with gravel backfill, 24.0-25.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Comacchio	TOR drilling	JJM	DWM

WINDOW SAMPLE LOG

Project				HOLE No
Camden Lock Village, London				**WS4**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	22-10-14	26.29	E 528,852.3 N 184,236.6	
Client				Sheet
Walsh Associates				1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result (N/kPa/ppm)		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				26.14		0.15	Paving slab over fine to medium orange sand. [MADE GROUND]	
0.30	ES109					(0.95)	Soft dark black brown slightly sandy clay. Moderate hydrocarbon odour noted. [MADE GROUND]	
				25.19		1.10		
2.00	ES112					(2.10)	Firm to stiff dark orange brown silty CLAY. [WEATHERED LONDON CLAY FORMATION] 2.50 Becoming stiff mottled grey.	
				23.09		3.20		
							(Window sample terminated at 3.2m)	

Boring Progress and Water Observations

Date	Strike depth	Casing depth	Comment	Time measured	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental samples, D= disturbed sample, B= bulk sample, N= SPT 'N' value, U100= U100 sample.

3. Installation details: 0.0-0.2mbgl: plain pipe with bentonite backfill; 0.2-1.2mbgl: slotted pipe with gravel backfill; 1.2-3.2mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Hand held window sampler	RP Drilling	JJM	DWM

WINDOW SAMPLE LOG

Project				HOLE No
Camden Lock Village, London				**WS5**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	21-10-14	26.14	E 528,824.0 N 184,288.4	
Client				Sheet
Walsh Associates				1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result (N/kPa/ppm)		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
0.20	ES105			25.64		(0.50) 0.50	Paving slab over soft dark brown slightly sandy slightly gravelly silty clay. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick, ceramic and occasional flint. [MADE GROUND]	
1.20	ES106						Firm dark orange brown slightly silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
						(2.20)	1.50 Becoming stiff.	
				23.44		2.70		
							(Window sample terminated at 2.7m)	

Boring Progress and Water Observations

Date	Strike depth	Casing depth	Comment	Time measured	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental samples, D= disturbed sample, B= bulk sample, N= SPT 'N' value, U100= U100 sample.

3. Installation details: 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-2.5mbgl: slotted pipe with gravel backfill; 2.5-2.7mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Hand held window sampler	RP Drilling	JJM	DWM

WINDOW SAMPLE LOG

Project				HOLE No
Camden Lock Village, London				**WS6**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14	27.06	E 528,815.0 N 184,232.7	
Client				Sheet
Walsh Associates				1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result (N/kPa/ppm)		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				26.86		0.20	Concrete. No rebar noted. [MADE GROUND]	
0.40	ES1					(0.70)	Loose dark brown silty gravelly sand. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded of brick, concrete, glass, slate and ceramic. [MADE GROUND]	
0.70	ES2			26.16		0.90		
1.20		N4				(0.90)	Firm dark green grey silty CLAY with frequent organic matter. [REWORKED WEATHERED LONDON CLAY FORMATION]	
1.40	ES3			25.26		1.80		
2.00		N8				(3.20)	Firm to stiff light orange brown mottled grey silty CLAY with frequent selenite crystals. [WEATHERED LONDON CLAY FORMATION]	
3.00		N7						
4.00		N11						
				22.06		5.00		
5.00		N10					*(Window sample terminated at 5m)*	

Boring Progress and Water Observations

Date	Strike depth	Casing depth	Comment	Time measured	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental sample, N= SPT 'N' value.

3. Installation details; 0.0-1.0mbgl: plain pipe with bentonite backfill; 1.0-2.0mbgl: slotted pipe with gravel backfill; 2.0-5.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Tracked window sample rig	RP Drilling	TOP	DWM

WINDOW SAMPLE LOG

Project				HOLE No
Camden Lock Village, London				WS7
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14	27.06		
Client				Sheet
Walsh Associates				1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result (N/kPa/ppm)		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				27.01		0.05	Concrete. No rebar noted. [MADE GROUND]	
0.20	215					(0.45)	Loose to medium dense dark brown gravelly very sandy clay. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick.	
				26.56		0.50	[MADE GROUND]	
0.60	216					(0.50)	Soft to firm grey clay. Occasional fine to coarse gravel of brick. [MADE GROUND]	
				26.06		1.00		
1.20	217						Firm dark orange brown mottled grey silty CLAY. Occasional fine selenite crystals noted. [WEATHERED LONDON CLAY FORMATION]	
1.20		N6						
							1.80 - 1.90 Occasional fine to medium gravel of mudstone.	
2.00		N9						
3.00		N12				(4.00)		
4.00		N16						
				22.06		5.00		
5.00		N17					*(Window sample terminated at 5m)*	

Boring Progress and Water Observations

Date	Strike depth	Casing depth	Comment	Time measured	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental sample, N= SPT 'N' value.

3. Installation details; 0.0-0.5mbgl: plain pipe with bentonite backfill; 0.5-2.0mbgl: slotted pipe with gravel backfill; 2.0-5.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Tracked window sample rig	RP Drilling	JJM	DWM

WINDOW SAMPLE LOG

Project				HOLE No
Camden Lock Village, London				**WS8**
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14	26.99	E 528,807.0 N 184,206.8	
Client				Sheet
Walsh Associates				1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result (N/kPa/ppm)		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				26.84		0.15	Concrete. 5mm rebar noted at 0.1mbgl [MADE GROUND]	
0.20	210			26.59		(0.25) 0.40	Loose to medium dense dark brown sandy very gravelly silt. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick and shell. [MADE GROUND]	
0.60	211			25.99		(0.60) 1.00	Soft dark grey slightly gravelly silty clay. Gravel is fine to medium subrounded to subangular of brick. [MADE GROUND]	
1.20		N5					Firm dark orange brown mottled grey silty CLAY. Occasional fine selenite crystals noted. [WEATHERED LONDON CLAY FORMATION]	
2.00		N11						
2.50	214							
3.00		N16				(4.00)		
4.00		N18						
				21.99		5.00		
5.00		N18					*(Window sample terminated at 5m)*	

Boring Progress and Water Observations

Date	Strike depth	Casing depth	Comment	Time measured	Standing Depth

General Remarks

1. No groundwater encountered in borehole.

2. ES= environmental sample, N= SPT 'N' value.

3. Installation details; 0.0-0.5mbgl: plain pipe with bentonite backfill; 0.5-2.0mbgl: slotted pipe with gravel backfill; 2.0-5.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Tracked window sample rig	RP Drilling	JJM	DWM

WINDOW SAMPLE LOG

Project				HOLE No
Camden Lock Village, London				WS9
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
CG/18067A	10-11-14	25.79		
Client				Sheet
Walsh Associates				1 of 1

SAMPLES & TESTS			Water	STRATA				Instrument /Backfill
Depth	Type No	Test Result (N/kPa/ppm)		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
				25.59		0.20	Paving slab over light orange brown fine to medium sand. [MADE GROUND]	
0.30	201					(0.80)	Loose to medium dense dark brown slightly gravelly very sandy silt. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular of brick. Occasional cobbles of brick noted. [MADE GROUND]	
			1	24.79		1.00		
1.20		N0					Soft to firm dark brown gravelly clayey silt. Gravel is fine to coarse subrounded to subangular of mudstone. [REWORKED WEATHERED LONDON CLAY FORMATION] 1.20 - 3.00 Very wet	
2.00	202					(2.00)		
2.00		N1						
				22.79		3.00		
3.00		N7					Firm dark orange brown silty CLAY. [WEATHERED LONDON CLAY FORMATION]	
4.00		N11				(2.00)		
				20.79		5.00		
5.00		N12					*(Window sample terminated at 5m)*	

Boring Progress and Water Observations

Date	Strike depth	Casing depth	Comment	Time measured	Standing Depth
	1				

General Remarks

1. Groundwater encountered at 1.0mbgl to 3.0mbgl.

2. ES= environmental sample, N= SPT 'N' value.

3. Installation details: 0.0-1.0m: plain pipe with bentonite backfill; 1.0-3.0mbgl: slotted pipe with gravel backfill; 3.0-5.0mbgl: arisings backfill. Gas tap, bung and flush cover installed.

Method/ Plant Used	Field Crew	Logged By	Checked By
Tracked window sample rig	RP Drilling	JJM	DWM

APPENDIX C

Ground gas and groundwater monitoring records

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	05/11/2014	Engineer:	TOP
Time:	am	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 999 to 1004 — Local pressure system*: Rising — Air temperature (°C): 7

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 GW (mbgl)	Comments
BH2	0	NR	NR	NR	NR	NR	NR	NR	Borehole covered by parked cars - unable to monitor
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH3	0	2.2	8.0	13.7	1.6	<0.1	NR	4.10	Base of borehole at 5.10mbgl
	15	0.4	1.0	13.6	1.6	<0.1			
	30	0.2	1.0	13.5	1.7	<0.1			Audible flow on opening gas tap (hiss of gas)
	45	0.3	1.0	13.7	1.6	<0.1			
	60	0.2	0.0	13.9	1.6	<0.1			
	90	0.1	0.0	14.5	1.4	<0.1			
	120	0.3	0.0	15.1	1.2	<0.1			
	150			16.3	0.8	<0.1			
	180			16.7	0.7	<0.1			
	240			17.2	0.6	<0.1			
	300			18.2	0.2	<0.1			
BH4	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH5	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH6	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	05/11/2014	Engineer:	TOP
Time:	am	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 999 to 1004 Local pressure system*: Rising Air temperature (°C): 7

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 GW (mbgl)	Comments
BH7	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH8	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH9	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH10	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS4	0	<0.1	0.0	16.0	2.3	<0.1	NR	0.92	Base of borehole at 1.30mbgl
	15	<0.1	0.0	15.6	2.4	<0.1			
	30	<0.1	0.0	15.5	2.4	<0.1			
	45	<0.1	0.0	15.4	2.5	<0.1			
	60	<0.1	0.0	15.3	2.5	<0.1			
	90	<0.1	0.0	15.3	2.6	<0.1			
	120	<0.1	0.0	15.3	2.6	<0.1			
	150			15.3	2.6	<0.1			
	180			15.3	2.6	<0.1			
	240			15.4	2.5	<0.1			
	300			15.5	2.4	<0.1			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	05/11/2014	Engineer:	TOP
Time:	am	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 999 to 1004 — Local pressure system*: Rising — Air temperature (°C): 7

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 GW (mbgl)	Comments
WS5	0	<0.1	0.0	18.7	2.0	<0.1	NR	2.15	Base of borehole at 2.67mbgl
	15	<0.1	0.0	18.5	2.0	<0.1			
	30	<0.1	0.0	18.4	2.1	<0.1			
	45	<0.1	0.0	18.3	2.2	<0.1			
	60	<0.1	0.0	18.3	2.2	<0.1			
	90	<0.1	0.0	18.1	2.3	<0.1			
	120	<0.1	0.0	18.0	2.6	<0.1			
	150			18.0	2.6	<0.1			
	180			18.0	2.6	<0.1			
	240			18.1	2.4	<0.1			
	300			18.5	2.0	<0.1			
WS6	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS7	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS8	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS9	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	19/11/2014	Engineer:	TOP
Time:	08:30	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1016-1019 Local pressure system*: Rising Air temperature (°C): 8

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 GW (mbgl)	Comments
BH2	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH3	0	1.3	2.0	13.8	1.8	<0.1	NR	3.31	Base of borehole at 5.06mbgl
	15	<0.1	0.0	13.5	1.9	<0.1			
	30	<0.1	0.0	13.3	1.9	<0.1			
	45	<0.1	0.0	13.6	1.6	<0.1			
	60	<0.1	0.0	14.6	1.5	<0.1			
	90	<0.1	0.0	14.4	1.5	<0.1			
	120	<0.1	0.0	15.6	1.2	<0.1			
	150			16.6	0.9	<0.1			
	180			16.8	0.9	<0.1			
	240			17.5	0.7	<0.1			
	300			17.9	0.7	<0.1			
BH4	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH5	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH6	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	19/11/2014	Engineer:	TOP
Time:	08:30	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1016-1019 Local pressure system*: Rising Air temperature (°C): 8

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 GW (mbgl)	Comments
BH7	0	<0.1	0.0	17.0	1.0	<0.1	NR	7.45	Base of borehole at 7.5mbgl
	15	<0.1	0.0	16.8	1.3	<0.1			
	30	<0.1	0.0	16.0	1.6	<0.1			
	45	<0.1	0.0	15.6	1.7	<0.1			
	60	<0.1	0.0	15.4	1.7	<0.1			
	90	<0.1	0.0	15.2	1.8	<0.1			
	120	<0.1	0.0	15.1	1.8	<0.1			
	150			15.1	1.8	<0.1			
	180			15.0	1.8	<0.1			
	240			15.0	1.8	<0.1			
	300			15.0	1.8	<0.1			
BH8	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH9	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH10	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS4	0	<0.1	0.0	15.9	2.3	<0.1	NR	0.65	Base of borehole at 1.30mbgl
	15	<0.1	0.0	15.7	2.3	<0.1			
	30	<0.1	0.0	15.6	2.3	<0.1			
	45	<0.1	0.0	15.5	2.3	<0.1			
	60	<0.1	0.0	15.5	2.3	<0.1			
	90	<0.1	0.0	15.5	2.3	<0.1			
	120	<0.1	0.0	15.5	2.3	<0.1			
	150			15.5	2.3	<0.1			
	180			15.6	2.3	<0.1			
	240			15.8	2.3	<0.1			
	300			15.9	2.3	<0.1			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	19/11/2014	Engineer:	TOP
Time:	08:30	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1016-1019 Local pressure system*: Rising Air temperature (°C): 8

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 GW (mbgl)	Comments
WS5	0	<0.1	0.0	18.0	0.2	<0.1	NR	2.26	Base of borehole at 2.59mbgl
	15	<0.1	0.0	17.9	0.2	<0.1			
	30	<0.1	0.0	17.8	0.2	<0.1			
	45	<0.1	0.0	17.8	0.2	<0.1			
	60	<0.1	0.0	17.8	0.2	<0.1			
	90	<0.1	0.0	7.7	0.3	<0.1			
	120	<0.1	0.0	17.7	0.4	<0.1			
	150			17.7	0.4	<0.1			
	180			17.8	0.4	<0.1			
	240			18.0	0.4	<0.1			
	300			18.4	0.4	<0.1			
WS6	0	<0.1	0.0	18.2	3.1	<0.1	NR	0.62	Base of borehole at 2.06mbgl
	15	<0.1	0.0	17.9	3.6	<0.1			
	30	<0.1	0.0	17.7	4.0	<0.1			
	45	<0.1	0.0	17.7	4.2	<0.1			
	60	<0.1	0.0	17.4	4.4	<0.1			
	90	<0.1	0.0	17.3	4.4	<0.1			
	120	<0.1	0.0	17.4	4.2	<0.1			
	150			17.5	4.1	<0.1			
	180			17.4	4.3	<0.1			
	240			18.1	2.1	<0.1			
	300			19.3	0.0	<0.1			
WS7	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS8	0	<0.1	0.0	19.2	0.1	<0.1	NR	0.46	Base of borehole at 2.06mbgl
	15	<0.1	0.0	19.5	<0.1	<0.1			
	30	<0.1	0.0	19.6	<0.1	<0.1			
	45	<0.1	0.0	19.6	<0.1	<0.1			
	60	<0.1	0.0	19.8	<0.1	<0.1			
	90	<0.1	0.0	19.7	<0.1	<0.1			
	120	<0.1	0.0	19.7	<0.1	<0.1			
	150			19.7	<0.1	<0.1			
	180			19.7	<0.1	<0.1			
	240			19.7	<0.1	<0.1			
	300			19.7	<0.1	<0.1			
WS9	0	<0.1	0.0	19.9	<0.1	<0.1	NR	1.20	Base of borehole at 2.93mbgl
	15	<0.1	0.0	19.9	<0.1	<0.1			
	30	<0.1	0.0	19.9	<0.1	<0.1			
	45	<0.1	0.0	19.9	<0.1	<0.1			
	60	<0.1	0.0	19.9	<0.1	<0.1			
	90	<0.1	0.0	19.9	<0.1	<0.1			
	120	<0.1	0.0	19.9	<0.1	<0.1			
	150			19.9	<0.1	<0.1			
	180			19.7	0.1	<0.1			
	240			19.5	0.5	<0.1			
	300			19.7	0.3	<0.1			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	01/12/2014	Engineer:	TOP
Time:	06:30	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1014 Local pressure system*: Rising Air temperature (°C): 8

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 GW (mbgl)	Comments
BH2	0	<0.1	0.0	12.3	2.2	<0.1	NR	7.60	Base of borehole at 9.93mbgl
	15	<0.1	0.0	12.6	2.1	<0.1			
	30	<0.1	0.0	13.1	1.6	<0.1			
	45	<0.1	0.0	16.3	0.9	<0.1			
	60	<0.1	0.0	16.4	0.8	<0.1			
	90	<0.1	0.0	17.2	0.4	<0.1			
	120	<0.1	0.0	17.6	0.7	<0.1			
	150			17.9	0.6	<0.1			
	180			18.0	0.6	<0.1			
	240			18.8	0.4	<0.1			
	300			18.8	0.4	<0.1			
BH3	0	<0.1	0.0	16.6	1.7	<0.1	NR	2.80	Base of borehole at 5.05mbgl
	15	<0.1	0.0	16.3	1.7	<0.1			
	30	<0.1	0.0	16.3	1.7	<0.1			
	45	<0.1	0.0	16.4	1.7	<0.1			
	60	<0.1	0.0	16.3	1.7	<0.1			
	90	<0.1	0.0	16.3	1.8	<0.1			
	120	<0.1	0.0	16.2	1.8	<0.1			
	150			16.2	1.9	<0.1			
	180			16.2	1.9	<0.1			
	240			16.1	2.0	<0.1			
	300			16.0	2.1	<0.1			
BH4	0	<0.1	0.0	18.9	0.3	<0.1	NR	1.18	Base of borehole at 8.98mbgl
	15	<0.1	0.0	18.9	0.2	<0.1			
	30	<0.1	0.0	18.9	0.2	<0.1			
	45	<0.1	0.0	19.0	0.2	<0.1			
	60	<0.1	0.0	19.0	0.2	<0.1			
	90	<0.1	0.0	19.1	0.2	<0.1			
	120	<0.1	0.0	19.2	0.2	<0.1			
	150			19.2	0.1	<0.1			
	180			19.3	0.1	<0.1			
	240			19.3	0.1	<0.1			
	300			19.3	0.1	<0.1			
BH5	0	<0.1	0.0	18.5	0.9	<0.1	NR	4.79	Base of borehole at 7.56mbgl
	15	<0.1	0.0	17.1	1.3	<0.1			
	30	<0.1	0.0	16.1	1.7	<0.1			
	45	<0.1	0.0	15.0	2.3	<0.1			
	60	<0.1	0.0	14.2	2.7	<0.1			
	90	<0.1	0.0	13.7	2.9	<0.1			
	120	<0.1	0.0	13.5	3.0	<0.1			
	150			13.4	3.0	<0.1			
	180			13.4	3.1	<0.1			
	240			13.4	3.1	<0.1			
	300			13.4	3.1	<0.1			
BH6	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	01/12/2014	Engineer:	TOP
Time:	06:30	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1014 Local pressure system*: Rising Air temperature (°C): 8

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 GW (mbgl)	Comments
BH7	0	<0.1	0.0	14.9	2.3	<0.1	NR	7.24	Base of borehole at 7.52mbgl
	15	<0.1	0.0	14.6	2.4	<0.1			
	30	<0.1	0.0	14.6	2.4	<0.1			
	45	<0.1	0.0	14.5	2.4	<0.1			
	60	<0.1	0.0	14.5	2.4	<0.1			
	90	<0.1	0.0	14.5	2.4	<0.1			
	120	<0.1	0.0	14.5	2.4	<0.1			
	150			14.5	2.4	<0.1			
	180			14.5	2.4	<0.1			
	240			14.4	2.4	<0.1			
	300			14.4	2.4	<0.1			
BH8	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH9	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH10	0	NR	NR	NR	NR	NR	NR	NR	Borehole not completed at time of visit
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS4	0	<0.1	0.0	15.5	2.3	<0.1	NR	0.67	Base of borehole at 1.3mbgl
	15	<0.1	0.0	15.4	2.3	<0.1			
	30	<0.1	0.0	15.4	2.3	<0.1			
	45	<0.1	0.0	15.4	2.3	<0.1			
	60	<0.1	0.0	15.3	2.3	<0.1			
	90	<0.1	0.0	15.3	2.3	<0.1			
	120	<0.1	0.0	15.3	2.3	<0.1			
	150			15.4	2.2	<0.1			
	180			15.4	2.2	<0.1			
	240			15.6	2.1	<0.1			
	300			15.8	2.1	<0.1			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	01/12/2014	Engineer:	TOP
Time:	06:30	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1014 Local pressure system*: Rising Air temperature (°C): 8

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 GW (mbgl)	Comments
WS5	0	<0.1	0.0	18.8	2.3	<0.1	NR	2.03	Base of borehole at 2.67mbgl
	15	<0.1	0.0	18.9	2.4	<0.1			
	30	<0.1	0.0	18.4	2.4	<0.1			
	45	<0.1	0.0	17.9	2.5	<0.1			
	60	<0.1	0.0	17.9	2.5	<0.1			
	90	<0.1	0.0	17.9	2.5	<0.1			
	120	<0.1	0.0	17.9	2.5	<0.1			
	150			17.9	2.4	<0.1			
	180			18.0	2.3	<0.1			
	240			18.5	1.9	<0.1			
	300			18.9	1.5	<0.1			
WS6	0	<0.1	0.0	16.6	5.4	<0.1	NR	0.65	Base of borehole at 2.09mbgl
	15	<0.1	0.0	16.5	5.3	<0.1			
	30	<0.1	0.0	16.8	4.7	<0.1			
	45	<0.1	0.0	17.2	4.2	<0.1			
	60	<0.1	0.0	17.4	3.9	<0.1			
	90	<0.1	0.0	18.0	3.1	<0.1			
	120	<0.1	0.0	18.4	2.2	<0.1			
	150			18.7	1.8	<0.1			
	180			18.9	1.5	<0.1			
	240			19.3	0.9	<0.1			
	300			19.5	0.6	<0.1			
WS7	0	<0.1	0.0	16.9	2.6	<0.1	NR	1.27	Base of borehole at 2.08mbgl
	15	<0.1	0.0	17.9	1.0	<0.1			
	30	<0.1	0.0	18.5	1.0	<0.1			
	45	<0.1	0.0	18.5	1.0	<0.1			
	60	<0.1	0.0	18.5	1.0	<0.1			
	90	<0.1	0.0	18.5	1.0	<0.1			
	120	<0.1	0.0	18.5	1.0	<0.1			
	150								
	180								
	240								
	300								
WS8	0	<0.1	0.0	19.0	<0.1	<0.1	NR	0.51	Base of borehole at 2.06mbgl
	15	<0.1	0.0	19.0	<0.1	<0.1			
	30	<0.1	0.0	19.0	<0.1	<0.1			
	45	<0.1	0.0	18.9	<0.1	<0.1			
	60	<0.1	0.0	18.9	<0.1	<0.1			
	90	<0.1	0.0	18.9	<0.1	<0.1			
	120	<0.1	0.0	18.9	<0.1	<0.1			
	150			18.9	<0.1	<0.1			
	180			18.9	<0.1	<0.1			
	240			18.9	<0.1	<0.1			
	300			18.9	<0.1	<0.1			
WS9	0	<0.1	0.0	19.4	0.1	<0.1	NR	1.25	Base of borehole at 2.78mbgl
	15	<0.1	0.0	19.7	0.1	<0.1			
	30	<0.1	0.0	19.7	0.1	<0.1			
	45	<0.1	0.0	19.8	0.1	<0.1			
	60	<0.1	0.0	19.8	0.1	<0.1			
	90	<0.1	0.0	19.8	<0.1	<0.1			
	120	<0.1	0.0	19.8	<0.1	<0.1			
	150			19.8	<0.1	<0.1			
	180			19.8	<0.1	<0.1			
	240			19.8	<0.1	<0.1			
	300			19.8	<0.1	<0.1			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	18/12/2014	Engineer:	TOP
Time:	07:00	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1003 - 1004 Local pressure system*: Rising Air temperature (°C): 13

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 GW (mbgl)	Comments
BH2	0	<0.1	0.0	17.8	2.0	<0.1	NR	6.72	Base of borehole at 10mbgl
	15	<0.1	0.0	17.8	2.0	<0.1			
	30	<0.1	0.0	17.7	2.1	<0.1			
	45	<0.1	0.0	17.7	2.1	<0.1			
	60	<0.1	0.0	17.6	2.1	<0.1			
	90	<0.1	0.0	17.6	2.2	<0.1			
	120	<0.1	0.0	17.5	2.2	<0.1			
	150			17.5	2.2	<0.1			
	180			17.5	2.2	<0.1			
	240			17.5	2.2	<0.1			
	300			17.5	2.2	<0.1			
BH3	0	-0.4	-2.0	14.0	2.2	<0.1	NR	2.23	Base of borehole at 5.09mbgl
	15	-0.3	-1.0	14.2	2.1	<0.1			
	30	-0.7	-4.0	14.9	1.8	<0.1			
	45	-0.8	-4.0	15.6	1.6	<0.1			
	60	-0.4	-2.0	16.1	1.4	<0.1			
	90	-0.6	-3.0	17.4	0.9	<0.1			
	120	-0.1	-1.0	18.2	0.7	<0.1			
	150	-0.3	-2.0	17.8	0.8	<0.1			
	180	-0.4	-2.0	18.2	0.7	<0.1			
	240	-0.7	-4.0	18.8	0.6	<0.1			
	300	0.0	0.0	18.9	0.5	<0.1			
BH4	0	<0.1	0.0	17.9	0.4	<0.1	NR	1.36	Base of borehole at 8.25mbgl
	15	<0.1	0.0	18.5	0.3	<0.1			
	30	<0.1	0.0	19.0	0.2	<0.1			
	45	<0.1	0.0	19.3	0.2	<0.1			
	60	<0.1	0.0	19.5	0.1	<0.1			
	90	<0.1	0.0	19.6	0.1	<0.1			
	120	<0.1	0.0	19.7	0.1	<0.1			
	150			19.7	0.1	<0.1			
	180			19.7	0.1	<0.1			
	240			19.8	0.1	<0.1			
	300			19.8	0.1	<0.1			
BH5	0	-0.7	-2.0	14.3	1.9	<0.1	NR	3.58	Base of borehole at 7.05mbgl
	15	-1.0	-4.0	12.7	2.2	<0.1			
	30	-0.4	-2.0	11.6	2.4	<0.1			
	45	-0.7	-3.0	11.4	2.4	<0.1			
	60	-0.4	-2.0	11.2	2.5	<0.1			
	90	-0.4	-2.0	10.9	2.5	<0.1			
	120	-0.7	-3.0	10.8	2.5	<0.1			
	150	-0.4	-2.0	10.7	2.6	<0.1			
	180	-1.2	-4.0	10.6	2.6	<0.1			
	240	-0.4	-2.0	10.5	2.6	<0.1			
	300	-0.4	-2.0	10.4	2.6	<0.1			
BH6	0	<0.1	0.0	15.8	3.9	<0.1	NR	8.1	Base of borehole at 8.54mbgl
	15	<0.1	0.0	16.0	3.9	<0.1			
	30	<0.1	0.0	16.0	3.9	<0.1			
	45	<0.1	0.0	16.0	4.0	<0.1			
	60	<0.1	0.0	16.0	4.0	<0.1			
	90	<0.1	0.0	16.0	4.0	<0.1			
	120	<0.1	0.0	16.0	3.9	<0.1			
	150			16.0	3.9	<0.1			
	180			16.0	3.9	<0.1			
	240			16.0	3.9	<0.1			
	300			16.0	4.0	<0.1			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	18/12/2014	Engineer:	TOP
Time:	07:00	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1003 - 1004 Local pressure system*: Rising Air temperature (°C): 13

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 GW (mbgl)	Comments
BH7	0	<0.1	0.0	7.7	1.9	<0.1	NR	7.01	Base of borehole at 7.55mbgl
	15	<0.1	0.0	17.6	2.0	<0.1			
	30	<0.1	0.0	17.5	2.0	<0.1			
	45	<0.1	0.0	17.4	2..1	<0.1			
	60	<0.1	0.0	17.4	2.1	<0.1			
	90	<0.1	0.0	17.3	2.1	<0.1			
	120	<0.1	0.0	17.3	2.1	<0.1			
	150			17.2	2.1	<0.1			
	180			17.2	2.1	<0.1			
	240			17.2	2.1	<0.1			
	300			17.1	2.2	<0.1			
BH8	0	-0.4	-2.0	12.4	2.1	<0.1	NR	16.52	Base of borehole at 26.0mbgl
	15	-0.3	-1.0	12.0	2.2	<0.1			
	30	-0.6	-2.0	12.0	2.2	<0.1			
	45	-0.6	-3.0	12.0	2.2	<0.1			
	60	-0.3	-1.0	11.9	2.2	<0.1			
	90	-0.4	-2.0	11.8	2.2	<0.1			
	120	-0.6	-3.0	11.8	2.2	<0.1			
	150	-0.3	-1.0	11.8	2.2	<0.1			
	180	-0.3	-1.0	11.7	2.2	<0.1			
	240	-0.4	-2.0	11.7	2.2	<0.1			
	300	-0.3	-1.0	11.7	2.2	<0.1			
BH9	0	<0.1	0.0	18.6	0.2	<0.1	NR	27.10	Base of borehole at 31.37mbgl
	15	<0.1	0.0	18.7	0.2	<0.1			
	30	<0.1	0.0	18.6	0.2	<0.1			
	45	<0.1	0.0	18.5	0.2	<0.1			
	60	<0.1	0.0	18.3	0.3	<0.1			
	90	<0.1	0.0	18.2	0.3	<0.1			
	120	<0.1	0.0	18.1	0.3	<0.1			
	150			18.1	0.3	<0.1			
	180			18.7	0.3	<0.1			
	240			18.1	0.3	<0.1			
	300			18.1	0.3	<0.1			
BH10	0	<0.1	0.0	8.3	1.6	<0.1	NR	2.0	Base of borehole at 24mbgl
	15	<0.1	0.0	8.2	1.6	<0.1			
	30	<0.1	0.0	8.2	1.6	<0.1			
	45	<0.1	0.0	8.1	1.7	<0.1			
	60	<0.1	0.0	8.0	1.7	<0.1			
	90	<0.1	0.0	8.0	1.7	<0.1			
	120	<0.1	0.0	8.0	1.7	<0.1			
	150			8.0	1.8	<0.1			
	180			8.0	1.8	<0.1			
	240			8.0	1.8	<0.1			
	300			8.0	1.8	<0.1			
WS4	0	<0.1	0.0	16.3	2.1	<0.1	NR	0.68	Base of borehole at 1.29mbgl
	15	<0.1	0.0	16.2	2.1	<0.1			
	30	<0.1	0.0	16.2	2.1	<0.1			
	45	<0.1	0.0	16.1	2.1	<0.1			
	60	<0.1	0.0	16.2	2.1	<0.1			
	90	<0.1	0.0	16.2	2.1	<0.1			
	120	<0.1	0.0	16.2	2.1	<0.1			
	150			16.3	2.1	<0.1			
	180			16.4	2.0	<0.1			
	240			16.5	2.0	<0.1			
	300			16.6	1.9	<0.1			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village, London	Job No:	CG/18067A
Date:	18/12/2014	Engineer:	TOP
Time:	07:00	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1003 - 1004 Local pressure system*: Rising Air temperature (°C): 13

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 GW (mbgl)	Comments
WS5	0	<0.1	0.0	18.4	2.1	<0.1	NR	2.07	Base of borehole at 2.67mbgl.
	15	<0.1	0.0	18.4	2.1	<0.1			
	30	<0.1	0.0	8.4	2.1	<0.1			
	45	<0.1	0.0	18.4	2.1	<0.1			
	60	<0.1	0.0	18.4	2.1	<0.1			
	90	<0.1	0.0	18.5	2.1	<0.1			
	120	<0.1	0.0	18.5	2.1	<0.1			
	150			18.5	2.0	<0.1			
	180			18.6	2.0	<0.1			
	240			18.6	1.9	<0.1			
	300			18.7	1.9	<0.1			
WS6	0	<0.1	0.0	19.5	0.8	<0.1		0.55	Base of borehole at 1.09mbgl.
	15	<0.1	0.0	19.6	0.8	<0.1			
	30	<0.1	0.0	19.7	0.7	<0.1			
	45	<0.1	0.0	19.7	0.6	<0.1			
	60	<0.1	0.0	19.8	0.5	<0.1			
	90	<0.1	0.0	19.8	0.5	<0.1			
	120	<0.1	0.0	19.8	0.5	<0.1			
	150			19.8	0.5	<0.1			
	180			19.9	0.5	<0.1			
	240			19.9	0.5	<0.1			
	300			19.9	0.5	<0.1			
WS7	0	<0.1	0.0	19.0	0.9	<0.1	NR	1.05	Base of borehole at 2.03mbgl.
	15	<0.1	0.0	19.0	1.0	<0.1			
	30	<0.1	0.0	18.9	1.0	<0.1			
	45	<0.1	0.0	19.0	0.9	<0.1			
	60	<0.1	0.0	19.0	0.9	<0.1			
	90	<0.1	0.0	19.0	0.9	<0.1			
	120	<0.1	0.0	18.9	0.9	<0.1			
	150			18.9	0.9	<0.1			
	180			19.0	0.9	<0.1			
	240			19.0	0.9	<0.1			
	300			18.9	0.9	<0.1			
WS8	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS9	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.

0

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village	Job No:	CG/18067A
Date:	08/01/2015	Engineer:	TOP
Time:	6.40am	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1012 - 1015 Local pressure system*: Falling Air temperature (°C): 9

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 GW (mbgl)	Comments
BH2	0	0.3	1.0	16.9	1.3	<0.01	<0.01	6.14	Base of borehole at 9.97mbgl
	15	0.1	0.0	17.1	1.4	<0.01	<0.01		
	30	0.1	0.0	17.3	1.5	<0.01	<0.01		
	45	0.2	0.0	17.4	1.6	<0.01	<0.01		
	60	0.3	1.0	17.4	1.6	<0.01	<0.01		
	90	0.2	0.0	17.5	1.7	<0.01			
	120	0.1	0.0	17.5	1.8	<0.01			
	150			17.5	1.9	<0.01			
	180			17.6	2.0	<0.01			
	240			17.7	2.0	<0.01			
	300			17.7	2.1	<0.01			
BH3	0	0.3	1.0	15.7	1.9	<0.01	<0.01	1.92	Base of borehole at 5.0mbgl
	15	0.1	0.0	16.1	1.7	<0.01	<0.01		
	30	0.1	0.0	16.3	1.5	<0.01	<0.01		
	45	0.2	0.0	16.4	1.4	<0.01	<0.01		
	60	0.3	1.0	16.4	1.4	<0.01	<0.01		
	90	0.2	0.0	16.3	1.4	<0.01			
	120	0.1	0.0	16.4	1.4	<0.01			
	150			16.6	1.3	<0.01			
	180			16.9	0.9	<0.01			
	240			17.2	0.6	<0.01			
	300			17.5	0.4	<0.01			
BH4	0	0.3	1.0	18.1	0.5	<0.01	<0.01	1.43	Base of borehole at 7.42mbgl
	15	0.1	0.0	18.3	0.3	<0.01	<0.01		
	30	0.1	0.0	18.5	0.2	<0.01	<0.01		
	45	0.2	0.0	18.7	0.1	<0.01	<0.01		
	60	0.3	1.0	18.8	0.1	<0.01	<0.01		
	90	0.2	0.0	19.0	0.1	<0.01			
	120	0.1	0.0	19.2	0.0	<0.01			
	150			19.3	0.0	<0.01			
	180			19.4	0.0	<0.01			
	240			19.6	0.0	<0.01			
	300			19.8	0.0	<0.01			
BH5	0	0.3	1.0	13.0	1.6	<0.01	<0.01	1.58	Base of borehole at 7.05mbgl
	15	0.1	0.0	12.5	1.6	<0.01	<0.01		
	30	0.1	0.0	12.0	1.6	<0.01	<0.01		Rainwater collected above pipe and drained into well once bung was removed.
	45	0.2	0.0	11.5	1.7	<0.01	<0.01		
	60	0.3	1.0	11.2	1.7	<0.01	<0.01		
	90	0.2	0.0	10.9	1.8	<0.01			
	120	0.1	0.0	10.7	1.8	<0.01			
	150			10.6	1.8	<0.01			
	180			10.6	1.8	<0.01			
	240			10.5	1.7	<0.01			
	300			10.5	1.7	<0.01			
BH6	0	0.3	1.0	15.6	4.1	<0.01	<0.01	7.9	Base of borehole at 8.4mbgl
	15	0.1	0.0	15.8	4.1	<0.01	<0.01		
	30	0.1	0.0	15.9	4.1	<0.01	<0.01		
	45	0.2	0.0	15.9	4.1	<0.01	<0.01		
	60	0.3	1.0	15.9	4.0	<0.01	<0.01		
	90	0.2	0.0	15.9	4.0	<0.01			
	120	0.1	0.0	15.9	4.0	<0.01			
	150			16.0	4.0	<0.01			
	180			16.0	4.0	<0.01			
	240			16.0	4.0	<0.01			
	300			16.0	3.9	<0.01			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village	Job No:	CG/18067A
Date:	08/01/2015	Engineer:	TOP
Time:	6.40am	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1012 - 1015 Local pressure system*: Falling Air temperature (°C): 9

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 GW (mbgl)	Comments
BH7	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
BH8	0	0.3	1.0	11.2	2.1	<0.01	<0.01	10.35	Base of borehole at 26.13mbgl
	15	0.1	0.0	11.4	2.0	<0.01	<0.01		
	30	0.1	0.0	12.5	1.8	<0.01	<0.01		
	45	0.2	0.0	13.1	1.6	<0.01	<0.01		
	60	0.3	1.0	13.9	1.4	<0.01	<0.01		
	90	0.2	0.0	15.2	1.1	<0.01			
	120	0.1	0.0	15.9	0.9	<0.01			
	150			16.6	0.7	<0.01			
	180			16.8	0.7	<0.01			
	240			17.1	0.6	<0.01			
	300			17.3	0.6	<0.01			
BH9	0	0.3	1.0	10.5	1.0	<0.01	<0.01	8.29	Base of borehole at >30.0mbgl
	15	0.1	0.0	9.7	1.1	<0.01	<0.01		
	30	0.1	0.0	9.8	1.1	<0.01	<0.01		
	45	0.2	0.0	10.9	0.9	<0.01	<0.01		
	60	0.3	1.0	13.8	0.8	<0.01	<0.01		
	90	0.2	0.0	14.8	0.4	<0.01			
	120	0.1	0.0	13.2	0.3	<0.01			
	150			14.7	0.2	<0.01			
	180			14.4	0.2	<0.01			
	240			13.9	0.3	<0.01			
	300			14.2	0.2	<0.01			
BH10	0	0.3	1.0	5.9	0.7	<0.01	<0.01	1.60	Base of borehole at 24.22mbgl
	15	0.1	0.0	5.4	0.7	<0.01	<0.01		
	30	0.1	0.0	5.3	0.7	<0.01	<0.01		
	45	0.2	0.0	5.2	0.7	<0.01	<0.01		
	60	0.3	1.0	5.2	0.7	<0.01	<0.01		
	90	0.2	0.0	5.2	0.7	<0.01			
	120	0.1	0.0	5.2	0.7	<0.01			
	150			5.1	0.7	<0.01			
	180			5.1	0.7	<0.01			
	240			5.1	0.7	<0.01			
	300			5.2	0.7	<0.01			
WS4	0	0.3	1.0	15.6	2.0	<0.01	<0.01	0.69	1.29mbgl to base of borehole
	15	0.1	0.0	15.7	1.9	<0.01	<0.01		
	30	0.1	0.0	15.8	1.9	<0.01	<0.01		
	45	0.2	0.0	15.9	1.9	<0.01	<0.01		
	60	0.3	1.0	15.9	1.8	<0.01	<0.01		
	90	0.2	0.0	16.1	1.8	<0.01			
	120	0.1	0.0	16.1	1.8	<0.01			
	150			16.2	1.8	<0.01			
	180			16.2	1.8	<0.01			
	240			16.3	1.8	<0.01			
	300			16.4	1.8	<0.01			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village	Job No:	CG/18067A
Date:	08/01/2015	Engineer:	TOP
Time:	6.40am	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 1012 - 1015 Local pressure system*: Falling Air temperature (°C): 9

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 GW (mbgl)	Comments
WS5	0	0.3	1.0	19.9	1.2	<0.01	<0.01	1.94	Base of borehole at 2.68mbgl
	15	0.1	0.0	19.8	1.2	<0.01	<0.01		
	30	0.1	0.0	19.7	1.3	<0.01	<0.01		
	45	0.2	0.0	19.6	1.4	<0.01	<0.01		
	60	0.3	1.0	19.6	1.4	<0.01	<0.01		
	90	0.2	0.0	19.6	1.4	<0.01			
	120	0.1	0.0	19.5	1.5	<0.01			
	150			19.5	1.5	<0.01			
	180			19.5	1.4	<0.01			
	240			19.5	1.5	<0.01			
	300			19.5	1.5	<0.01			
WS6	0	0.3	1.0	16.8	3.2	<0.01	<0.01	0.62	Base of borehole at 2.06mbgl
	15	0.1	0.0	17.1	3.0	<0.01	<0.01		
	30	0.1	0.0	17.5	2.7	<0.01	<0.01		
	45	0.2	0.0	17.9	2.4	<0.01	<0.01		
	60	0.3	1.0	18.2	2.0	<0.01	<0.01		
	90	0.2	0.0	18.4	1.6	<0.01			
	120	0.1	0.0	18.7	1.2	<0.01			
	150			18.9	0.7	<0.01			
	180			19.2	0.4	<0.01			
	240			19.4	0.3	<0.01			
	300			19.6	0.2	<0.01			
WS7	0	0.3	1.0	20.4	0.4	<0.01	<0.01	0.86	Base of borehole at 2.07mbgl
	15	0.1	0.0	20.2	0.4	<0.01	<0.01		
	30	0.1	0.0	19.9	0.4	<0.01	<0.01		
	45	0.2	0.0	19.9	0.4	<0.01	<0.01		
	60	0.3	1.0	19.9	0.4	<0.01	<0.01		
	90	0.2	0.0	19.9	0.4	<0.01			
	120	0.1	0.0	19.8	0.4	<0.01			
	150			19.8	0.4	<0.01			
	180			19.8	0.4	<0.01			
	240			19.7	0.4	<0.01			
	300			19.7	0.4	<0.01			
WS8	0	NR	NR	NR	NR	NR	NR	NR	Unable to access borehole
	15								
	30								
	45								
	60								
	90								
	120								
	150								
	180								
	240								
	300								
WS9	0	0.3	1.0	20.5	<0.01	<0.01	<0.01	1.16	2.72mbgl to base of borehole
	15	0.1	0.0	20.6	<0.01	<0.01	<0.01		
	30	0.1	0.0	20.6	<0.01	<0.01	<0.01		
	45	0.2	0.0	20.5	<0.01	<0.01	<0.01		
	60	0.3	1.0	20.6	<0.01	<0.01	<0.01		
	90	0.2	0.0	20.6	<0.01	<0.01			
	120	0.1	0.0	20.6	<0.01	<0.01			
	150			20.6	<0.01	<0.01			
	180			20.6	<0.01	<0.01			
	240			20.6	<0.01	<0.01			
	300			20.6	<0.01	<0.01			

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village	Job No:	CG/18067A
Date:	13/01/2015	Engineer:	JJM
Time:	07:45	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 999-1001 ıcal pressure system*: Steady Air temperature (°C): 7.1

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 GW (mbgl)	Comments
BH2	0	<0.1	0.0	16.9	1.5	<0.1	NR	4.77	Base of borehole at 9.97mbgl
	15	<0.1	0.0	18.4	1.0	<0.1			
	30	<0.1	0.0	18.8	1.2	<0.1			
	45	<0.1	0.0	18.7	1.4	<0.1			
	60	<0.1	0.0	18.6	1.4	<0.1			
	90	<0.1	0.0	18.6	1.5	<0.1			
	120	<0.1	0.0	18.6	1.5	<0.1			
	150			18.6	1.5	<0.1			
	180								
	240								
	300								
BH3	0	<0.1	0.0	18.3	1.3	<0.1	NR	1.93	Base of borehole at 5.06mbgl
	15	<0.1	0.0	15.5	1.7	<0.1			
	30	<0.1	0.0	14.4	1.7	<0.1			
	45	<0.1	0.0	16.4	0.9	<0.1			
	60	<0.1	0.0	17.3	1.0	<0.1			
	90	<0.1	0.0	17.8	0.7	<0.1			
	120	<0.1	0.0	18.1	0.8	<0.1			
	150			18.5	0.5	<0.1			
	180			18.7	0.4	<0.1			
	240			18.9	0.7	<0.1			
	300			18.9	0.7	<0.1			
BH4	0	<0.1	0.0	19.0	0.6	<0.1	NR	4.06	Base of borehole at 8.22mbgl
	15	<0.1	0.0	19.2	0.7	<0.1			
	30	<0.1	0.0	18.8	0.7	<0.1			
	45	<0.1	0.0	18.8	0.7	<0.1			
	60	<0.1	0.0	18.8	0.6	<0.1			
	90	<0.1	0.0	18.9	0.6	<0.1			
	120	<0.1	0.0	18.9	0.6	<0.1			
	150			18.9	0.6	<0.1			
	180								
	240								
	300								
BH5	0	<0.1	0.0	19.1	0.4	<0.1	NR	2.65	Base of borehole at 7.05mbgl
	15	<0.1	0.0	19.6	0.3	<0.1			
	30	<0.1	0.0	19.5	0.3	<0.1			
	45	<0.1	0.0	19.4	0.3	<0.1			
	60	<0.1	0.0	19.4	0.3	<0.1			
	90	<0.1	0.0	19.4	0.3	<0.1			
	120	<0.1	0.0	19.4	0.3	<0.1			
	150								
	180								
	240								
	300								
BH6	0	<0.1	0.0	17.3	0.9	<0.1	NR	7.70	Base of borehole at 8.53mbgl
	15	<0.1	0.0	18.8	0.6	<0.1			
	30	<0.1	0.0	19.4	0.6	<0.1			
	45	<0.1	0.0	19.5	0.6	<0.1			
	60	<0.1	0.0	19.5	0.6	<0.1			
	90	<0.1	0.0	19.5	0.6	<0.1			
	120	<0.1	0.0	19.5	0.6	<0.1			
	150								
	180								
	240								
	300								

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village	Job No:	CG/18067A
Date:	13/01/2015	Engineer:	JJM
Time:	07:45	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 999-1001 ıcal pressure system*: Steady Air temperature (°C): 7.1

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 GW (mbgl)	Comments
BH7	0	<0.1	0.0	15.2	1.8	<0.1	NR	7.10	Base of borehole at 7.53mbgl
	15	<0.1	0.0	15.4	1.8	<0.1			
	30	<0.1	0.0	15.6	1.7	<0.1			
	45	<0.1	0.0	16.0	1.7	<0.1			
	60	<0.1	0.0	16.2	1.8	<0.1			
	90	<0.1	0.0	16.2	1.8	<0.1			
	120	<0.1	0.0	16.2	1.8	<0.1			
	150								
	180								
	240								
	300								
BH8	0	<0.1	0.0	13.5	0.7	<0.1	NR	10.25	Base of borehole at 25.26mbgl
	15	<0.1	0.0	10.7	2.1	<0.1			
	30	<0.1	0.0	9.1	2.4	<0.1			
	45	<0.1	0.0	7.9	2.6	<0.1			
	60	<0.1	0.0	8.3	2.4	<0.1			
	90	<0.1	0.0	10.3	2.0	<0.1			
	120	<0.1	0.0	12.3	1.8	<0.1			
	150			13.2	1.6	<0.1			
	180			11.8	1.9	<0.1			
	240			14.1	1.2	<0.1			
	300			14.5	1.2	<0.1			
BH9	0	<0.1	0.0	11.2	0.8	<0.1	NR	8.22	Base of borehole at 30.6mbgl
	15	<0.1	0.0	0.9	0.8	<0.1			
	30	<0.1	0.0	10.7	1.0	<0.1			
	45	<0.1	0.0	10.9	1.2	<0.1			
	60	<0.1	0.0	11.1	1.0	<0.1			
	90	<0.1	0.0	11.5	0.9	<0.1			
	120	<0.1	0.0	11.8	0.9	<0.1			
	150			12.2	0.9	<0.1			
	180			12.6	0.9	<0.1			
	240			13.0	0.8	<0.1			
	300			13.4	0.8	<0.1			
BH10	0	<0.1	0.0	13.5	0.6	<0.1	NR	1.52	Base of borehole at 24.2mbgl
	15	<0.1	0.0	13.4	0.6	<0.1			
	30	<0.1	0.0	12.7	0.6	<0.1			
	45	<0.1	0.0	12.3	0.6	<0.1			
	60	<0.1	0.0	12.3	0.6	<0.1			
	90	<0.1	0.0	12.1	0.6	<0.1			
	120	<0.1	0.0	12.0	0.6	<0.1			
	150			11.8	0.6	<0.1			
	180			11.5	0.7	<0.1			
	240			11.2	0.7	<0.1			
	300			11.2	0.7	<0.1			
WS4	0	<0.1	0.0	18.9	1.0	<0.1	NR	0.53	Base of borehole at 1.29mbgl
	15	<0.1	0.0	17.3	1.3	<0.1			
	30	<0.1	0.0	16.0	1.5	<0.1			
	45	<0.1	0.0	15.8	1.5	<0.1			
	60	<0.1	0.0	15.8	1.5	<0.1			
	90	<0.1	0.0	15.8	1.5	<0.1			
	120	<0.1	0.0						
	150								
	180								
	240								
	300								

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

GAS MONITORING RECORD SHEET

JOB DETAILS			
Site:	Camden Lock Village	Job No:	CG/18067A
Date:	13/01/2015	Engineer:	JJM
Time:	07:45	Client	Walsh Associates

METEOROLOGICAL & SITE INFORMATION

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

Barometric pressure (mb): 999-1001 ıcal pressure system*: Steady Air temperature (°C): 7.1

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 GW (mbgl)	Comments
WS5	0	<0.1	0.0	19.2	0.6	<0.1	NR	1.17	Base of borehole at 2.68mbgl
	15	<0.1	0.0	19.4	1.1	<0.1			
	30	<0.1	0.0	19.1	1.1	<0.1			
	45	<0.1	0.0	19.1	1.1	<0.1			
	60	<0.1	0.0	19.1	1.1	<0.1			
	90	<0.1	0.0	19.1	1.1	<0.1			
	120	<0.1	0.0	19.1	1.1	<0.1			
	150								
	180								
	240								
	300								
WS6	0	<0.1	0.0	18.4	0.6	<0.1	NR	7.70	Base of borehole at 2.1mbgl
	15	<0.1	0.0	19.1	0.8	<0.1			
	30	<0.1	0.0	19.0	0.8	<0.1			
	45	<0.1	0.0	19.0	0.7	<0.1			
	60	<0.1	0.0	19.1	0.7	<0.1			
	90	<0.1	0.0	19.1	0.7	<0.1			
	120	<0.1	0.0	19.1	0.7	<0.1			
	150			19.1	0.7				
	180								
	240								
	300								
WS7	0	<0.1	0.0	19.1	0.4	<0.1	NR	0.78	Base of borehole at 2.1mbgl
	15	<0.1	0.0	19.5	0.4	<0.1			
	30	<0.1	0.0	19.5	0.5	<0.1			
	45	<0.1	0.0	19.5	0.5	<0.1			
	60	<0.1	0.0	19.4	0.5	<0.1			
	90	<0.1	0.0	19.4	0.5	<0.1			
	120	<0.1	0.0	19.4	0.5	<0.1			
	150								
	180								
	240								
	300								
WS8	0	0.5	2.0	18.7	0.4	<0.1	NR	0.23	Base of borehole at 2.03mbgl
	15	0.4	2.0	18.8	<0.1	<0.1			
	30	0.1	1.0	17.8	<0.1	0.3			
	45	0.1	1.0	17.6	<0.1	0.4			
	60	<0.1	0.0	17.3	<0.1	0.4			
	90	<0.1	0.0	17.4	<0.1	0.4			
	120	<0.1	0.0	17.4	<0.1	0.4			
	150	<0.1	0.0	17.4	<0.1	0.4			
	180								
	240								
	300								
WS9	0	<0.1	0.0	19.8	<0.1	<0.1	NR	1.08	Base of borehole at 2.8mbgl
	15	<0.1	0.0	19.8	<0.1	<0.1			
	30	<0.1	0.0	19.7	<0.1	<0.1			
	45	<0.1	0.0	19.7	<0.1	<0.1			
	60	<0.1	0.0	19.7	<0.1	<0.1			
	90	<0.1	0.0	19.7	<0.1	<0.1			
	120	<0.1	0.0	19.7	<0.1	<0.1			
	150								
	180								
	240								
	300								

Notes:

The measurement of hydrogen sulphide and hydrocarbon free product is undertaken on a site specific basis, if deemed necessary.
** With reference to the Met Office rolling weather archive for Northolt weather station.*

APPENDIX D

Results of chemical analysis

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-61909

Project / Site name:	CLV P1 - Building B	**Samples received on:**	23/10/2014
Your job number:	CG-18067	**Samples instructed on:**	23/10/2014
Your order number:	1431	**Analysis completed by:**	03/11/2014
Report Issue Number:	1	**Report issued on:**	03/11/2014
Samples Analysed:	2 soil samples		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-61909

Project / Site name: CLV P1 - Building B
Your Order No: 1431

Lab Sample Number				384775	384776			
Sample Reference				WS5	WS4			
Sample Number				105	109			
Depth (m)				0.20	0.30			
Date Sampled				21/10/2014	22/10/2014			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	11	27			
Total mass of sample received	kg	0.001	NONE	0.92	1.1			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
General Inorganics								
pH	pH Units	N/A	MCERTS	7.3	7.6			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO_4	mg/kg	50	ISO 17025	2300	820			
Organic Matter	%	0.1	MCERTS	3.2	2.3			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	0.34	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	2.5	< 0.10			
Anthracene	mg/kg	0.1	MCERTS	0.73	< 0.10			
Fluoranthene	mg/kg	0.1	MCERTS	11	< 0.10			
Pyrene	mg/kg	0.1	MCERTS	9.4	< 0.10			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	6.0	< 0.10			
Chrysene	mg/kg	0.05	MCERTS	5.1	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	6.8	< 0.10			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	3.2	< 0.10			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	5.8	< 0.10			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	2.8	< 0.10			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	0.41	< 0.10			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.1	< 0.05			
Coronene	mg/kg	0.05	NONE	< 0.05	< 0.05			
Total PAH								
Total WAC-17 PAHs	mg/kg	1.6	NONE	57	< 1.6			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	12			
Barium (aqua regia extractable)	mg/kg	1	MCERTS	340	110			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.3	1.3			
Boron (water soluble)	mg/kg	0.2	MCERTS	3.3	3.3			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	< 0.2			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	30			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	130	82			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	1100	190			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.2	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	18			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	51	64			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	370	72			

Analytical Report Number: 14-61909

Project / Site name: CLV P1 - Building B
Your Order No: 1431

Lab Sample Number				384775	384776			
Sample Reference				WS5	WS4			
Sample Number				105	109			
Depth (m)				0.20	0.30			
Date Sampled				21/10/2014	22/10/2014			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	0.4			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	0.3			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	20			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	64			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	14			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	34	22			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	34	120			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	2.9			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	2.6	14			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	36	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	83	17			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	120	34			

Analytical Report Number : 14-61909

Project / Site name: CLV P1 - Building B

* 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 topsoil/loam 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 *
384775	WS5	105	0.20	Brown sandy topsoil with gravel.
384776	WS4	109	0.30	Brown clay and topsoil with brick.

Analytical Report Number : 14-61909

Project / Site name: CLV P1 - Building B

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	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	ISO 17025
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-62846

Project / Site name:	CLV P2	**Samples received on:**	11/11/2014
Your job number:	CG-18067A	**Samples instructed on:**	12/11/2014
Your order number:	1499	**Analysis completed by:**	20/11/2014
Report Issue Number:	1	**Report issued on:**	20/11/2014
Samples Analysed:	6 soil samples		

Signed:

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-62846

Project / Site name: CLV P2
Your Order No: 1499

Lab Sample Number				390748	390749	390750	390751	390752	390753
Sample Reference				WS9	WS6	WS8	WS8	WS7	WS7
Sample Number				201	204	210	211	215	217
Depth (m)				0.30	0.70	0.20	0.60	0.20	1.20
Date Sampled				10/11/2014	10/11/2014	10/11/2014	10/11/2014	10/11/2014	10/11/2014
Time Taken				None Supplied	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	< 0.1
Moisture Content	%	N/A	NONE	12	5.7	7.5	24	27	22
Total mass of sample received	kg	0.001	NONE	1.4	2.0	1.3	1.3	1.4	1.1
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	-	Not-detected	-
General Inorganics									
pH	pH Units	N/A	MCERTS	5.7	11.7	8.0	7.8	7.9	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO_4	mg/kg	50	ISO 17025	1600	4000	1400	550	490	220
Organic Matter	%	0.1	MCERTS	< 0.1	0.2	< 0.1	0.1	< 0.1	0.1
Total Phenols									
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs									
Naphthalene	mg/kg	0.05	MCERTS	1.6	< 0.05	0.30	< 0.05	< 0.05	0.45
Acenaphthylene	mg/kg	0.1	MCERTS	6.7	0.36	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	2.7	0.31	0.20	< 0.10	< 0.10	0.18
Fluorene	mg/kg	0.1	MCERTS	7.6	0.29	0.22	0.23	< 0.10	0.20
Phenanthrene	mg/kg	0.1	MCERTS	57	4.9	2.8	0.82	< 0.10	0.30
Anthracene	mg/kg	0.1	MCERTS	16	1.3	0.34	0.14	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	74	9.0	3.0	0.60	< 0.10	< 0.10
Pyrene	mg/kg	0.1	MCERTS	60	8.4	2.5	0.61	< 0.10	< 0.10
Benzo(a)anthracene	mg/kg	0.1	MCERTS	29	4.7	1.6	0.29	< 0.10	< 0.10
Chrysene	mg/kg	0.05	MCERTS	26	3.3	1.6	0.28	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	28	4.6	1.8	0.27	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	14	1.6	0.78	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	26	3.7	1.3	0.24	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	15	2.1	0.65	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	3.4	0.50	0.20	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	15	2.3	0.72	< 0.05	< 0.05	< 0.05
Coronene	mg/kg	0.05	NONE	5.2	1.1	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH									
Total WAC-17 PAHs	mg/kg	1.6	NONE	390	48	18	3.5	< 1.6	< 1.6
Heavy Metals / Metalloids									
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	17	9.2	12	7.4	14
Barium (aqua regia extractable)	mg/kg	1	MCERTS	180	120	53	66	69	78
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.3	0.3	0.4	1.8	0.8	1.7
Boron (water soluble)	mg/kg	0.2	MCERTS	3.1	1.3	< 0.2	0.9	0.3	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.6
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	-	-	< 1.2	-	< 1.2
Chromium (III)	mg/kg	1	NONE	-	-	-	44	-	47
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	15	13	44	21	47
Copper (aqua regia extractable)	mg/kg	1	MCERTS	62	30	34	30	35	25
Lead (aqua regia extractable)	mg/kg	1	MCERTS	140	230	100	29	87	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	25	11	17	33	16	44
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	57	33	28	77	41	82
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	150	43	69	50	65

Analytical Report Number: 14-62846

Project / Site name: CLV P2
Your Order No: 1499

Lab Sample Number				390748	390749	390750	390751	390752	390753
Sample Reference				WS9	WS6	WS8	WS8	WS7	WS7
Sample Number				201	204	210	211	215	217
Depth (m)				0.30	0.70	0.20	0.60	0.20	1.20
Date Sampled				10/11/2014	10/11/2014	10/11/2014	10/11/2014	10/11/2014	10/11/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**						
Monoaromatics									
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons									
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	2.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	27	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	210	24	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	190	36	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	430	60	< 10	< 10	< 10	< 10

Analytical Report Number: 14-62846

Project / Site name: CLV P2
Your Order No: 1499

Lab Sample Number							
Sample Reference							
Sample Number							
Depth (m)							
Date Sampled							
Time Taken							
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE				
Moisture Content	%	N/A	NONE				
Total mass of sample received	kg	0.001	NONE				
Asbestos in Soil	Type	N/A	ISO 17025				
General Inorganics							
pH	pH Units	N/A	MCERTS				
Total Cyanide	mg/kg	1	MCERTS				
Total Sulphate as SO_4	mg/kg	50	ISO 17025				
Organic Matter	%	0.1	MCERTS				
Total Phenols							
Total Phenols (monohydric)	mg/kg	1	MCERTS				
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS				
Acenaphthylene	mg/kg	0.1	MCERTS				
Acenaphthene	mg/kg	0.1	MCERTS				
Fluorene	mg/kg	0.1	MCERTS				
Phenanthrene	mg/kg	0.1	MCERTS				
Anthracene	mg/kg	0.1	MCERTS				
Fluoranthene	mg/kg	0.1	MCERTS				
Pyrene	mg/kg	0.1	MCERTS				
Benzo(a)anthracene	mg/kg	0.1	MCERTS				
Chrysene	mg/kg	0.05	MCERTS				
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS				
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS				
Benzo(a)pyrene	mg/kg	0.1	MCERTS				
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS				
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS				
Coronene	mg/kg	0.05	NONE				
Total PAH							
Total WAC-17 PAHs	mg/kg	1.6	NONE				
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS				
Barium (aqua regia extractable)	mg/kg	1	MCERTS				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS				
Boron (water soluble)	mg/kg	0.2	MCERTS				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS				
Chromium (hexavalent)	mg/kg	1.2	MCERTS				
Chromium (III)	mg/kg	1	NONE				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS				
Copper (aqua regia extractable)	mg/kg	1	MCERTS				
Lead (aqua regia extractable)	mg/kg	1	MCERTS				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS				

Analytical Report Number: 14-62846

Project / Site name: CLV P2
Your Order No: 1499

Lab Sample Number							
Sample Reference							
Sample Number							
Depth (m)							
Date Sampled							
Time Taken							
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Monoaromatics							
Benzene	µg/kg	1	MCERTS				
Toluene	µg/kg	1	MCERTS				
Ethylbenzene	µg/kg	1	MCERTS				
p & m-xylene	µg/kg	1	MCERTS				
o-xylene	µg/kg	1	MCERTS				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS				

Analytical Report Number : 14-62846

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
390748	WS9	201	0.30	Light brown clay and sand.
390749	WS6	204	0.70	Non Soil **
390750	WS8	210	0.20	Non Soil **
390751	WS8	211	0.60	Non Soil **
390752	WS7	215	0.20	Non Soil **
390753	WS7	217	1.20	Non Soil **

** Non MCerts Matrix

Analytical Report Number : 14-62846

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
chromium III in soil	In-house method by calculation from total Cr and Cr VI.	In-house method	L068-PL	D	NONE
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	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	ISO 17025
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-62807

Project / Site name:	CLV P1 Building W	**Samples received on:**	07/11/2014
Your job number:	CG-18067	**Samples instructed on:**	07/11/2014
Your order number:	1432	**Analysis completed by:**	18/11/2014
Report Issue Number:	1	**Report issued on:**	18/11/2014
Samples Analysed:	1 soil sample		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-62807

Project / Site name: CLV P1 Building W

Your Order No: 1432

Lab Sample Number				390517				
Sample Reference				BH2				
Sample Number				None Supplied				
Depth (m)				0.20-0.60				
Date Sampled				05/11/2014				
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	9.8				
Total mass of sample received	kg	0.001	NONE	0.52				
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected				
General Inorganics								
pH	pH Units	N/A	MCERTS	8.0				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO_4	mg/kg	50	ISO 17025	1600				
Organic Matter	%	0.1	MCERTS	2.0				
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10				
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10				
Fluorene	mg/kg	0.1	MCERTS	< 0.10				
Phenanthrene	mg/kg	0.1	MCERTS	1.1				
Anthracene	mg/kg	0.1	MCERTS	0.22				
Fluoranthene	mg/kg	0.1	MCERTS	2.2				
Pyrene	mg/kg	0.1	MCERTS	2.0				
Benzo(a)anthracene	mg/kg	0.1	MCERTS	1.0				
Chrysene	mg/kg	0.05	MCERTS	1.2				
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	1.6				
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	0.76				
Benzo(a)pyrene	mg/kg	0.1	MCERTS	1.1				
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.67				
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	0.18				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.77				
Coronene	mg/kg	0.05	NONE	< 0.05				
Total PAH								
Total WAC-17 PAHs	mg/kg	1.6	NONE	13				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	23				
Barium (aqua regia extractable)	mg/kg	1	MCERTS	240				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.5				
Boron (water soluble)	mg/kg	0.2	MCERTS	1.4				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	30				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	570				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	8.5				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	58				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	300				

Analytical Report Number: 14-62807

Project / Site name: CLV P1 Building W
Your Order No: 1432

Lab Sample Number				390517				
Sample Reference				BH2				
Sample Number				None Supplied				
Depth (m)				0.20-0.60				
Date Sampled				05/11/2014				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	29				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	29				

Analytical Report Number : 14-62807

Project / Site name: CLV P1 Building W

* 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 topsoil/loam 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 *
390517	BH2	None Supplied	0.20-0.60	Brown topsoil and sand with gravel.

Analytical Report Number : 14-62807

Project / Site name: CLV P1 Building W

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	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	ISO 17025
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-63102

Project / Site name:	CLV P2	**Samples received on:**	17/11/2014
Your job number:	CG-18067A	**Samples instructed on:**	17/11/2014
Your order number:	1499	**Analysis completed by:**	26/11/2014
Report Issue Number:	1	**Report issued on:**	26/11/2014
Samples Analysed:	2 soil samples		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-63102

Project / Site name: CLV P2

Your Order No: 1499

Lab Sample Number				392525	392526			
Sample Reference				BH6	BH6			
Sample Number				220	221			
Depth (m)				0.30	2.20			
Date Sampled				14/11/2014	14/11/2014			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	8.8	18			
Total mass of sample received	kg	0.001	NONE	1.3	1.1			
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile- Loose fibres	-			
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-			
General Inorganics								
pH	pH Units	N/A	MCERTS	10.3	7.6			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO_4	mg/kg	50	ISO 17025	1500	6000			
Organic Matter	%	0.1	MCERTS	3.0	0.2			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	2.4	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	8.4	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	11	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	100	0.61			
Anthracene	mg/kg	0.1	MCERTS	30	0.17			
Fluoranthene	mg/kg	0.1	MCERTS	160	0.87			
Pyrene	mg/kg	0.1	MCERTS	130	0.69			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	78	0.33			
Chrysene	mg/kg	0.05	MCERTS	54	0.36			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	73	0.30			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	31	0.21			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	64	0.30			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	28	< 0.10			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	5.5	< 0.10			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	29	< 0.05			
Coronene	mg/kg	0.05	NONE	7.1	< 0.05			
Total PAH								
Total WAC-17 PAHs	mg/kg	1.6	NONE	810	3.8			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	24	14			
Barium (aqua regia extractable)	mg/kg	1	MCERTS	230	35			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.8	1.7			
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	1.6			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	< 1.2			
Chromium (III)	mg/kg	1	NONE	-	46			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	36	46			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	160	31			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	340	14			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	47	45			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	67	87			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	430	87			

Analytical Report Number: 14-63102

Project / Site name: CLV P2
Your Order No: 1499

Lab Sample Number				392525	392526			
Sample Reference				BH6	BH6			
Sample Number				220	221			
Depth (m)				0.30	2.20			
Date Sampled				14/11/2014	14/11/2014			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	3.8	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	22	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	19	< 8.0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	45	< 10			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	51	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	490	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	650	< 10			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1200	< 10			

Analytical Report Number : 14-63102

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
392525	BH6	220	0.30	Brown sandy topsoil with rubble and brick.
392526	BH6	221	2.20	Light brown clay.

Analytical Report Number : 14-63102

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
chromium III in soil	In-house method by calculation from total Cr and Cr VI.	In-house method	L068-PL	D	NONE
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	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	ISO 17025
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-62702

Project / Site name:	CLV P2	**Samples received on:**	07/11/2014
Your job number:	CG/18067A	**Samples instructed on:**	07/11/2014
Your order number:	1499	**Analysis completed by:**	18/11/2014
Report Issue Number:	1	**Report issued on:**	18/11/2014
Samples Analysed:	2 soil samples		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-62702

Project / Site name: CLV P2

Your Order No: 1499

Lab Sample Number				389798	389799			
Sample Reference				BH7	BH7			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.50-1.00	1.70-2.20			
Date Sampled				05/11/2014	05/11/2014			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	25	21			
Total mass of sample received	kg	0.001	NONE	1.4	1.5			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
General Inorganics								
pH	pH Units	N/A	MCERTS	7.4	7.9			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO_4	mg/kg	50	ISO 17025	1600	430			
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.76	-			
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	760	-			
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.38	-			
Total Sulphur	mg/kg	50	NONE	1300	-			
Organic Matter	%	0.1	MCERTS	0.5	< 0.1			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Coronene	mg/kg	0.05	NONE	< 0.05	< 0.05			
Total PAH								
Total WAC-17 PAHs	mg/kg	1.6	NONE	< 1.6	< 1.6			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	48	13			
Barium (aqua regia extractable)	mg/kg	1	MCERTS	370	130			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	4.7	1.4			
Boron (water soluble)	mg/kg	0.2	MCERTS	10	4.4			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	< 0.2			
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2			
Chromium (III)	mg/kg	1	NONE	52	37			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	52	37			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	120	22			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	87	20			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	77	30			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	200	69			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	170	59			

Analytical Report Number: 14-62702

Project / Site name: CLV P2

Your Order No: 1499

Lab Sample Number				389798	389799			
Sample Reference				BH7	BH7			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.50-1.00	1.70-2.20			
Date Sampled				05/11/2014	05/11/2014			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	20			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	20			

Analytical Report Number : 14-62702

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
389798	BH7	None Supplied	0.50-1.00	Grey sandy clay.
389799	BH7	None Supplied	1.70-2.20	Light brown clay.

Analytical Report Number : 14-62702

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
chromium III in soil	In-house method by calculation from total Cr and Cr VI.	In-house method	L068-PL	D	NONE
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1 leachate (g/l).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	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	ISO 17025
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	NONE

Analytical Report Number : 14-62702

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-61911

Project / Site name:	CLV P1 - Building B	**Samples received on:**	23/10/2014
Your job number:	CG-18067	**Samples instructed on:**	23/10/2014
Your order number:	1431	**Analysis completed by:**	03/11/2014
Report Issue Number:	1	**Report issued on:**	03/11/2014
Samples Analysed:	1 wac multi sample		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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.

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**14-61911**						
					Client: CARDGEO		
Location	**CLV P1 - Building B**						
Lab Reference (Sample Number)	384782				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	22/10/2014				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS4						
Depth (m)	0.30						
Solid Waste Analysis							
TOC (%)**	1.3				3%	5%	6%
Loss on Ignition (%) **	8.7				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.30				1	--	--
Mineral Oil (mg/kg)	120				500	--	--
Total PAH (WAC-17) (mg/kg)	< 1.6				100	--	--
pH (units)**	7.6				--	>6	--
Acid Neutralisation Capacity (mol / kg)	3.4				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.012	< 0.010		0.082	0.5	2	25
Barium *	0.065	0.064		0.64	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	< 0.0010	< 0.0010		< 0.0050	0.5	10	70
Copper *	0.0042	0.0038		0.039	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.024	0.012		0.13	0.5	10	30
Nickel *	0.0016	< 0.0010		< 0.0050	0.4	10	40
Lead *	0.0066	< 0.0050		0.033	0.5	10	50
Antimony *	0.0059	0.0054		0.054	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.0011	< 0.0010		< 0.020	4	50	200
Chloride *	< 4.0	< 4.0		< 15	800	4000	25000
Fluoride	0.33	0.30		3.0	10	150	500
Sulphate *	38	27		280	1000	20000	50000
TDS	240	170		1800	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	45	20		230	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.1						
Dry Matter (%)	73						
Moisture (%)	27						
Stage 1							
Volume Eluate L2 (litres)	0.30						
Filtered Eluate VE1 (litres)	0.16						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accrediited

Analytical Report Number : 14-61911

Project / Site name: CLV P1 - Building B

* 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 topsoil/loam 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 *
384782	WS4	109	0.30	Brown clay and topsoil with brick.

Analytical Report Number : 14-61911

Project / Site name: CLV P1 - Building B

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of chloride in leachate by Gallery discrete analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L082-PL	W	ISO 17025
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
Mineral Oil in Soil	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Seciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L004-PL	W	NONE
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS

Analytical Report Number : 14-61911

Project / Site name: CLV P1 - Building B

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-62703

Project / Site name:	CLV P2	**Samples received on:**	07/11/2014
Your job number:	CG/18067A	**Samples instructed on:**	07/11/2014
Your order number:	1499	**Analysis completed by:**	18/11/2014
Report Issue Number:	1	**Report issued on:**	18/11/2014
Samples Analysed:	1 wac multi sample		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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.

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**14-62703**						
					Client:	**CARDGEO**	
Location	**CLV P2**						
Lab Reference (Sample Number)	389800				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	05/11/2014				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH7						
Depth (m)	0.50-1.00						
Solid Waste Analysis							
TOC (%)**	0.3				3%	5%	6%
Loss on Ignition (%) **	2.9				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.30				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 1.6				100	--	--
pH (units)**	7.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.3				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		0.081	0.5	2	25
Barium *	0.20	0.14		1.5	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0023	< 0.0010		< 0.0050	0.5	10	70
Copper *	< 0.0010	< 0.0030		< 0.020	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.076	0.013		0.19	0.5	10	30
Nickel *	0.0019	0.0015		0.016	0.4	10	40
Lead *	< 0.0050	< 0.0050		< 0.020	0.5	10	50
Antimony *	0.011	0.010		0.10	0.06	0.7	5
Selenium *	0.16	0.037		0.48	0.1	0.5	7
Zinc *	0.0022	< 0.0010		< 0.020	4	50	200
Chloride *	21	< 4.0		41	800	4000	25000
Fluoride	1.2	0.93		9.5	10	150	500
Sulphate *	370	110		1400	1000	20000	50000
TDS	600	280		3100	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	1.8	1.2		12	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.4						
Dry Matter (%)	75						
Moisture (%)	25						
Stage 1							
Volume Eluate L2 (litres)	0.31						
Filtered Eluate VE1 (litres)	0.16						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accrediited

Analytical Report Number : 14-62703

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
389800	BH7	None Supplied	0.50-1.00	Grey sandy clay.

Analytical Report Number : 14-62703

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of chloride in leachate by Gallery discrete analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L082-PL	W	ISO 17025
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
Mineral Oil in Soil	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Seciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L004-PL	W	NONE

Analytical Report Number : 14-62703

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-62848

Project / Site name:	CLV P2	**Samples received on:**	11/11/2014
Your job number:	CG-18067A	**Samples instructed on:**	12/11/2014
Your order number:	1499	**Analysis completed by:**	20/11/2014
Report Issue Number:	1	**Report issued on:**	20/11/2014
Samples Analysed:	1 wac multi sample		

Signed:

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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.

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**14-62848**						
					Client:	**CARDGEO**	
Location	**CLV P2**						
Lab Reference (Sample Number)	390756				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	10/11/2014				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS6 204						
Depth (m)	0.70						
Solid Waste Analysis							
TOC (%)**	0.1				3%	5%	6%
Loss on Ignition (%) **	8.5				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.30				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	45				100	--	--
pH (units)**	11.7				--	>6	--
Acid Neutralisation Capacity (mol / kg)	30				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.61	0.24		3.0	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0018	0.0016		0.016	0.5	10	70
Copper *	0.026	0.0076		0.10	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0049	0.0011		0.016	0.4	10	40
Lead *	< 0.0050	< 0.0050		0.034	0.5	10	50
Antimony *	< 0.0050	< 0.0050		0.027	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	< 0.0010	< 0.0010		< 0.020	4	50	200
Chloride *	63	17		240	800	4000	25000
Fluoride	0.97	0.94		9.4	10	150	500
Sulphate *	8.2	7.5		76	1000	20000	50000
TDS	1700	900		10000	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	42	7.8		130	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	94						
Moisture (%)	5.7						
Stage 1							
Volume Eluate L2 (litres)	0.34						
Filtered Eluate VE1 (litres)	0.26						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accrediited

Analytical Report Number : 14-62848

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
390756	WS6	204	0.70	Light brown clay and sand.

Analytical Report Number : 14-62848

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of chloride in leachate by Gallery discrete analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L082-PL	W	ISO 17025
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
Mineral Oil in Soil	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Seciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L004-PL	W	NONE

Analytical Report Number : 14-62848

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-62897

Project / Site name:	CLV P1 Building B	**Samples received on:**	12/11/2014
Your job number:	CG-18067	**Samples instructed on:**	12/11/2014
Your order number:	1432	**Analysis completed by:**	20/11/2014
Report Issue Number:	1	**Report issued on:**	20/11/2014
Samples Analysed:	8 soil samples		

Signed:

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-62897

Project / Site name: CLV P1 Building B
Your Order No: 1432

Lab Sample Number				391089	391090	391091	391092	391093
Sample Reference				BH3	BH3	BH3	BH3	BH2
Sample Number				6	11	17	27	4
Depth (m)				2.50	4.50	7.50	13.50	1.50
Date Sampled				05/11/2014	05/11/2014	05/11/2014	05/11/2014	05/11/2014
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	20	21	20	21	15
Total mass of sample received	kg	0.001	NONE	0.37	0.42	0.39	0.32	0.47
General Inorganics								
pH	pH Units	N/A	MCERTS	7.5	7.5	7.6	7.7	7.7
Total Sulphate as SO_4	mg/kg	50	ISO 17025	29000	15000	1800	1500	1100
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	4.6	4.8	1.4	1.3	0.22
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	4600	4800	1400	1300	220
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.3	2.4	0.72	0.65	0.11
Total Sulphur	mg/kg	50	NONE	10000	5900	1400	6400	390

Analytical Report Number: 14-62897

Project / Site name: CLV P1 Building B
Your Order No: 1432

Lab Sample Number				391094	391095	391096		
Sample Reference				BH2	BH2	BH2		
Sample Number				9	14	29		
Depth (m)				3.50	6.00	15.00		
Date Sampled				05/11/2014	05/11/2014	05/11/2014		
Time Taken				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		
Moisture Content	%	N/A	NONE	22	20	18		
Total mass of sample received	kg	0.001	NONE	0.34	0.33	0.56		
General Inorganics								
pH	pH Units	N/A	MCERTS	7.6	7.6	7.7		
Total Sulphate as SO_4	mg/kg	50	ISO 17025	6400	11000	860		
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	4.8	5.4	0.81		
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	4800	5400	810		
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.4	2.7	0.40		
Total Sulphur	mg/kg	50	NONE	2700	4100	3200		

Analytical Report Number : 14-62897

Project / Site name: CLV P1 Building B

* 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 topsoil/loam 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 *
391089	BH3	6	2.50	Light brown clay.
391090	BH3	11	4.50	Light brown clay.
391091	BH3	17	7.50	Light brown clay.
391092	BH3	27	13.50	Brown clay.
391093	BH2	4	1.50	Light brown clay and sand.
391094	BH2	9	3.50	Light brown clay.
391095	BH2	14	6.00	Light brown clay.
391096	BH2	29	15.00	Brown clay.

Analytical Report Number : 14-62897

Project / Site name: CLV P1 Building B

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

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 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-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	ISO 17025
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	NONE

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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-63013

Project / Site name:	CLV P2	**Samples received on:**	14/11/2014
Your job number:	CG18067A	**Samples instructed on:**	14/11/2014
Your order number:	1499	**Analysis completed by:**	25/11/2014
Report Issue Number:	1	**Report issued on:**	25/11/2014
Samples Analysed:	2 soil samples		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-63013

Project / Site name: CLV P2
Your Order No: 1499

Lab Sample Number				391950	391951			
Sample Reference				BH7	BH7			
Sample Number				None Supplied	None Supplied			
Depth (m)				4.50-4.95	22.50-22.95			
Date Sampled				06/11/2014	06/11/2014			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	19	14			
Total mass of sample received	kg	0.001	NONE	0.38	0.53			
General Inorganics								
pH	pH Units	N/A	MCERTS	7.2	8.3			
Total Sulphate as SO_4	mg/kg	50	ISO 17025	1600	560			
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	1.5	0.55			
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	1500	550			
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.77	0.28			
Total Sulphur	mg/kg	50	NONE	710	8500			

Analytical Report Number : 14-63013

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
391950	BH7	None Supplied	4.50-4.95	Light brown clay.
391951	BH7	None Supplied	22.50-22.95	Grey clay.

Analytical Report Number : 14-63013

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

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 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1 leachate (g/l)	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-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	ISO 17025
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	NONE

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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-63103

Project / Site name:	CLV P2	**Samples received on:**	17/11/2014
Your job number:	CG-18067A	**Samples instructed on:**	17/11/2014
Your order number:	1499	**Analysis completed by:**	26/11/2014
Report Issue Number:	1	**Report issued on:**	26/11/2014
Samples Analysed:	1 wac multi sample		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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.

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**14-63103**						
					Client:	**CARDGEO**	
Location	**CLV P2**						
Lab Reference (Sample Number)	392527				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	14/11/2014				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH6 220						
Depth (m)	0.30						
Solid Waste Analysis							
TOC (%)**	1.7				3%	5%	6%
Loss on Ignition (%) **	5.7				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.30				1	--	--
Mineral Oil (mg/kg)	45				500	--	--
Total PAH (WAC-17) (mg/kg)	810				100	--	--
pH (units)**	10.3				--	>6	--
Acid Neutralisation Capacity (mol / kg)	14				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		0.068	0.5	2	25
Barium *	0.048	0.023		0.27	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.010	0.0032		0.044	0.5	10	70
Copper *	0.030	0.0093		0.13	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.0066	< 0.0030		0.035	0.5	10	30
Nickel *	0.0017	< 0.0010		0.0098	0.4	10	40
Lead *	0.025	0.0071		0.10	0.5	10	50
Antimony *	< 0.0050	< 0.0050		0.021	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.023	0.0038		0.070	4	50	200
Chloride *	< 4.0	< 4.0		19	800	4000	25000
Fluoride	0.43	0.18		2.2	10	150	500
Sulphate *	19	3.9		65	1000	20000	50000
TDS	60	20		270	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	11	6.4		71	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.3						
Dry Matter (%)	91						
Moisture (%)	8.8						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.30						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accrediited

Analytical Report Number : 14-63103

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
392527	BH6	220	0.30	Brown sandy topsoil with rubble and brick.

Analytical Report Number : 14-63103

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of chloride in leachate by Gallery discrete analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L082-PL	W	ISO 17025
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
Mineral Oil in Soil	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Seciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L004-PL	W	NONE

Analytical Report Number : 14-63103

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-63590

Project / Site name:	CLV P2	**Samples received on:**	25/11/2014
Your job number:	CG-18067A	**Samples instructed on:**	26/11/2014
Your order number:	1500	**Analysis completed by:**	05/12/2014
Report Issue Number:	1	**Report issued on:**	05/12/2014
Samples Analysed:	7 soil samples		

Signed: CCStone

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: TPl

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-63590

Project / Site name: CLV P2
Your Order No: 1500

Lab Sample Number				395404	395405	395406	395407	395408
Sample Reference				BH4	BH4	BH5	BH5	BH5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				4.50	19.50	3.50	9.00	18.00
Date Sampled				18/11/2014	18/11/2014	12/11/2014	12/11/2014	12/11/2014
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	18	22	20	19
Total mass of sample received	kg	0.001	NONE	0.48	0.60	0.40	0.47	0.40
General Inorganics								
pH	pH Units	N/A	MCERTS	7.5	7.9	7.9	7.8	8.1
Total Sulphate as SO_4	mg/kg	50	ISO 17025	1800	870	490	2100	860
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	1.7	0.85	0.12	1.6	0.72
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	1700	850	120	1600	720
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.85	0.43	0.061	0.81	0.36
Total Sulphur	mg/kg	50	NONE	710	4300	170	4200	7200

Analytical Report Number: 14-63590

Project / Site name: CLV P2
Your Order No: 1500

Lab Sample Number				395409	395410			
Sample Reference				BH6	BH6			
Sample Number				None Supplied	None Supplied			
Depth (m)				4.50	16.50			
Date Sampled				14/11/2014	14/11/2014			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	20	17			
Total mass of sample received	kg	0.001	NONE	0.35	0.50			
General Inorganics								
pH	pH Units	N/A	MCERTS	7.9	8.1			
Total Sulphate as SO_4	mg/kg	50	ISO 17025	19000	940			
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	5.6	0.84			
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	5600	840			
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.8	0.42			
Total Sulphur	mg/kg	50	NONE	6200	4400			

Analytical Report Number : 14-63590

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
395404	BH4	None Supplied	4.50	Light brown clay.
395405	BH4	None Supplied	19.50	Light grey clay.
395406	BH5	None Supplied	3.50	Light brown clay.
395407	BH5	None Supplied	9.00	Light grey clay.
395408	BH5	None Supplied	18.00	Light grey clay.
395409	BH6	None Supplied	4.50	Light brown clay.
395410	BH6	None Supplied	16.50	Light grey clay.

Analytical Report Number : 14-63590

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

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 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-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	ISO 17025
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	NONE

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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

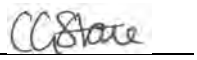
t: 01483 310600
f: 01483 527285
e:

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 : 14-64676

Project / Site name:	CLV P2	**Samples received on:**	23/10/2014
Your job number:	CG/18067A	**Samples instructed on:**	11/12/2014
Your order number:	1499	**Analysis completed by:**	22/12/2014
Report Issue Number:	1	**Report issued on:**	22/12/2014
Samples Analysed:	4 soil samples		

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: 

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-64676

Project / Site name: CLV P2
Your Order No: 1499

Lab Sample Number				402180	402181	402182	402183	
Sample Reference				WS4	WS7	WS8	WS9	
Sample Number				109	216	211	202	
Depth (m)				0.30	0.60	0.60	2.00	
Date Sampled				22/10/2014	10/11/2014	10/11/2014	10/11/2014	
Time Taken				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	
Moisture Content	%	N/A	NONE	27	18	23	28	
Total mass of sample received	kg	0.001	NONE	1.1	1.3	1.3	1.3	
General Inorganics								
pH	pH Units	N/A	MCERTS	7.6	7.7	8.1	8.9	
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.55	0.20	0.43	0.55	
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	550	200	430	550	
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.28	0.099	0.22	0.28	

Analytical Report Number : 14-64676

Project / Site name: CLV P2

* 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 topsoil/loam 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 *
402180	WS4	109	0.30	Brown clay and topsoil with brick.
402181	WS7	216	0.60	Brown clay and sand.
402182	WS8	211	0.60	Light brown clay and sand.
402183	WS9	202	2.00	Light grey clay and sand.

Analytical Report Number : 14-64676

Project / Site name: CLV P2

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

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 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1 leachate (g/l)	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-63523

Project / Site name:	CLV P3	**Samples received on:**	25/11/2014
Your job number:	CG/18067B	**Samples instructed on:**	25/11/2014
Your order number:	1536	**Analysis completed by:**	04/12/2014
Report Issue Number:	1	**Report issued on:**	04/12/2014
Samples Analysed:	1 wac multi sample		

Signed: CCStone

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: TPl

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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.

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**14-63523**						
					Client:	**CARDGEO**	
Location	**CLV P3**						
Lab Reference (Sample Number)	395059				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	24/11/2014				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH9 3.1						
Depth (m)	0.40						
Solid Waste Analysis							
TOC (%)**	1.1				3%	5%	6%
Loss on Ignition (%) **	4.7				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.30				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	18				100	--	--
pH (units)**	9.3				--	>6	--
Acid Neutralisation Capacity (mol / kg)	11				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.023	0.019		0.19	0.5	2	25
Barium *	0.047	0.021		0.24	20	100	300
Cadmium *	< 0.0005	< 0.0005		0.0020	0.04	1	5
Chromium *	0.029	0.0076		0.11	0.5	10	70
Copper *	0.056	0.014		0.20	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0028	0.0017		0.019	0.4	10	40
Lead *	0.041	0.024		0.26	0.5	10	50
Antimony *	0.0063	< 0.0050		0.034	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.0059	0.0042		0.045	4	50	200
Chloride *	7.2	< 4.0		28	800	4000	25000
Fluoride	0.50	0.35		3.7	10	150	500
Sulphate *	47	9.8		150	1000	20000	50000
TDS	130	60		700	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	9.5	4.2		49	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.84						
Dry Matter (%)	83						
Moisture (%)	17						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.25						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accrediited

Analytical Report Number : 14-63523

Project / Site name: CLV P3

* 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 topsoil/loam 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 *
395059	BH9	3.1	0.40	Light brown sandy clay with gravel.

Analytical Report Number : 14-63523

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of chloride in leachate by Gallery discrete analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L082-PL	W	ISO 17025
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
Mineral Oil in Soil	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Seciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L004-PL	W	NONE
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS

Analytical Report Number : 14-63523

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

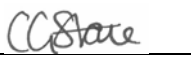
t: 01483 310600
f: 01483 527285
e:

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 : 14-63525

Project / Site name:	CLV P3	**Samples received on:**	25/11/2014
Your job number:	CG/18067B	**Samples instructed on:**	25/11/2014
Your order number:	1536	**Analysis completed by:**	04/12/2014
Report Issue Number:	1	**Report issued on:**	04/12/2014
Samples Analysed:	1 soil sample		

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: 

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-63525

Project / Site name: CLV P3
Your Order No: 1536

Lab Sample Number				395066				
Sample Reference				BH9				
Sample Number				301				
Depth (m)				0.40				
Date Sampled				24/11/2014				
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	0.55				
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected				
General Inorganics								
pH	pH Units	N/A	MCERTS	9.1				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO_4	mg/kg	50	ISO 17025	2100				
Organic Matter	%	0.1	MCERTS	2.5				
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10				
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10				
Fluorene	mg/kg	0.1	MCERTS	< 0.10				
Phenanthrene	mg/kg	0.1	MCERTS	1.5				
Anthracene	mg/kg	0.1	MCERTS	0.39				
Fluoranthene	mg/kg	0.1	MCERTS	5.0				
Pyrene	mg/kg	0.1	MCERTS	4.5				
Benzo(a)anthracene	mg/kg	0.1	MCERTS	3.2				
Chrysene	mg/kg	0.05	MCERTS	2.8				
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	3.3				
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	2.2				
Benzo(a)pyrene	mg/kg	0.1	MCERTS	3.0				
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.73				
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	0.25				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1				
Coronene	mg/kg	0.05	NONE	< 0.05				
Total PAH								
Total WAC-17 PAHs	mg/kg	1.6	NONE	28				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17				
Barium (aqua regia extractable)	mg/kg	1	MCERTS	260				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.9				
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	88				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	820				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.1				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	45				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	300				

Analytical Report Number: 14-63525

Project / Site name: CLV P3
Your Order No: 1536

Lab Sample Number				395066				
Sample Reference				BH9				
Sample Number				301				
Depth (m)				0.40				
Date Sampled				24/11/2014				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	32				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	32				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	14				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	47				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	61				

Analytical Report Number : 14-63525

Project / Site name: CLV P3

* 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 topsoil/loam 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 *
395066	BH9	301	0.40	Brown clay and sand with gravel.

Analytical Report Number : 14-63525

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	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	ISO 17025
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

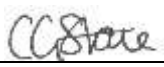
t: 01483 310600
f: 01483 527285
e:

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 : 14-64042

Project / Site name:	CCU P3	**Samples received on:**	03/12/2014
Your job number:	CG-18067B	**Samples instructed on:**	03/12/2014
Your order number:		**Analysis completed by:**	15/12/2014
Report Issue Number:	1	**Report issued on:**	15/12/2014
Samples Analysed:	2 soil samples		

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: 

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-64042

Project / Site name: CCU P3

Lab Sample Number				398053	398054			
Sample Reference				BH10.302	BH10.303			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.60	0.50			
Date Sampled				02/12/2014	02/12/2014			
Time Taken				2310	0210			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	24	16			
Total mass of sample received	kg	0.001	NONE	1.3	1.2			
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile- Loose fibres			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected			
General Inorganics								
pH	pH Units	N/A	MCERTS	7.5	7.5			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO_4	mg/kg	50	ISO 17025	2100	12000			
Organic Matter	%	0.1	MCERTS	0.2	1.5			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	0.53	0.97			
Anthracene	mg/kg	0.1	MCERTS	0.10	0.17			
Fluoranthene	mg/kg	0.1	MCERTS	0.78	2.0			
Pyrene	mg/kg	0.1	MCERTS	0.74	1.7			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	0.38	0.91			
Chrysene	mg/kg	0.05	MCERTS	0.36	0.94			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.51	1.3			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	0.21	0.57			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.37	0.91			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.29	0.70			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	0.14			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.29	0.78			
Coronene	mg/kg	0.05	NONE	< 0.05	< 0.05			
Total PAH								
Total WAC-17 PAHs	mg/kg	1.6	NONE	4.6	11			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	27			
Barium (aqua regia extractable)	mg/kg	1	MCERTS	74	340			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.8	2.4			
Boron (water soluble)	mg/kg	0.2	MCERTS	2.5	3.1			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	1.0			
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	-			
Chromium (III)	mg/kg	1	NONE	50	-			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	50	36			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	53	320			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	86	760			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	0.5			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	45	55			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	88	57			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	680			

Analytical Report Number: 14-64042

Project / Site name: CCU P3

Lab Sample Number				398053	398054			
Sample Reference				BH10.302	BH10.303			
Sample Number				None Supplied	None Supplied			
Depth (m)				0.60	0.50			
Date Sampled				02/12/2014	02/12/2014			
Time Taken				2310	0210			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	21			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	100			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	120			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10			

Analytical Report Number : 14-64042

Project / Site name: CCU P3

* 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 topsoil/loam 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 *
398053	BH10.302	None Supplied	0.60	Light brown clay and sand.
398054	BH10.303	None Supplied	0.50	Brown topsoil and sand with gravel.

Analytical Report Number : 14-64042

Project / Site name: CCU P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
chromium III in soil	In-house method by calculation from total Cr and Cr VI.	In-house method	L068-PL	D	NONE
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	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	ISO 17025
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

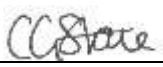
t: 01483 310600
f: 01483 527285
e:

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 : 14-64044

Project / Site name:	CG-180687B	**Samples received on:**	03/12/2014
Your job number:	CCU P3	**Samples instructed on:**	03/12/2014
Your order number:		**Analysis completed by:**	15/12/2014
Report Issue Number:	1	**Report issued on:**	15/12/2014
Samples Analysed:	2 wac multi samples		

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: 

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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.

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**14-64044**						
					Client:	**CARDGEO**	
Location	**CG-180687B**						
Lab Reference (Sample Number)	398060				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	02/12/2014				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH10.302						
Depth (m)	0.60						
Solid Waste Analysis							
TOC (%)**	0.5				3%	5%	6%
Loss on Ignition (%) **	5.4				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.30				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	4.6				100	--	--
pH (units)**	7.5				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.7				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.11	0.040		0.46	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	< 0.0010	< 0.0010		< 0.0050	0.5	10	70
Copper *	0.0021	< 0.0030		< 0.020	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.0048	0.0036		0.037	0.5	10	30
Nickel *	0.0014	< 0.0010		< 0.0050	0.4	10	40
Lead *	< 0.0050	< 0.0050		< 0.020	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.0034	< 0.0010		< 0.020	4	50	200
Chloride *	25	< 4.0		57	800	4000	25000
Fluoride	0.47	0.50		5.0	10	150	500
Sulphate *	660	150		1900	1000	20000	50000
TDS	670	230		2700	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	2.6	2.0		21	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.3						
Dry Matter (%)	76						
Moisture (%)	24						
Stage 1							
Volume Eluate L2 (litres)	0.31						
Filtered Eluate VE1 (litres)	0.17						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accrediited

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**14-64044**						
					Client:	**CARDGEO**	
Location	**CG-180687B**						
Lab Reference (Sample Number)	398061				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	02/12/2014				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH10.303						
Depth (m)	0.50						
Solid Waste Analysis							
TOC (%)**	1.3				3%	5%	6%
Loss on Ignition (%) **	6.4				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.30				1	--	--
Mineral Oil (mg/kg)	120				500	--	--
Total PAH (WAC-17) (mg/kg)	11				100	--	--
pH (units)**	7.5				--	>6	--
Acid Neutralisation Capacity (mol / kg)	1.5				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.095	0.094		0.94	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0035	0.0027		0.028	0.5	10	70
Copper *	0.0090	0.0041		0.048	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.012	0.0049		0.059	0.5	10	30
Nickel *	0.0034	< 0.0010		0.012	0.4	10	40
Lead *	< 0.0050	< 0.0050		0.027	0.5	10	50
Antimony *	0.0087	< 0.0050		0.044	0.06	0.7	5
Selenium *	< 0.010	< 0.010		0.043	0.1	0.5	7
Zinc *	0.017	0.0056		0.072	4	50	200
Chloride *	32	< 4.0		70	800	4000	25000
Fluoride	0.48	0.39		4.0	10	150	500
Sulphate *	1700	430		6100	1000	20000	50000
TDS	1300	510		6300	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	17	4.6		64	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.2						
Dry Matter (%)	84						
Moisture (%)	16						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.25						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accrediited

Analytical Report Number : 14-64044

Project / Site name: CG-180687B

* 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 topsoil/loam 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 *
398060	BH10.302	None Supplied	0.60	Light brown clay and sand.
398061	BH10.303	None Supplied	0.50	Brown topsoil and sand with gravel.

Analytical Report Number : 14-64044

Project / Site name: CG-180687B

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of chloride in leachate by Gallery discrete analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L082-PL	W	ISO 17025
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
Mineral Oil in Soil	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Seciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L004-PL	W	NONE
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS

Analytical Report Number : 14-64044

Project / Site name: CG-180687B

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status

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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-64192

Project / Site name:	CLV P3	**Samples received on:**	04/12/2014
Your job number:	CG18067B	**Samples instructed on:**	08/12/2014
Your order number:	1536	**Analysis completed by:**	16/12/2014
Report Issue Number:	1	**Report issued on:**	16/12/2014
Samples Analysed:	2 soil samples		

Signed: CCStone

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: TPl

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-64192

Project / Site name: CLV P3
Your Order No: 1536

Lab Sample Number				398945	398946			
Sample Reference				BH10	BH10			
Sample Number				304	3.5			
Depth (m)				2.80	7.00			
Date Sampled				03/10/2014	04/10/2014			
Time Taken				2240	0040			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	15	17			
Total mass of sample received	kg	0.001	NONE	2.0	2.0			
General Inorganics								
pH	pH Units	N/A	MCERTS	8.2	7.9			
Total Sulphate as SO_4	mg/kg	50	ISO 17025	5600	8400			
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	5.4	6.2			
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	5400	6200			
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.7	3.1			
Total Sulphur	mg/kg	50	NONE	2400	3300			

Analytical Report Number : 14-64192

Project / Site name: CLV P3

* 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 topsoil/loam 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 *
398945	BH10	304	2.80	Light brown clay.
398946	BH10	3.5	7.00	Light brown clay.

Analytical Report Number : 14-64192

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

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 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1 leachate (g/l)	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-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	ISO 17025
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	NONE

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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

t: 01483 310600
f: 01483 527285
e:

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 : 14-64395

Project / Site name:	CLV P3	**Samples received on:**	10/12/2014
Your job number:	CG-18067B	**Samples instructed on:**	10/12/2014
Your order number:	1536	**Analysis completed by:**	19/12/2014
Report Issue Number:	1	**Report issued on:**	19/12/2014
Samples Analysed:	1 soil sample		

Signed:

Neil Donovan
Environmental Forensics Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-64395

Project / Site name: CLV P3
Your Order No: 1536

Lab Sample Number				400399				
Sample Reference				BH10				
Sample Number				306				
Depth (m)				20.50				
Date Sampled				09/12/2014				
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	36				
Total mass of sample received	kg	0.001	NONE	2.0				

General Inorganics

pH	pH Units	N/A	MCERTS	7.5				
Total Sulphate as SO_4	mg/kg	50	ISO 17025	3400				
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	3.3				
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	3300				
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.7				
Total Sulphur	mg/kg	50	NONE	5900				

Analytical Report Number : 14-64395

Project / Site name: CLV P3

* 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 topsoil/loam 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 *
400399	BH10	306	20.50	Grey clay.

Analytical Report Number : 14-64395

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

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 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-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	ISO 17025
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	NONE

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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

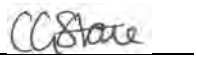
t: 01483 310600
f: 01483 527285
e:

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 : 14-64726

Project / Site name:	CLV P3	**Samples received on:**	15/12/2014
Your job number:	CG-18067B	**Samples instructed on:**	17/12/2014
Your order number:	1536	**Analysis completed by:**	30/12/2014
Report Issue Number:	1	**Report issued on:**	30/12/2014
Samples Analysed:	4 soil samples		

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: 

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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: 14-64726

Project / Site name: CLV P3

Your Order No: 1536

Lab Sample Number				402489	402490	402491	402492	
Sample Reference				BH8	BH9	BH9	BH9	
Sample Number				380	390	311	312	
Depth (m)				24.00	1.20	7.00	9.00	
Date Sampled				11/12/2014	11/12/2014	11/12/2014	11/12/2014	
Time Taken				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	
Moisture Content	%	N/A	NONE	21	22	19	19	
Total mass of sample received	kg	0.001	NONE	2.0	2.0	2.0	2.0	
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	-	
General Inorganics								
pH	pH Units	N/A	MCERTS	7.8	7.1	7.6	7.5	
Total Cyanide	mg/kg	1	MCERTS	-	< 1	-	-	
Total Sulphate as SO_4	mg/kg	50	ISO 17025	3100	1100	10000	10000	
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	2.3	1.0	7.0	6.8	
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	2300	1000	7000	6800	
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.1	0.51	3.5	3.4	
Total Sulphur	mg/kg	50	NONE	5600	-	3600	3500	
Organic Matter	%	0.1	MCERTS	-	2.2	-	-	
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	-	-	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Acenaphthylene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Acenaphthene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Fluorene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Phenanthrene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Anthracene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Fluoranthene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Pyrene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Benzo(a)anthracene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Benzo(a)pyrene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	-	< 0.10	-	-	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	
Coronene	mg/kg	0.05	NONE	-	< 0.05	-	-	
Total PAH								
Total WAC-17 PAHs	mg/kg	1.6	NONE	-	< 1.6	-	-	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	11	-	-	
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	55	-	-	
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	1.5	-	-	
Boron (water soluble)	mg/kg	0.2	MCERTS	-	1.1	-	-	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	-	-	
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	< 1.2	-	-	
Chromium (III)	mg/kg	1	NONE	-	47	-	-	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	47	-	-	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	28	-	-	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	29	-	-	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	-	-	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	27	-	-	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-	-	
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	78	-	-	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	61	-	-	

Analytical Report Number: 14-64726

Project / Site name: CLV P3
Your Order No: 1536

Lab Sample Number				402489	402490	402491	402492	
Sample Reference				BH8	BH9	BH9	BH9	
Sample Number				380	390	311	312	
Depth (m)				24.00	1.20	7.00	9.00	
Date Sampled				11/12/2014	11/12/2014	11/12/2014	11/12/2014	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	-	< 1.0	-	-	
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	-	
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	-	
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-	-	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-	-	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	< 8.0	-	-	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	< 8.0	-	-	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	-	-	
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	-	< 0.1	-	-	
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-	-	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-	-	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	< 10	-	-	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	< 10	-	-	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	-	-	

Analytical Report Number : 14-64726

Project / Site name: CLV P3

* 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 topsoil/loam 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 *
402489	BH8	380	24.00	Light grey clay.
402490	BH9	390	1.20	Light grey clay.
402491	BH9	311	7.00	Light brown clay.
402492	BH9	312	9.00	Light brown clay.

Analytical Report Number : 14-64726

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
chromium III in soil	In-house method by calculation from total Cr and Cr VI.	In-house method	L068-PL	D	NONE
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1 leachate (g/l).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	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	ISO 17025
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	NONE

Analytical Report Number : 14-64726

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	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.

James Morrice
Card Geotechnics Ltd
4 Godalming Business Centre
Woolsack Way
Godalming
Surrey
GU7 1XW

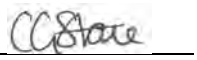
t: 01483 310600
f: 01483 527285
e:

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 : 14-64727

Project / Site name:	CLV P3	**Samples received on:**	15/12/2014
Your job number:	CG-18067B	**Samples instructed on:**	17/12/2014
Your order number:	1536	**Analysis completed by:**	30/12/2014
Report Issue Number:	1	**Report issued on:**	30/12/2014
Samples Analysed:	1 wac multi sample		

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed: 

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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.

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**14-64727**						
					Client:	**CARDGEO**	
Location	**CLV P3**						
Lab Reference (Sample Number)	402493				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	11/12/2014				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH9 390						
Depth (m)	1.20						
Solid Waste Analysis							
TOC (%)**	1.3				3%	5%	6%
Loss on Ignition (%) **	8.1				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg)	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 1.6				100	--	--
pH (units)**	7.1				--	>6	--
Acid Neutralisation Capacity (mol / kg)	0.41				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.10	0.044		0.48	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0022	< 0.0010		0.0051	0.5	10	70
Copper *	0.0024	< 0.0030		< 0.020	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.050	0.013		0.16	0.5	10	30
Nickel *	0.0031	0.0026		0.026	0.4	10	40
Lead *	< 0.0050	< 0.0050		< 0.020	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	< 0.0010	< 0.0010		< 0.020	4	50	200
Chloride *	28	4.2		61	800	4000	25000
Fluoride	2.7	1.2		13	10	150	500
Sulphate *	340	120		1400	1000	20000	50000
TDS	420	200		2200	4000	60000	100000
Phenol Index (Monhydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	22	9.9		110	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	78						
Moisture (%)	22						
Stage 1							
Volume Eluate L2 (litres)	0.31						
Filtered Eluate VE1 (litres)	0.14						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

*= UKAS accredited (liquid eluate analysis only)
** = MCERTS accrediited

Analytical Report Number : 14-64727

Project / Site name: CLV P3

* 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 topsoil/loam 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 *
402493	BH9	390	1.20	Light grey clay.

Analytical Report Number : 14-64727

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of chloride in leachate by Gallery discrete analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L082-PL	W	ISO 17025
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L047-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
Mineral Oil in Soil	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Seciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight. Sample results are not corrected for the stone content of the sample.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L004-PL	W	NONE

Analytical Report Number : 14-64727

Project / Site name: CLV P3

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-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.

APPENDIX E

Results of geotechnical analysis

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	MC (%)	LL (%)	PL (%)	PI (%)	<425 • m (%)	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)	
BH2	4	1.50-1.95	U	Stiff yellowish brown silty CLAY with occasional fine to medium gravel	21	61	23	38	43	2.03	1.68	29	121	61				
BH2	9	3.50-3.95	U	Mottled brown and grey silty CLAY with occasional gypsum	33	75	27	48	100									
BH2	14	6.00-6.45	U	Stiff fissured brown silty CLAY with rare gypsum	31	73	28	45	99	1.95	1.49	114	222	111				
BH2	19	9.00-9.45	U	Brown mottled orange-brown silty CLAY	29	77	27	50	100									
BH2	24	12.00-12.45	U	Stiff fissured brownish grey silty CLAY	29	75	25	50	100	1.96	1.52	228	174	87				
BH2	29	15.00-15.45	U	Brown fine sandy silty CLAY	24	62	24	38	100									
BH2	34	18.00-18.45	U	Stiff fissured dark brownish grey silty CLAY	25	67	25	42	100	1.99	1.59	342	165	83				
BH2	44	24.00-24.45	U	Very stiff fissured brownish grey silty CLAY	26	79	28	51	100	1.88	1.49	456	598	299				
BH2	54	30.00-30.45	U	Stiff fissured brownish grey silty CLAY	25	75	29	46	99	1.91	1.53	570	434	217				
BH3	6	2.50-2.95	U	Stiff fissured brown silty CLAY	34	76	29	47	99	1.92	1.43	48	140	70				
BH3	11	4.50-4.95	U	Brown mottled grey silty CLAY with rare gypsum	32	73	27	46	99									
BH3	17	7.50-7.95	U	Stiff fissured brown silty CLAY	30	72	25	47	97	1.95	1.50	143	277	138				

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

Checked and Approved by

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS®

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	MC (%)	LL (%)	PL (%)	PI (%)	<425 • m (%)	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)	
BH3	22	10.50-10.95	U	Brown silty CLAY	31	77	27	50	100									
BH3	27	13.50-13.95	U	Stiff fissured greyish brown silty CLAY	30	83	28	55	100	1.94	1.49	257	168	84				

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

Checked and Approved by

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS®

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	MC (%)	LL (%)	PL (%)	PI (%)	<425 • m (%)	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)	
BH4	7	2.50-2.95	U	Firm fissured brown mottled grey CLAY	31	71	27	44	100	1.92	1.47	48	95	47				
BH4	12	4.50-4.95	U	Brown mottled grey silty CLAY with rare gypsum	31	75	26	49	100									
BH4	23	10.50-10.95	U	Very fissured dark grey CLAY	29					1.90	1.47	200	200	100				
BH4	38	19.50-19.95	U	Brown grey silty CLAY	25	62	26	36	100									
BH4	43	22.50-22.95	U	Very stiff fissured dark grey CLAY	26	63	25	38	100	2.08	1.65	428	312	156				
BH5	4	1.50-1.95	U	Stiff fissured brown CLAY	31	71	27	44	100	1.96	1.50	29	135	67				
BH5	9	3.50-3.95	U	Brown mottled orange silty CLAY with rare fine siltstone	28	67	25	42	98									
BH5	19	9.00-9.45	U	Brown silty CLAY	30	77	31	46	100									
BH5	24	12.00-12.45	U	Very stiff fissured dark grey CLAY	28	71	27	44	100	1.96	1.53	228	210	105				
BH5	34	18.00-18.45	U	Greyish brown slightly fine sandy silty CLAY	26	60	28	32	100									
BH5	39	21.00-21.45	U	Very stiff fissured dark grey silty CLAY	27	63	26	37	100	1.98	1.56	399	324	162				
BH5	49	27.00-27.45	U	Very stiff fissured dark grey silty CLAY	24	68	27	41	100	2.01	1.62	513	1,067	533				

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

Checked and Approved by

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS®

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	MC (%)	LL (%)	PL (%)	PI (%)	<425 • m (%)	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)	
BH5	62	36.00-36.50	U	Brown silty CLAY	20	48	20	28	100									
BH6	5	2.50-2.95	U	Firm to stiff fissured brown CLAY	33	72	26	46	100	1.95	1.47	48	147	73				
BH6	10	4.50-4.95	U	Brown silty CLAY with rare gypsum	31	73	27	46	100									
BH6	20	10.50-10.95	U	Very stiff fissured dark brown CLAY	30					1.95	1.50	200	160	80				
BH6	29	16.50-16.95	U	Brownish grey silty CLAY	25	59	28	31	100									
BH6	34	19.50-19.95	U	Very stiff fissured dark grey CLAY	24	64	25	39	100	1.97	1.59	371	478	239				

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

Checked and Approved by

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS®

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	MC (%)	LL (%)	PL (%)	PI (%)	<425 • m (%)	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)	
BH7	7	2.20-2.65	U	Firm to stiff yellow-brown silty CLAY	32	67	25	42	100	1.93	1.46	42	127	64				
BH7	12	4.50-4.95	U	Stiff fissured brown mottled grey silty CLAY	30					1.94	1.49	86	220	110				
BH7	16	7.50-7.95	U	Stiff fissured brown silty CLAY	34	79	29	50	100	1.94	1.45	143	208	104				
BH7	21	10.50-10.95	U	Stiff fissured brownish grey silty CLAY	25					2.03	1.62	200	291	146				
BH7	26	13.50-13.95	U	Dark grey-brown silty CLAY	26	65	27	38	100									
BH7	31	16.50-16.95	U	Very stiff fissured brownish grey silty CLAY	27					2.01	1.58	314	277	139				
BH7	42	19.50-19.95	U	Dark grey-brown silty CLAY	28	73	29	44	100									
BH7	48	22.50-22.95	U	Very stiff fissured brownish grey silty CLAY	24					2.08	1.68	428	688	344				
BH7	58	28.50-28.95	U	Very stiff fissured brownish grey silty CLAY	25					1.97	1.58	542	630	315				

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

Checked and Approved by

Senior Technician
20/11/2014

Project Number:

GEO / 21953

Project Name:

CAMDEN LOCK VILLAGE PHASE 2
CG/18067a

GEOLABS®

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH2
Sample Ref	4
Depth (m)	1.50-1.95
Sample Type	U

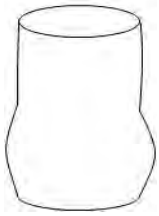
Description:

Stiff yellowish brown gravelly silty CLAY. Gravel is fine to medium.

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.4
Diameter	(mm)	102.5
Moisture Content	(%)	21
Bulk Density	(Mg/m³)	2.03
Dry Density	(Mg/m³)	1.68
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.83
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	29
Strain at failure	(%)	13.4
Maximum Deviator Stress	(kPa)	121
Shear Stress Cu	(kPa)	61

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH2
Sample Ref	14
Depth (m)	6.00-6.45
Sample Type	U

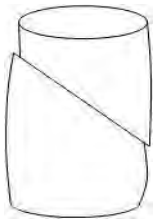
Description:

Stiff fissured brown silty CLAY with rare gypsum

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.4
Diameter	(mm)	102.5
Moisture Content	(%)	31
Bulk Density	(Mg/m³)	1.95
Dry Density	(Mg/m³)	1.48
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.55
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	114
Strain at failure	(%)	7.9
Maximum Deviator Stress	(kPa)	222
Shear Stress Cu	(kPa)	111

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	30

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH2
Sample Ref	24
Depth (m)	12.00-12.45
Sample Type	U

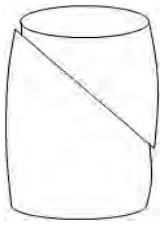
Description:

Stiff fissured brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.5
Diameter	(mm)	102.7
Moisture Content	(%)	29
Bulk Density	(Mg/m³)	1.96
Dry Density	(Mg/m³)	1.52
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.52
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	228
Strain at failure	(%)	7.4
Maximum Deviator Stress	(kPa)	174
Shear Stress Cu	(kPa)	87

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	90

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH2
Sample Ref	34
Depth (m)	18.00-18.45
Sample Type	U

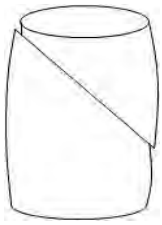
Description:

Stiff fissured dark brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.7
Diameter	(mm)	102.4
Moisture Content	(%)	25
Bulk Density	(Mg/m³)	1.99
Dry Density	(Mg/m³)	1.59
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.16
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	342
Strain at failure	(%)	2.0
Maximum Deviator Stress	(kPa)	165
Shear Stress Cu	(kPa)	83

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	160

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH2
Sample Ref	44
Depth (m)	24.00-24.45
Sample Type	U

Description:

Very stiff fissured brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.7
Diameter	(mm)	103.4
Moisture Content	(%)	26
Bulk Density	(Mg/m³)	1.88
Dry Density	(Mg/m³)	1.49
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.55
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	456
Strain at failure	(%)	7.9
Maximum Deviator Stress	(kPa)	598
Shear Stress Cu	(kPa)	299

Mode of failure

Orientation of the sample	Vertical
Distance from top of tube mm	110

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH2
Sample Ref	54
Depth (m)	30.00-30.45
Sample Type	U

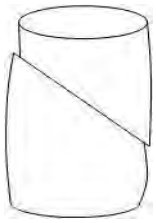
Description:

Stiff fissured brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.4
Diameter	(mm)	102.6
Moisture Content	(%)	25
Bulk Density	(Mg/m^3)	1.91
Dry Density	(Mg/m^3)	1.53
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.34
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	570
Strain at failure	(%)	4.5
Maximum Deviator Stress	(kPa)	434
Shear Stress Cu	(kPa)	217

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	120

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH3
Sample Ref	6
Depth (m)	2.50-2.95
Sample Type	U

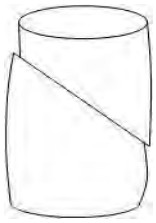
Description:

Stiff fissured brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	188.5
Diameter	(mm)	102.4
Moisture Content	(%)	34
Bulk Density	(Mg/m³)	1.92
Dry Density	(Mg/m³)	1.43
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.55
Axial displacement rate	(%/min)	2.12
Cell pressure	(kPa)	48
Strain at failure	(%)	8.0
Maximum Deviator Stress	(kPa)	140
Shear Stress Cu	(kPa)	70

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH3
Sample Ref	17
Depth (m)	7.50-7.95
Sample Type	U

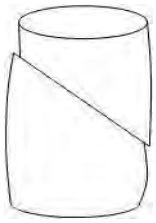
Description:

Stiff fissured brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.4
Diameter	(mm)	103.4
Moisture Content	(%)	30
Bulk Density	(Mg/m³)	1.95
Dry Density	(Mg/m³)	1.50
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.05
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	143
Strain at failure	(%)	0.5
Maximum Deviator Stress	(kPa)	277
Shear Stress Cu	(kPa)	138

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	120

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH3
Sample Ref	27
Depth (m)	13.50-13.95
Sample Type	U

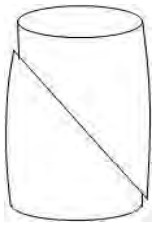
Description:

Stiff fissured greyish brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.3
Diameter	(mm)	102.6
Moisture Content	(%)	30
Bulk Density	(Mg/m³)	1.94
Dry Density	(Mg/m³)	1.50
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.24
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	257
Strain at failure	(%)	3.0
Maximum Deviator Stress	(kPa)	168
Shear Stress Cu	(kPa)	84

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	30

Checked and Approved by:

S Burke

Senior Technician
26/11/2014

Project Number:

GEO / 21947-2

Project Name:

CAMDEN LOCK VILLAGE PHASE 1
CG/18067

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH7
Sample Ref	7
Depth (m)	2.20-2.65
Sample Type	U

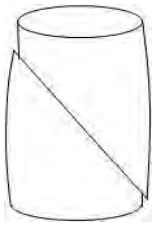
Description:

Firm to stiff yellow-brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.4
Diameter	(mm)	102.6
Moisture Content	(%)	32
Bulk Density	(Mg/m³)	1.93
Dry Density	(Mg/m³)	1.46
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	1.03
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	42
Strain at failure	(%)	17.9
Maximum Deviator Stress	(kPa)	127
Shear Stress Cu	(kPa)	64

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	120

Checked and Approved by:

S Burke

Senior Technician
20/11/2014

Project Number:

GEO / 21953

Project Name:

CAMDEN LOCK VILLAGE PHASE 2
CG/18067a

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH7
Sample Ref	12
Depth (m)	4.50-4.95
Sample Type	U

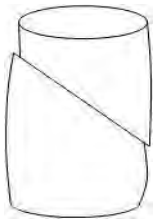
Description:

Stiff fissured brown mottled grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	188.2
Diameter	(mm)	103.7
Moisture Content	(%)	30
Bulk Density	(Mg/m³)	1.94
Dry Density	(Mg/m³)	1.50
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.58
Axial displacement rate	(%/min)	2.12
Cell pressure	(kPa)	86
Strain at failure	(%)	8.5
Maximum Deviator Stress	(kPa)	220
Shear Stress Cu	(kPa)	110

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	210

Checked and Approved by:

S Burke

Senior Technician
20/11/2014

Project Number:

GEO / 21953

Project Name:

CAMDEN LOCK VILLAGE PHASE 2
CG/18067a

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH7
Sample Ref	16
Depth (m)	7.50-7.95
Sample Type	U

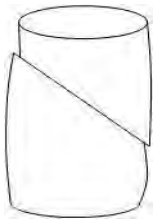
Description:

Stiff fissured brown silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.0
Diameter	(mm)	103.7
Moisture Content	(%)	34
Bulk Density	(Mg/m³)	1.94
Dry Density	(Mg/m³)	1.45
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.22
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	143
Strain at failure	(%)	2.7
Maximum Deviator Stress	(kPa)	208
Shear Stress Cu	(kPa)	104

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	110

Checked and Approved by:

S Burke

Senior Technician
20/11/2014

Project Number:

GEO / 21953

Project Name:

CAMDEN LOCK VILLAGE PHASE 2
CG/18067a

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH7
Sample Ref	21
Depth (m)	10.50-10.95
Sample Type	U

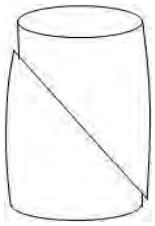
Description:

Stiff fissured brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.5
Diameter	(mm)	103.6
Moisture Content	(%)	25
Bulk Density	(Mg/m³)	2.03
Dry Density	(Mg/m³)	1.62
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.46
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	200
Strain at failure	(%)	6.5
Maximum Deviator Stress	(kPa)	291
Shear Stress Cu	(kPa)	146

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	80

Checked and Approved by:

S Burke

Senior Technician
20/11/2014

Project Number:

GEO / 21953

Project Name:

CAMDEN LOCK VILLAGE PHASE 2
CG/18067a

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH7
Sample Ref	31
Depth (m)	16.50-16.95
Sample Type	U

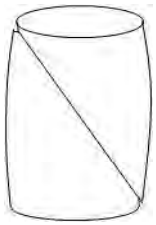
Description:

Very stiff fissured brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.3
Diameter	(mm)	103.3
Moisture Content	(%)	27
Bulk Density	(Mg/m³)	2.01
Dry Density	(Mg/m³)	1.58
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.22
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	314
Strain at failure	(%)	2.7
Maximum Deviator Stress	(kPa)	277
Shear Stress Cu	(kPa)	139

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	80

Checked and Approved by:

S Burke

Senior Technician
20/11/2014

Project Number:

GEO / 21953

Project Name:

CAMDEN LOCK VILLAGE PHASE 2
CG/18067a

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH7
Sample Ref	48
Depth (m)	22.50-22.95
Sample Type	U

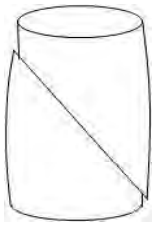
Description:

Very stiff fissured brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	188.7
Diameter	(mm)	102.0
Moisture Content	(%)	24
Bulk Density	(Mg/m³)	2.08
Dry Density	(Mg/m³)	1.68
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.31
Axial displacement rate	(%/min)	2.12
Cell pressure	(kPa)	428
Strain at failure	(%)	4.0
Maximum Deviator Stress	(kPa)	688
Shear Stress Cu	(kPa)	344

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	160

Checked and Approved by:

S Burke

Senior Technician
20/11/2014

Project Number:

GEO / 21953

Project Name:

CAMDEN LOCK VILLAGE PHASE 2
CG/18067a

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH7
Sample Ref	58
Depth (m)	28.50-28.95
Sample Type	U

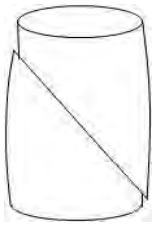
Description:

Very stiff fissured brownish grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.7
Diameter	(mm)	103.3
Moisture Content	(%)	25
Bulk Density	(Mg/m³)	1.97
Dry Density	(Mg/m³)	1.58
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.24
Axial displacement rate	(%/min)	0.99
Cell pressure	(kPa)	542
Strain at failure	(%)	3.0
Maximum Deviator Stress	(kPa)	630
Shear Stress Cu	(kPa)	315

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	120

Checked and Approved by:

S Burke

Senior Technician
20/11/2014

Project Number:

GEO / 21953

Project Name:

CAMDEN LOCK VILLAGE PHASE 2
CG/18067a

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH4
Sample Ref	7
Depth (m)	2.50-2.95
Sample Type	U

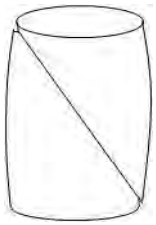
Description:

Firm fissured brown mottled grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.6
Diameter	(mm)	103.2
Moisture Content	(%)	31
Bulk Density	(Mg/m³)	1.92
Dry Density	(Mg/m³)	1.46
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.80
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	48
Strain at failure	(%)	12.9
Maximum Deviator Stress	(kPa)	95
Shear Stress Cu	(kPa)	47

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	60

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH4
Sample Ref	23
Depth (m)	10.50-10.95
Sample Type	U

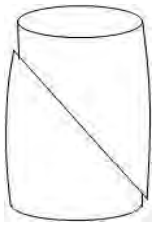
Description:

Very fissured dark grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.1
Diameter	(mm)	104.4
Moisture Content	(%)	29
Bulk Density	(Mg/m³)	1.90
Dry Density	(Mg/m³)	1.47
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.27
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	200
Strain at failure	(%)	3.5
Maximum Deviator Stress	(kPa)	200
Shear Stress Cu	(kPa)	100

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	30

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

UKAS TESTING

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH4
Sample Ref	43
Depth (m)	22.50-22.95
Sample Type	U

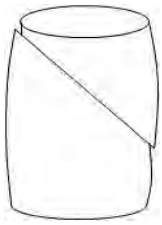
Description:

Very stiff fissured dark grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	202.3
Diameter	(mm)	100.6
Moisture Content	(%)	26
Bulk Density	(Mg/m³)	2.08
Dry Density	(Mg/m³)	1.64
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.41
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	428
Strain at failure	(%)	5.4
Maximum Deviator Stress	(kPa)	312
Shear Stress Cu	(kPa)	156

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH5
Sample Ref	4
Depth (m)	1.50-1.95
Sample Type	U

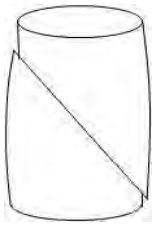
Description:

Stiff fissured brown CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.3
Diameter	(mm)	102.6
Moisture Content	(%)	31
Bulk Density	(Mg/m³)	1.96
Dry Density	(Mg/m³)	1.49
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.16
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	29
Strain at failure	(%)	2.0
Maximum Deviator Stress	(kPa)	135
Shear Stress Cu	(kPa)	67

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH5
Sample Ref	24
Depth (m)	12.00-12.45
Sample Type	U

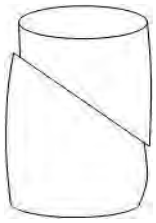
Description:

Very stiff fissured dark grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.2
Diameter	(mm)	103.3
Moisture Content	(%)	28
Bulk Density	(Mg/m³)	1.96
Dry Density	(Mg/m³)	1.54
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.12
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	228
Strain at failure	(%)	1.5
Maximum Deviator Stress	(kPa)	210
Shear Stress Cu	(kPa)	105

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	50

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH5
Sample Ref	39
Depth (m)	21.00-21.45
Sample Type	U

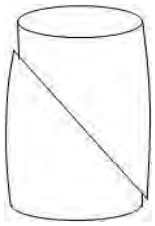
Description:

Very stiff fissured dark grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.5
Diameter	(mm)	103.7
Moisture Content	(%)	27
Bulk Density	(Mg/m³)	1.98
Dry Density	(Mg/m³)	1.56
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.22
Axial displacement rate	(%/min)	1.98
Cell pressure	(kPa)	399
Strain at failure	(%)	2.7
Maximum Deviator Stress	(kPa)	324
Shear Stress Cu	(kPa)	162

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	60

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH5
Sample Ref	49
Depth (m)	27.00-27.45
Sample Type	U

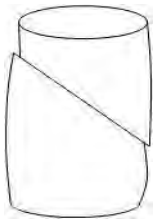
Description:

Very stiff fissured dark grey silty CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	185.2
Diameter	(mm)	103.6
Moisture Content	(%)	24
Bulk Density	(Mg/m³)	2.01
Dry Density	(Mg/m³)	1.62
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.25
Axial displacement rate	(%/min)	2.16
Cell pressure	(kPa)	513
Strain at failure	(%)	3.2
Maximum Deviator Stress	(kPa)	1067
Shear Stress Cu	(kPa)	533

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	10

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH6
Sample Ref	5
Depth (m)	2.50-2.95
Sample Type	U

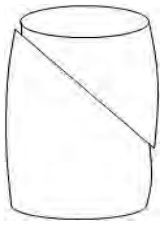
Description:

Firm to stiff fissured brown CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	200.7
Diameter	(mm)	102.8
Moisture Content	(%)	33
Bulk Density	(Mg/m³)	1.95
Dry Density	(Mg/m³)	1.47
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.53
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	48
Strain at failure	(%)	7.5
Maximum Deviator Stress	(kPa)	147
Shear Stress Cu	(kPa)	73

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH6
Sample Ref	20
Depth (m)	10.50-10.95
Sample Type	U

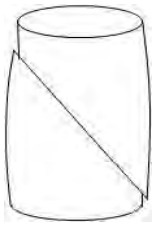
Description:

Very stiff fissured dark brown CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	201.1
Diameter	(mm)	103.6
Moisture Content	(%)	30
Bulk Density	(Mg/m³)	1.95
Dry Density	(Mg/m³)	1.50
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.16
Axial displacement rate	(%/min)	1.99
Cell pressure	(kPa)	200
Strain at failure	(%)	2.0
Maximum Deviator Stress	(kPa)	160
Shear Stress Cu	(kPa)	80

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	20

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS

BS 1377 : Part 7 : 1990 Clause 8

QUICK UNDRAINED TRIAXIAL COMPRESSION TEST

BH/TP No	BH6
Sample Ref	34
Depth (m)	19.50-19.95
Sample Type	U

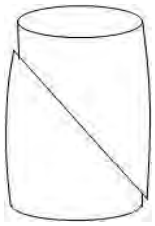
Description:

Very stiff fissured dark grey CLAY

Specimen Details

Specimen conditions		Undisturbed
Length	(mm)	200.3
Diameter	(mm)	104.6
Moisture Content	(%)	24
Bulk Density	(Mg/m³)	1.97
Dry Density	(Mg/m³)	1.58
Test Details		
Latex membrane thickness	(mm)	0.30
Membrane correction	(kPa)	0.29
Axial displacement rate	(%/min)	2.00
Cell pressure	(kPa)	371
Strain at failure	(%)	3.7
Maximum Deviator Stress	(kPa)	478
Shear Stress Cu	(kPa)	239

Mode of failure



Orientation of the sample	Vertical
Distance from top of tube mm	60

Checked and Approved by:

S Burke

Senior Technician
09/12/2014

Project Number:

GEO / 21995

Project Name:

CAMDEN LOCK VILLAGE PHASE II
CG/18067A

GEOLABS