



PHASE II GEO-ENVIRONMENTAL ASSESSMENT

**PROPOSED SECONDARY SCHOOL
RICHFIELD AVENUE, READING
RG1 8JS**

REC REFERENCE: 1CO106158/P2/R0

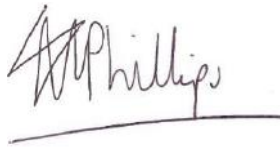
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QUALITY ASSURANCE

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EXECUTIVE SUMMARY

Site Address	Former Golf Driving Range, Richfield Avenue, Reading RG1 8JS	
Site Area	The site area was observed to be a former golf driving range with a driving range structure running east to west with associated parking immediately south of this. The site can be split into two portions across the centre east to west; with the northern portion being dominated by open soft landscape with grass cover. The southern portion is seen to be open space with roadstone capping and intermittent plant cover. Trees are seen to border the site around the boundaries. The site is generally flat and a drainage ditch with small surface water feature in the form of a brook runs east to west circa 20m south of the driving range structure.	
Current Site Use	The northern portion of the site is used as a lazer clay Pidgeon shooting range and lazer tag assault area. The southern portion of the site is disused land.	
Proposed Use	Secondary School with numerous buildings and areas of hard landscaping to the south for a proposed car parking area. It is understood that the existing structure is to be demolished to make space for the proposed buildings. In the northern areas of the site playing field and athletic spaces are proposed.	
Site Investigation Findings	Made Ground	Made Ground encountered within all locations and generally comprised topsoil over fill material which capped the identified landfill material. This material was observed to have frequent amounts of brick, concrete, glass and bituminous materials within.
	Landfill Material	Landfill material was identified within all of the exploratory boreholes and within HP01, HP02 and HP04. The material generally encountered was of a CLAY with varying degrees of SAND and GRAVEL. Large sums of visual and olfactory contamination were identified within this stratum.
	Kempton Park Gravel Member	Encountered within all exploratory boreholes this stratum typically comprised of granular deposits of varying proportions of SAND and GRAVEL.
	Seaford and Newhaven Chalk Formation	Encountered within all exploratory borehole locations this was identified underlying the Kempton Park Gravel Member and typically was recovered as slightly clayey GRAVEL with occasional flint bands.
	Groundwater	Groundwater was encountered between 3.10mbgl to 3.40mbgl within the Kempton Park Gravel Member. Groundwater was also encountered within the Chalk Aquifer. Ground water inflow rates were fast within the Kempton Park Gravel Member.
	Obstructions	Black flint obstructions causing chiselling were identified within BH01 at 10.00mbgl and BH04 at 12.00mbgl. Flint cobble bands were also encountered through the boreholes from depths from 9.40mbgl to 13.50mbgl.
Contamination and Geotechnical Assessment		
Revised Conceptual Site Model (CSM)	Made Ground	13no. soil samples were screened against relevant GAC screening values for the proposed scheme, upon review of this chemical exceedances of Heavy Metals, PAHs and TPHs were identified within the made ground and landfill material. In addition to this asbestos was identified within one location from 2.00 – 2.10mbgl within BH05. It is considered that the identified contamination





		within the made ground and landfill material poses a significant risk to future site users.
	Groundwater & Surface Water	Elevated levels of Nickel and PAHs were identified within the groundwater from samples within the Kempton Park Gravel Member and Seaford and Newhaven Chalk Formation when compared to surface water and drinking water screening criteria. It is believed that these are derived from the identified contamination within the overlying soils. However, given the site setting, it is considered that this presents a low risk to controlled waters.
	Waste Acceptance Criteria (WAC)	WAC analysis was undertaken on 13no. samples taken from within the made ground and landfill materials. Upon review of the results it was identified that 2no. of the samples qualified for Hazardous Landfill Site disposal requirements. These samples were obtained from depths of 1.50mbgl and 2.00mbgl, within the landfill materials. REC recommends that consideration be given to pre-treatment of soils prior to disposal. REC also recommends that discussions regarding disposal is made with landfill operators prior to removal of soils from site.
Preliminary Geotechnical Assessment	Concrete Durability - Subsurface Kempton Park Gravel Member and Seaford and Newhaven Chalk Formation meet DS-1/AC-1 for Design Sulphate Class and Aggressive Chemical Environment for Concrete Classification. Piled Foundations - REC recommends that piles bear into the underlying Seaford and Newhaven Chalk Formations where greater preliminary piling values can be achieved.	
Summary and Conclusions	▶ It is concluded that the underlying soils pose a significant risk to future site users, REC recommends that a clean cover system of a minimum of 600mm is employed in all areas where soft landscaping is proposed. For areas where asbestos is identified the clean cover system should be advanced to a minimum thickness of 1000mm or cover with hardstanding. Additional sampling works could be undertaken within the area where asbestos was encountered in order to undertake further delineation; ▶ REC recommends that a RS is prepared for the recommended clean cover system; following this REC recommend that validation works and reporting are completed to ensure the suitability of the employed clean cover system; ▶ It is recommended that a Piling Risk Assessment is undertaken; ▶ It is concluded that no significant risk is posed to controlled waters; ▶ Hazardous leachable material was identified from the WAC testing and therefore treatment of soils may be required prior to disposal, REC recommend that relevant enquiries are made to relevant waste providers based on the WAC findings; ▶ Based on the preliminary pile capacities REC recommends that a maximum initial pile capacity of 945kN can be achieved within the Seaford and Newhaven Chalk Formation from 15.00mbgl using a shaft and base diameter of 600mm; and, ▶ REC recommends Piles are founded in the Seaford & Newhaven Chalk Formation.	





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APPENDICES

Appendix I	Limitations
Appendix II	Glossary
Appendix III	Drawings
	1CO106158-001 – Site Location Plan
	1CO106158-002 – Site Layout Plan
	1CO106158-003 – Proposed Development and Exploratory Location Plan
	1CO106158-004 – Exploratory Location Plan
	1CO106158-005 – Soils Contamination Plan
	1CO106158-006 Waters Contamination Plan
Appendix IV	Photographs
Appendix V	Exploratory Hole Logs
Appendix VI	Chemical Laboratory Results
Appendix VIII	Geotechnical Laboratory Results





1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants Ltd (REC) was commissioned by Hampshire County Council 'the Client', to undertake a Phase II Geo-Environmental Assessment at the Laser Clay Pidgeon Shooting Range (Former Golf Driving Range), North of Richfield Avenue, Reading, RG1 8JS, the 'site'.

The purpose of this report is to determine the chemical and geotechnical characteristics of the underlying geology in order to support the proposed scheme.

1.2 Proposed Development

REC understands that the proposed development comprises the construction of a new secondary school with associated outdoor athletics facilities within the northern portion of the site and staff and visitor car parking spaces the south of the proposed school structures. The proposed school is understood to comprise of three separate structures forming a "main" building, sports hall and a third, undefined, structure.

The objectives of the Geo-Environmental Assessment are as follows:

- ▶ Undertake a preliminary stage of intrusive works including sampling and analysis to provide an overview of geological and geotechnical conditions beneath the site;
- ▶ Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to on-site receptors;
- ▶ Assess the geotechnical information and provide preliminary recommendations in relation to foundations of the proposed school buildings; and
- ▶ Provide recommendations regarding future works, if required.

1.3 Limitations

The limitations of this report are presented in Appendix I.

1.4 Confidentiality

REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC. A charge may be levied against such approval.





2. SITE SETTING

2.1 Site Details

Table 2.1 Site Details

Site Address	Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS
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All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location plan (Ref. 1CO106158-001) is presented in Appendix III.

2.2 Current Site Use

2.2.1 Site Description

The site currently covers two areas which have been defined by “north” and “south” for ease of description with the centre point being the drainage ditch which runs east-west across the site. See 1CO106158-002 site layout and exploratory location plan.

The northern portion of the site is found to consist of a generally flat open area dominated by grass cover. The southernmost portion of this half of the site is where a former golf driving range structure is located which is now operated by Reload Reading – Laser Clay Shooting Range. The structure has associated car parking to the south and an access road which runs east along the drainage ditch towards the leisure centre. The golf range area was seen to have local minor depressions and rises with no significant change in elevation or slope. The site was bound on all sides by a metal fence.

The southern portion of the site, south of the drainage ditch, comprised areas of open space which were seen to have poor quality asphalt/ roadstone capping. Interspersed vegetation was identified to typically consist of trees, shrubs and occasional patches of grass cover. This southern area was seen to have various items of discarded materials such as metals and plastics. The topography here was typically flat with occasional local depressions and rises. The elevation dropped slightly to the southernmost point. It was seen that this area was not in use by the public and was largely derelict, with the exception access for articulated lorries delivering goods to the neighbouring Caversham Bridge Garden Centre.

The drainage ditch running east to west across the site was seen to be set below the typical ground level by circa. 2.0mbgl with the water levels appearing to not exceed 1.0m. The surface water feature contained physical detritus such as plastic, wood and metal objects of various forms. The water course was heavily overgrown with junior trees and large shrubs.





2.3 Surrounding Area

The surrounding land uses are summarised in Table 2.2 below:

Table 2.2 Surrounding Land Uses

Direction	Land Use
North	Open Space and River Thames (c.139m)
East	Rivermead Leisure Complex & MUGA
South	Industrial and commercial estates
West	Open Space





3. SITE INVESTIGATION

3.1 Site Investigation

A ground investigation has been designed based on the scope received from Hampshire County Council in the invitation to tender documentation (Ref. No.:G1439). The scope comprised 6no. Cable Percussive boreholes advanced to 15.00mbgl, to provide information on the underlying geology, and hand pits across the remainder of the site to provide information on CBR within shallow soils across the site.

Exploratory fieldwork commenced on 17th September 2018 and was completed on the 24th September 2018. A selection of site photographs are presented in Appendix IV and the works are summarised in Table 3.1 below:

Table 3.1 Summary of Fieldwork

Hole Location	Potential Source/Rationale	Type	Maximum Depth (mbgl)
BH01	To obtain information on baseline chemical and geotechnical conditions.	Cable Percussive	15.00
BH02			
BH03			
BH04			
BH05			
BH06			
HP01	To obtain information for CBR Analysis and shallow chemical analysis.	Hand Pit	1.10
HP02			0.80
HP03			0.80
HP04			0.80
HP05			0.80
HP06			0.70
HP07			0.90
HP08			0.80
HP09			0.90

Notes mbgl – metres below ground level

The exploratory hole locations are shown on drawing ref. 1CO106158-002, included within Appendix III.

All samples scheduled for laboratory analysis were collected in appropriate sampling containers and suitably stored prior to submission for analysis. The samples were collected using appropriate PPE and





sampling equipment which was cleaned at each location. A detailed copy of REC sampling methodology, QA procedures and laboratory chain of custody forms can be provided upon request.

3.2 In-Situ Testing

3.2.1 Standard Penetration Tests

Standard Penetration Tests (SPT) were carried out within the cable percussive borehole locations from 1.00mbgl and at one metre centres to a depth of 5.00mbgl, where tests were taken at 1.50 metre centres thereafter. The testing was carried out to provide validation of ground consistency and or relative density and strength observations. The results of the in-situ SPT testing are presented on the exploratory hole logs, included within Appendix V.

3.2.2 CBR Testing

In situ CBR testing was undertaken within the hand dug exploratory holes (HP01 to HP09) using a MEXE Probe as requested by the Client. Hand pits were advanced into the shallow soils to confirm its composition prior to testing. Readings were undertaken every 5cm with results displayed in Table 4.7.

3.3 Laboratory Analysis

3.3.1 Soil Chemical Analysis

Selected soil samples were submitted to UKAS accredited Concept Life Sciences, of Braintree, for the following chemical analyses, in accordance with the Hampshire County Council soil contamination testing suite E1:

- ▶ Asbestos identification;
- ▶ Heavy metals;
- ▶ Total cyanide;
- ▶ Total phenols;
- ▶ Soil Organic Content (SOM%);
- ▶ Speciated Polycyclic Aromatic Hydrocarbons (PAH);
- ▶ Total Petroleum Hydrocarbons (TPH);
- ▶ pH, water soluble sulphate (2:1 extract), acid soluble sulphate and total sulphur for use in subsurface concrete design parameters;
- ▶ Topsoil analysis in accordance to BS 3882:2015; and,
- ▶ Quantification of identified Asbestos Fibres.

The results of the chemical analyses are included in Appendix VI and discussed in Section 5.





3.3.2 Geotechnical Laboratory Analysis

Selected soil samples were submitted to UKAS accredited Geo Site & Testing Services (GSTL) Ltd of Llanelli, where the following geotechnical tests were undertaken:

- ▶ Moisture Content;
- ▶ Atterberg Limits;
- ▶ Particle Size Distribution by Wet Sieve Analysis;
- ▶ Determination of Saturated Moisture Content / Intact Dry Density of Chalk; and,
- ▶ Shear box analysis of granular materials recovered.

The results of the geotechnical analysis are presented in Appendix VII.





4. GROUND AND GROUNDWATER CONDITIONS

4.1 Ground Conditions

4.1.1 Summary of Ground Conditions

The ground investigation generally confirmed the published geology and identifies the strata set out in Table 4.1 below. Exploratory hole logs are included in Appendix V.

Table 4.1 Summary of Strata within Former Landfill Area

Stratum	Min Depth to Top of Strata (m)	Max Depth to Top of Strata (m)	Max Thickness(m)
Made Ground	Ground Level	Ground Level	1.30 (BH01)
Landfill Material	0.40	1.20	2.00 (BH02 & BH05)
Kempton Park Gravel Member	2.00	2.80	5.80 (BH01)
Seaford and Newhaven Chalk Formation	7.00	8.70	8.00 (BH01 & BH05)

NP * – Total strata thickness not proven. Table 4.1 includes data from BH01 – BH06 and HP01 – HP05.

Table 4.2 Summary of Strata within Disused Land in Southern Portion of Site

Stratum	Min Depth to Top of Strata (m)	Max Depth to Top of Strata (m)	Max Thickness(m)
Made Ground	Ground Level	0.90	0.90 (HP07) NP*
Langley Silt Member	0.25	0.90	0.60 (HP09) NP*

NP * – Total strata thickness not proven. Table 4.2 includes data from HP06 – HP09.

4.1.2 Made Ground

Made Ground was encountered in all locations with the exception of HP08 and HP09. Topsoil was observed to depth up to 1.20mbgl with a slightly sandy gravelly CLAY composition, typically being dry and friable in consistency. The material in most cases was found to contain gravels of predominantly flint with anthropogenic materials featuring heavily, such as glass, brick, ceramic, plastic and metal objects. It is believed that this material was employed as a type of clean cover capping for the underlying landfill material. The material was seen to have been mixed well and there was little in the way of discerning true topsoil from the subsoils due to colour and constituent similarities.

4.1.3 Landfill Materials

Landfill material was encountered within all borehole locations and three of the nine hand pitted locations (HP01, HP02 and HP04). The material recovered from the boreholes was typically encountered from depth of 0.80m to 1.30mbgl and was identified as comprising sand and gravel set within a CLAY matrix. The material was predominantly homogenous in nature, however in some instances (BH06 from 2.30 to 2.60mbgl) this homogenous material was underlain by granular landfill which were recorded as comprising of varying quantities of SAND and GRAVEL.





Sands within this unit were typically fine to coarse. Gravels recovered were identified as being angular to rounded fine to coarse flint, concrete, brick, metal objects, glass, plastic objects, hair material, relic plant matter, wood matter, bituminous material, ceramic objects and paper objects. Cobbles within this fill were recorded as angular to subrounded fine to coarse metal and plastic objects, wood and glass.

Strong visual and olfactory evidence was identified within this stratum, therefore indicating significant likelihood of contamination.

4.1.4 Kempton Park Gravel Member

Identified within all of the boreholes this stratum was encountered from depth varying from 2.00m to 2.80mbgl. The unit was identified as a dark grey to grey granular stratum underlying the landfill material comprising varying quantities of SAND and GRAVEL with low to high cobble content. Sands were fine to coarse. Gravel was angular to rounded fine to coarse flint. Cobbles were angular to subrounded flint.

The material graduated into a yellowish brown to light brown colour deeper within the unit.

4.1.5 Seaford and Newhaven Chalk Formation

Identified within all boreholes the Seaford Chalk Formation was identified from depths of 7.00m to 8.70mbgl. The material was recovered as an off-white gravelly CLAY to clayey GRAVEL with occasional bands of black flint gravel or cobbles.

4.1.6 Langley Silt Member

The Langley Silt Member was identified in two locations during the site investigation within HP08 and HP09. The material encountered was found to comprise greenish grey to brown CLAY with slight amounts of sand and gravel. Sand was found to be fine to medium and gravels were subangular to subrounded fine flint.

4.1.7 Particle Size Distributions by wet sieve analysis

Selected samples were scheduled for Particle Size Distribution by wet sieve analysis. Results of analyses undertaken are presented in Table 4.3.

Table 4.3 Summary of Particle Size Distribution by Wet Sieve Analysis Tests

Location	Depth (mbgl)	Stratum	Granulometric Composition (%)			
			Cobbles	Gravel	Sand	Silt / Clay
BH01	4.00 – 4.50	Kempton Park Gravel Member	0	86	14	0
BH02	4.00 – 4.50		0	65	34	1
BH02	8.00 – 8.50		0	94	6	0
BH03	7.00 – 7.50		0	70	29	1
BH04	4.00 – 4.50		0	81	18	1





Location	Depth (mbgl)	Stratum	Granulometric Composition (%)			
			Cobbles	Gravel	Sand	Silt / Clay
BH04	6.50 – 7.00		7	84	9	0
BH05	4.00 – 4.50		0	74	25	1

The particle size distribution tests carried out on representative soils confirmed on-site engineer's descriptions.

4.1.8 Mean Standard Penetration (SPT) Results

The results of SPTs presented within the exploratory hole logs within Appendix VI and summarised in Table 4.4 below and continued overleaf:

Table 4.4 Average Standard Penetration Test Results

Boreholes	Depth (m bgl)	Material Field Description	Mean SPT "N" Value	No. Tests at Depth	Standard Deviation	Relative Density / Consistency
All	1.0	Made Ground	6	6	3.34	Soft
All	2.0		16.5	6	10.5	Firm to Stiff
All	3.0	Kempton Park Gravel Member	15.6	6	6.21	Medium Dense
All	4.0		15.8	6	6.43	Medium Dense
All	5.0		12.8	6	4.79	Medium Dense
All	6.5		13.5	6	4.92	Medium Dense
All	8.0	Seaford and Newhaven Chalk Formation	13	6	5.29	N/A
All	9.5		12.6	6	1.21	N/A
All	11.0		13.6	6	2.71	N/A
All	12.5		22.8	6	6.64	N/A
All	14.5		42	6	4.14	N/A

N/A – not applicable

Typical SPT values indicated the ground was found to generally have medium dense consistency within the granular material of the Kempton Park Gravel Member and Seaford and Newhaven Chalk Formation, with Chalks becoming Dense from 14.50mbgl.

4.1.9 Soil Plasticity

The results of the Atterberg Limit determinations, presented within Appendix VIII and summarised in Table 4.5 below and continued overleaf:

Table 4.5 Summary of Plasticity Index Test Results

Location	Depth (m)	Stratum	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Percentage passing 425µm sieve (%)	Modified Plasticity Index (%)	Volume Change Potential
HP08	0.30	Gravelly	17	41	29	12	75	9	N/A





		Silty CLAY							
HP09	0.70	Gravelly Silty CLAY	20	43	17	26	82	21	Low

Based on the results of Atterberg Limit determinations, the clayey Kempton Park Gravel Member within the southern portion of the site are of low volume change potential.

4.1.10 Saturation Moisture Content of Chalk

Saturation moisture content testing was undertaken on three samples from across the site within the Seaford and Newhaven Chalk Formation, results are presented below within Table 4.6.

Table 4.6 Summary of Saturation Moisture Content of Chalk

Location	Depth (m)	Stratum	Natural Moisture Content (%)	Bulk Density (mg/m ³)	Dry Density (mg/m ³)	Saturated Moisture Content (%)
BH01	14.0	CHALK	36	1.78	1.31	39
BH03	11.0		33	1.82	1.37	36
BH06	8.0		36	1.77	1.30	40

4.1.11 CBR Testing

In-situ CBR testing was undertaken within nine exploratory holes (HP1 to HP9). As detailed in Table 4.7 below, CBR values ranged between 1 and 14%, averaging 6.3%.

Table 4.7 In-situ CBR Results

Location	Depth (mbgl)	CBR Result (%)
HP1	1.0	1
HP2	0.8	4
HP3	0.8	14
HP4	0.8	4
HP5	0.8	2.65
HP6	0.7	12
HP7	0.9	14
HP8	0.8	1.75
HP9	0.8	3.625

It should be noted that in the exploratory locations (HP3, HP6 and HP7) the material was observed as being very dense and advancing the MEXE Proved difficult with only a single 5mm length being





archived. Repeat tests were carried out in order to avoid producing anomalous results.

4.1.12 Shear Box Testing

Shear Box testing was undertaken on a representative sample from the Kempton Park Gravel Member combining material from BH03 and BH04 from Depths of 3.50 to 4.50mbgl. Results are presented within Table 4.8 overleaf and presented within Appendix VIII.

Table 4.8 Large Shear Box Results

Test Number	Bulk Density (Mg/m ³)	Normal Pressure (kPa)	Rate of Strain (mm/min)	Strain at Peak Shear Stress (%)	Peak Shear Stress (kPa)	Peak Angle of Shearing Resistance (°)	Peak Effective Cohesion (kPa)
1	1.83	40	1.500	16.85	41	46.5	0
2	1.83	80	1.500	26.30	84		
3	1.83	160	1.500	24.65	169		

A Peak angle of shearing resistance was recorded at 46.5° with a peak effective cohesion of 0kPa.

4.1.13 pH and Sulphate

Chemical analysis for pH and sulphate contained in Appendix VI shows that the underlying Topsoil and Kempton Park Gravel and Seaford and Newhaven Chalk Formation, including groundwaters, meet Design Sulphate Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1 in accordance with BRE Special Digest 1 (2005). A summary of pH and soluble sulphate results are summarised in Table 4.9 below:

Table 4.9 Summary of pH and Sulphate Data

Location	Depth (m)	pH Value	Water soluble SO ₄ (mg/l)	Concrete Classification
BH01	5.00	8.9	10	DS-1 / AC1
BH02	6.00	8.7	20	DS-1 / AC1
BH06	8.00	8.9	40	DS-1 / AC1
BH03	10.00	9.2	20	DS-1 / AC1
BH04	12.00	9.3	20	DS-1 / AC1
BH05	14.50	9.2	20	DS-1 / AC1





BH01 (Groundwater)	N/A	8.3	22	DS-1 / AC1
BH02 (Groundwater)	N/A	8.0	19	DS-1 / AC1
BH03 (Groundwater)	N/A	8.1	22	DS-1 / AC1
BH04 (Groundwater)	N/A	8.2	16	DS-1 / AC1
BH05 (Groundwater)	N/A	8.3	16	DS-1 / AC1
BH06 (Groundwater)	N/A	8.1	11	DS-1 / AC1

4.1.14 Organic Matter

Soil organic matter chemical analysis shows that the underlying soils has a soil organic matter between 1.7 and 2.2%.

Table 4.10 Summary of Soil Organic Matter

Location	Depth (m)	Soil Organic Matter (%)
BH01	1.50	35
	3.00	0.7
BH02	2.50	2.6
BH03	0.70	6.2
	1.20	6.7
BH04	2.20	0.2
BH05	1.50	16
	2.00	8.8
BH06	1.10	10
	1.60	3.6

4.2 Groundwater Conditions

Groundwater was encountered within all six of the exploratory boreholes on site, however, no groundwater was recorded within the hand pits. Groundwater was encountered during the ground investigation, shown on exploratory holes logs within Appendix VI, within the coarse-grained Kempton Park Gravel Member from depths of 3.10 to 3.40mbgl. These were recorded as strikes with fast effuse rates. Groundwater was also encountered within the Seaford and Newhaven Chalk Formation. However, determining the depth at which it was encountered was made difficult due to the hydraulic relationship between the above coarse-grained deposits, as indicated by the groundwater monitoring





results. In addition to this, perched water was noted to be seeping from the shallow Made Ground deposits within BH04 from 1.50mbgl and BH06 from 1.00mbgl.

Table 4.11 Summary of Groundwater Monitoring

Location	Stratum	Material Description	Depth to Water (mbgl)	Monitoring Response Zone (mbgl)
BH01	Landfill	Gravelly CLAY	2.28	1.00 – 3.00
	KPGM	SAND and GRAVEL	2.28	4.00 – 7.00
BH02	Landfill	Gravelly CLAY	2.60	1.00 – 3.00
	SCF	CHALK	2.59	9.00 – 15.00
BH03	Landfill	Gravelly CLAY	2.10	1.00 – 2.00
	KPGM	Gravelly SAND	2.34	3.00 – 5.00
BH04	Landfill	Gravelly CLAY	N/A	1.00 – 2.00
	SCF	CHALK	2.45	7.00 – 15.00
BH05	Landfill	Gravelly CLAY	2.25	1.00 – 3.00
	SCF	CHALK	2.26	8.00 – 15.00
BH06	Landfill	Gravelly CLAY	2.42	1.00 – 3.00
	KPGM	Sandy GRAVEL	2.43	4.00 – 5.00

KPGM = Kempton Park Gravel Member, SCF = Seaford Chalk Formation.





5. TIER II GENERIC QUANTITATIVE CONTAMINATED LAND RISK ASSESSMENT

REC has undertaken a Tier II qualitative risk assessment to determine if any potential contaminants within the underlying soils and groundwater pose an unacceptable level of risk to the identified receptors.

5.1 Human Health

At a Tier II stage, the long term (chronic) toxicity risk to human health is assessed by utilising appropriate and conservative generic assessment criteria (GAC) to determine whether there are actual or potential unacceptable risks at the site and if any viable pollutant linkages are present.

To undertake the Tier II assessment within the context of the proposed development, REC has determined that the most appropriate GAC values available will be those based upon a residential end use with plant uptake, and a soil organic matter of 6.0% (based on mean SOM results from soil testing). It was decided that this was most appropriate due to the proposed scheme being a school and therefore there is an increased likelihood of exposure caused over an extended time period.

The following assessment, summarised below and overleaf, has primarily adopted the S4UL (Suitable for Use Levels reference values published by LQM/CIEH in 2015, the S4ULs). Currently, no published GAC value is available for cyanide and therefore REC has utilised the Environmental Agency Contaminated Land Exposure Assessment Tool (CLEA v1.06) to derive the relevant GAC for this proposed land use. Due to the absence of a published lead GAC for direct use within the planning regime, the 2014 Defra C4SL (Category 4 Screening Level) has been used as this value is considered to incorporate the latest toxicological, bio-accessibility and exposure modelling research to date.

Table 5.1 Summary of Generic Human Health Toxicity Assessment for Residential end use with plant uptake 6.0% SOM

Determinand	Units	GAC	GAC Source	n	[mc]	No.	Primary Pathway	Assessment
Inorganics								
Arsenic	mg/kg	37	(i)	13	56	BH01 ES6, BH03 ES3, BH05 ES3, BH06 ES4 & BH06 ES5	1	See Discussion
Boron	mg/kg	290	(i)	13	3	N/A	1,2	No Further Action
Cadmium	mg/kg	11	(i)	13	2.8		1	
Chromium	mg/kg	910	(i)	13	44		1	
Chromium (VI)	mg/kg	6.0	(i)	13	<1		1	
Copper	mg/kg	2,400	(i)	13	320		1	
Lead	mg/kg	200	(iv)	13	2,000	BH01 ES3, BH02 ES5, BH03 ES2, BH03 ES3, BH05 ES3, BH05 ES4	1	See Discussion





Determinand	Units	GAC	GAC Source	n	[mc]	No.	Primary Pathway	Assessment
						& BH06 ES3		
Mercury [Inorganic]	mg/kg	40	(i)	13	<1	N/A	1	No Further Action
Nickel	mg/kg	180	(i)	13	210	BH05 ES4	1	See Discussion
Selenium	mg/kg	250	(i)	13	<3	N/A	1	No Further Action
Zinc	mg/kg	3,700	(i)	13	1,800		1	
Cyanide [Total]	mg/kg	3.4	(v)	13	13	BH01 ES3 & BH05 ES4	1	See Discussion
Asbestos	-	D.	-	13	D.	BH05 ES4	3	See Discussion
Organics – PAHs and Phenol								
Phenols	mg/kg	280	(ii)	13	23	N/A	5	No Further Action
Naphthalene	mg/kg	2.3	(ii)	13	20	BH01 ES3	4	See Discussion
Acenaphthylene	mg/kg	170	(ii)	13	0.8	N/A	1	No Further Action
Acenaphthene	mg/kg	210	(ii)	13	41		1	
Fluorene	mg/kg	170	(ii)	13	26		1	
Phenanthrene	mg/kg	95	(ii)	13	45		1	
Anthracene	mg/kg	2,400	(ii)	13	11		1	
Fluoranthene	mg/kg	280	(ii)	13	13		1	
Pyrene	mg/kg	620	(ii)	13	8.5		1	
Benzo(a)anthracene	mg/kg	7.2	(ii)	13	1.9		1	
Chrysene	mg/kg	15	(ii)	13	2		1	
Benzo(b)fluoranthene	mg/kg	2.6	(ii)	13	1.5		1	
Benzo(k)fluoranthene	mg/kg	77	(ii)	13	1.1		1	
Benzo(a)pyrene	mg/kg	2.2	(ii)	13	1.1		1	
Indeno(123-cd)pyrene	mg/kg	27	(ii)	13	0.7		1	
Dibenzo(a,h)anthracene	mg/kg	0.24	(ii)	13	0.4	BH01 ES3 & BH05 ES4	1	See Discussion
Benzo(ghi)perylene	mg/kg	320	(ii)	13	0.7	N/A	1	No Further Action
Organics – TPHs								
TPH C₁₀- C₄₀	mg/kg	N/A	(iii)	13	7,800	BH01 ES3 BH03 ES5 BH05 ES4 & BH06 ES3	4	See Discussion
<u>Key</u> [mc] Maximum Concentration Recorded n Number of tested samples D. Detected N.D. None Detected (Limit of Detection = <0.0001%) <u>Primary Pathways</u> 1 Ingestion of soil and indoor dust and / or oral background exposure; 2 Consumption of home-grown produce and attached soil; 3 Inhalation of dust (background and indoor); 4 Inhalation of vapour (background and indoor);								



Determinand	Units	GAC	GAC Source	n	[mc]	No.	Primary Pathway	Assessment
5	Direct dermal / skin contact.							
<u>Generic Assessment Criteria (GAC) Source</u>								
(i)	LQM/CIEH Suitable For Use Level (S4UL) (2015);							
(ii)	S4UL – Conservative Assessment Approach of 6% SOM;							
(iii)	S4UL – 6 SOM and assumed worst case aliphatic / aromatic compound;							
(iv)	Defra Category 4 Screening Level (2014);							
(v)	CLEA 1.06 Derived Value.							

Referring to Table 5.1, the results of this direct comparison indicates that the screening values have been exceeded for the following tested determinants:

- ▶ **Arsenic** - BH01 ES1 (@ 3.00 – 3.10mbgl), BH03 ES3 (@ 1.20 – 1.30mbgl), BH05 ES3 (@ 1.50 – 1.60mbgl), BH06 ES4 (@ 1.60 – 1.70mbgl) and BH06 ES5 (@ 2.30 – 2.40mbgl);
- ▶ **Lead** – BH01 ES3 (@ 1.50 – 1.60mbgl), BH02 ES5 (@ 2.50 – 2.60mbgl), BH03 ES2 (@ 0.70 – 0.80mbgl), BH03 ES3 (@ 1.20 – 1.30mbgl), BH05 ES3 (@ 1.50 – 1.60mbgl), BH05 ES4 (@ 2.00 – 2.10mbgl) and BH06 ES3 (@ 1.10 – 1.20mbgl);
- ▶ **Nickel** – BH05 ES4 (@ 2.00 – 2.10mbgl);
- ▶ **Cyanide (Total)** – BH01 ES2 (@ 1.50 – 1.60mg/l) and BH05 ES4 (@ 2.00 – 2.10mbgl);
- ▶ **Asbestos** – BH05 ES4 (@ 2.00 – 2.10mbgl);
- ▶ **Naphthalene** – BH01 ES3 (@ 1.50 – 1.60mbgl);
- ▶ **Dibenzo(a,h)Anthracene** – BH01 ES3 (@ 1.50 - 1.60mbgl) and BH05 ES4 (2.00 - 2.10mbgl); and
- ▶ **TPH (C₁₀ – C₄₀)** – BH01 ES3 (@ 1.50 – 1.60mbgl), BH02 ES5 (@ 2.50 – 2.60mbgl), BH05 ES4 (@ 2.00 – 2.10mbgl) and BH06 ES3 (@ 1.10 – 1.20mbgl).

5.1.1 Arsenic, Lead, Nickel, Cyanide and Dibenzo(a,h)Anthracene

Exceedances of arsenic, lead, nickel, cyanide and/or dibenzo(a,h)anthracene were identified within ten of the thirteen tested samples. The main pathway for these determinants is ingestion of soil and indoor dust and / or oral background exposure. With current levels it is considered that this presents a risk to human health for future site users.

5.1.2 Asbestos

Asbestos was identified within a single borehole (BH05 ES4 @ 2.00 – 2.10mbgl) as loose chrysotile fibres and chrysotile asbestos cement board. Stage 3 quantification was undertaken on the fibre count within the soil sample, with an overall mass percentage of 0.71% asbestos being determined. The main pathway for this determinant is through inhalation of dust (background and indoor).

5.1.3 Naphthalene

A single high elevated concentration of naphthalene was recorded. The main pathway for this determinant is through inhalation of vapour (background and indoor). With current levels it is considered that this presents a risk to human health for future site users.

5.1.4 TPH

High concentrations of TPH (C₁₀ – C₄₀) (>2,000 mg/kg) were encountered within 4no. locations.





Without analysis for specific carbon chain lengths, no direct comparison can be made with the generic assessment criteria. As such, it is conservatively considered that this presents a potential risk to human health for future site users.

5.1.5 Waste Acceptance Criteria

Waste Acceptance Criteria testing was carried on select samples from the Made Ground (Landfill Material) to identify the most appropriate disposal route for soils which may be removed from site. The results of laboratory WAC analysis are summarised in Table 5.2. Laboratory testing certificates are reproduced within Appendix VI.

Table 5.2 Summary of WAC Analysis

Sample location (Depth mbgl)	Waste Classification	Determinand of Concern (Result)
BH01 1.50 – 1.60	Hazardous Waste Landfill*	Loss on Ignition @ 450C (38%) Total Organic Carbon (20%)
	Stable Non-Reactive	PAH (170 mg/kg) TPH C10-C40 (7800 mg/kg) Antimony (0.17 mg/kg) SO4-- (2200 mg/kg) Total Dissolved Solids (4100 mg/kg)
BH01 3.00 – 3.10	Inert Waste Landfill	N/A
BH02 2.50 – 2.60	Stable Non-Reactive	TPH C10-C40 (7300 mg/kg)
BH03 0.70 – 0.80	Stable Non-Reactive	Total Organic Carbon (3.6%) Antimony (0.069 mg/kg)
BH03 1.20 – 1.30	Stable Non-Reactive	Total Organic Carbon (3.9%) SO4-- (1200 mg/kg)
BH04 2.20 – 2.30	Inert Waste Landfill	N/A
BH05 1.50 – 1.60	Hazardous Waste Landfill*	Loss on Ignition @ 450C (14%)
	Stable Non-Reactive	Antimony (0.11 mg/kg)
BH05 2.00 – 2.10	Hazardous Waste Landfill	Total Organic Carbon (5.1%) Antimony (1.80mg/kg)
	Stable Non-Reactive	TPH C10 – C40 (1100 mg/kg) SO4-- (1,900 mg/kg)
BH06 1.10 – 1.20	Hazardous Waste Landfill	Total Organic Carbon (5.9%)
	Stable Non-Reactive	TPH C10 – C40 (2300 mg/kg) SO4-- (2100 mg/kg)
BH06 1.60 – 1.70	Inert Waste Landfill	N/A
BH06 2.30 – 2.40	Inert Waste Landfill	N/A
HP08 0.70 – 0.80	Inert Waste Landfill	N/A
HP09 0.50 – 0.60	Inert Waste Landfill	N/A

* Pre-treatment may be required prior to disposal





Guidance should be sought from the receiving landfill regarding these determinants and the potential for concern. In the case of BH1 (1.60 – 1.70mbgl) and BH05 (2.00 – 2.10mbgl), high Loss on Ignition levels may require the soil to be treated prior to disposal.

Given that asbestos fibres were identified within BH05, the presence of further asbestos fibres and potential for ACM is considered likely. Any soils contaminated with asbestos containing material, or soils with a fibre count greater than or equal to 0.001% will require treatment and/or disposal to appropriate hazardous waste landfill.

REC recommend that contractors open up discussions with landfill operators regarding the findings of the WAC testing and contamination analysis within this report to allow for appropriate management of disposal and landfill operator recommendations.

5.2 BS3882: 2015 Analysis

Ten samples were taken and submitted for chemical laboratory analysis to determine the materials suitability as a Topsoil in construction. Ten samples were taken across the site in order to obtain a suitable spread.

Findings can be found within Table 5.3.





Table 5.3 Summary of Topsoil Analysis

Parameters		Multipurpose Topsoil Criteria	HP01	HP02	HP03	HP04	HP05	HP06	BH06
BH02	> 2mm	30	41.8	54.3	31.8	6.4	8.6	17.6	37.8
	> 20mm	10	14.9	30.5	8.0	3.0	4.9	11.9	15.5
	> 50mm	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mass loss on Ignition (%)	Clay 5% - 20%	3 to 20	15	15	13	15	13	16	13
	Clay 20% - 35%	5 to 20	-	-	-	-	-	-	-
Plant Nutrient Content	Total Nitrogen % m/m	>0.15	0.23	0.28	0.17	0.38	0.19	0.14	0.13
	Extractable Phosphate mg/L	16 to 140	31	26	39	30	64	34	49
	Extractable Potassium mg/L	121 to 1,500	150	27	43	33	140	95	52
	Extractable Magnesium mg/L	51 to 600	98	15	23	23	53	41	29
Potentially Phytotoxic Elements (mg/kg) (pH > 7.0)	Zinc	<300	89	550	66	280	240	130	57
	Copper	<200	98	27	22	20	45	26	98
	Nickel	<110	17	17	23	20	13	28	35
Visible Contaminants % m/m	Air Dried	<0.5	7.4	8.6	5.6	11.5	6.6	5.3	5.0
	Plastics	<0.25							
	Sharps	N.D	2.0	5.0	N.D.	2.0	2.0	2.0	N.D.
General	pH	5.5 to 8.5	5.7	7.9	7.9	7.0	8.0	8.6	8.3
	Carbon:Nitrogen Ratio	<20:1	22:1	23:1	25:1	25:1	49:1	19:1	18:1
	Electrical Conductivity $\mu\text{S}/\text{cm}^{-1}$	3,300	1,800	1,800	2,00	1,300	2,100	1,900	1,900



Parameters		Multipurpose Topsoil Criteria	BH02	HP07	HP09
Maximum Coarse Fragment (% m/m)	> 2mm	30	37.4	12.5	13.5
	> 20mm	10	15.3	11	10.3
	> 50mm	0	<0.1	<0.1	<0.1
Mass loss on Ignition (%)	Clay 5% - 20%	3 to 20	8.0	6.0	5.0
	Clay 20% - 35%	5 to 20	-	-	-
Plant Nutrient Content	Total Nitrogen % m/m	>0.15	0.12	0.1	0.05
	Extractable Phosphate mg/L	16 to 140	59	37	46
	Extractable Potassium mg/L	121 to 1,500	61	93	240
	Extractable Magnesium mg/L	51 to 600	31	27	<10
Potentially Phytotoxic Elements (mg/kg) (pH > 7.0)	Zinc	<300	73	78	140
	Copper	<200	19	40	61
	Nickel	<110	21	19	21
Visible Contaminants % m/m	Air Dried	<0.5	5.2	4.2	4.2
	Plastics	<0.25			
	Sharps	N.D	N.D.	2.0	N.D.
General	pH	5.5 to 8.5	8.2	8.2	10.9
	Carbon:Nitrogen Ratio	<20:1	19:1	18:1	20:1
	Electrical Conductivity $\mu\text{S}/\text{cm}^{-1}$	3,300	2,000	2,000	2,000



It is considered that the topsoil identified on site do not meet topsoil multi use criteria and exceeded criteria values on numerous aspects as outlined above in table 5.4. It is believed that extractable magnesium and potassium are below threshold values which may lead to poor growing conditions of plants within this material. It was also found that visible contaminants and sharps contamination were significantly above the screening criteria.

It is believed that the topsoil across the site are not suitable for topsoil use for the growing of plants. However, given the underlying contamination within the made ground and landfill, REC recommend that growth of edible plants is not allowed. Should planting be desired REC recommends that raised planters are used with imported topsoil which is suitable for use.

5.3 Controlled Waters

The site assessment identified that the site overlies Secondary A and Principal Aquifers within the underlying superficial and bedrock geology.

Groundwater samples were recovered from monitoring standpipes installed within the Kempton Park Gravel Member and Seaford and Newhaven Chalk Formation, with response zones each targeting a single stratum. Three groundwater samples from each stratum were then analysed for the following determinants as specified by the Client:

- ▶ Heavy Metals & Metalloids;
- ▶ Cyanide (total);
- ▶ Phenols (mono);
- ▶ Total and Speciated Polycyclic Aromatic Hydrocarbons (PAHs): USEPA16; and,
- ▶ Banded Total Petroleum Hydrocarbons CWG (Criteria Working Group).

Results of the analysis and a comparison against generic assessment criteria are given in Table 5.4.





Table 5.4 Summary of Controlled Waters Risk Assessment

Determinand	Units	Hardness Banding (mg/l CaCO ₃)	Surface Water Screening Values (fresh waters)	Drinking Water Screening Values	Monitoring Well Location					
					BH1	BH2	BH3	BH4	BH5	BH6
					KPGM	SCF	KPGM	SCF	SCF	KPGM
Arsenic	µg/l	-	50 ⁽¹⁾	10 ⁽³⁾	0.8	0.3	9.3	0.3	0.7	5.5
Boron	µg/l	-	2,000 ⁽¹⁾	-	210	220	570	160	180	480
Cadmium	µg/l	>200	0.25 ⁽²⁾	5 ⁽³⁾	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium VI	µg/l	-	3.4 ⁽¹⁾	50 ⁽³⁾	<3	<3	<3	<3	<3	<3
Copper	µg/l	-	1 ⁽¹⁾	2000 ⁽³⁾	0.9	<0.5	<0.5	0.7	0.7	<0.5
Cyanide	µg/l	-	1 ⁽¹⁾	50 ⁽³⁾	<10	<10	<10	<10	<10	<10
Lead	µg/l	-	1.2 ⁽²⁾	10 ⁽³⁾	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Mercury	µg/l	-	0.07 ⁽²⁾	1 ⁽³⁾	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	µg/l	-	4.0 ⁽²⁾	20 ⁽³⁾	15	2	13	3	8	8
Selenium	µg/l	-	-	10 ⁽³⁾	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Zinc	µg/l	-	10.9 ⁽¹⁾	5000 ⁽³⁾	<2	<2	4	3	<2	3
Sulphate (SO ₄)	mg/l	-	400 ⁽¹⁾	250 ⁽³⁾	66	58	65	50	52	35
pH	-	-	<6 or >9 ⁽¹⁾	-	8.3	8.0	8.1	8.2	8.3	8.1
Phenol	µg/l	-	7.7 ⁽¹⁾	0.5 ⁽³⁾	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)Pyrene	µg/l	-	0.27 (MAC) ⁽²⁾	0.03 ⁽³⁾	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo[b] fluoranthene	µg/l	-	0.017 ⁽²⁾	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo[k] fluoranthene	µg/l	-	0.017 ⁽²⁾	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(ghi)perylene	µg/l	-	0.0082 (MAC) ⁽²⁾	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Indeno(123-cd) pyrene	µg/l	-	-	-	0.03	<0.02	0.03	<0.02	<0.02	<0.02
Anthracene	µg/l	-	0.1 ⁽²⁾	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
Fluoranthene	µg/l	-	0.12 (MAC) ⁽²⁾	-	<0.02	<0.02	0.03	0.02	<0.02	0.18
Naphthalene	µg/l	-	2 ⁽²⁾	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.02



Determinand	Units	Hardness Banding (mg/l CaCO ₃)	Surface Water Screening Values (fresh waters)	Drinking Water Screening Values	Monitoring Well Location					
					BH1	BH2	BH3	BH4	BH5	BH6
					KPGM	SCF	KPGM	SCF	SCF	KPGM
PAHs (Sum of Four) ⁵	µg/l	-	-	0.1 ⁽⁵⁾	0.09	<0.08	0.9	<0.08	<0.08	<0.09
PAHs (Total)	µg/l	-	0.0017 ⁽²⁾	-	0.34	0.08	0.22	0.10	0.08	1.7
TPH aromatic C ₁₀ -C ₄₀	µg/l	-	-	N/A	130	160	280	140	120	320

Key

- (1) Water Framework Directive – EQS Specific Pollutant
- (2) Water Framework Directive – EQS for priority Hazardous Substances. Annual Average concentration unless otherwise stated. MAC = Maximum admissible concentration unless otherwise stated
- (3) Drinking Water Screening Values – The Water Supply (Water Quality) Regulations 2016
- (4) WHO DWS for TPH (2008)
- (5) Sum of Four PAHs (benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene and indeno[1,2,3-c,d]pyrene)
- (6) UKTAG definition for hazardous substances, UK Technical Advisory Group on the Water Framework Directive Technical report on Groundwater Hazardous Substances, 11b(iii) v12 , Final version for website. Annual mean value.
- (7) WHO Drinking water Guideline
- (8) EA/SNIFFER (2001) – non statutory
- (9) In the absence on a screening value the laboratory LOD has been used as a marker for screening

KPGM – Kempton Park Gravel Member;

SCF – Seaford and Newhaven Chalk Formation



Elevations of nickel and PAH were identified when compared to groundwater screening values. All samples from the Kempton Park Gravel Member had elevated concentrations of nickel. A single sample from the Seaford and Newhaven Chalk Formation had a single elevated concentration (nickel).

PAHs (Total)

Elevated concentrations of Total PAH has been inferred from results of the groundwater samples tested, however individual determinands were generally below the laboratory limit of detection. Given that elevated concentrations of PAH were recorded within the soils and visual evidence of PAH included bituminous material in the form of gravels and burned wood fragments was noted, the presence of further PAH cannot be ruled out.

TPH C10 – C40

Without analysis for specific carbon chain lengths, no direct comparison can be made with the generic assessment criteria. However, given the concentrations reported and that the GAC for different chain lengths are generally $>90 \mu\text{g/l}$, it is considered unlikely that elevated concentrations would be present in the groundwater.

5.2.1 Phase I Review for Controlled Waters Risk Assessment

Upon review of the Terraforma Phase I report (dated May 2018), it is understood that there are potentially contaminative land uses to the south of the site. These sources are anticipated to be up hydraulic gradient, with groundwater flowing northward towards the River Thames (120m north at its nearest point). Given the distance of these sources and the potential for the Langley Silt Member to act as a fine grained barrier, as identified within the southern area of the site, it is considered that the risk from off-site sources from historical and current potentially contaminative land uses to be low. On-site potential sources of contamination include the historical land use which occurred between 1970 and 1979, at which time the site was operated as a household and commercial landfill.

It is understood that pollution incidents have occurred within 250m of the site, the nearest involving minor impact of metals on the area. Hydrocarbon and aromatic pollution also occurred from 142m east. However, given that it is unknown whether this affected the groundwaters, these cannot be assumed or proven as a source.

The site lies within a Flood Zone 2 and 3 which indicates the risk from flooding from rivers as between 1 in 1000 (0.1%) to 1 in 100 (1%). The site is vulnerable to clearwater groundwater flooding due to the granular deposits underlying the site which house Secondary A and Principal Aquifers.

REC therefore considers it likely that the contamination derives from on-site Made Ground which can be attributed to the historic land uses dated from 1970-1979 (i.e. landfill site). Visual and olfactory evidence of PAH and TPH contamination was identified in soils during the ground investigation within the made ground in the form of sludge like substances and solids in the form of bituminous materials and black solid combustion material from burnt wood. Numerous metal objects were also recovered





during the site investigation from within the made ground materials and fill material. With respect to the above and site history REC identify these as likely on-site sources for groundwater contamination.

Figure 1, below, is the conceptual site model extracted from the TerraFirma report, which illustrates the key potential sources and pathways of/ for contamination on site.

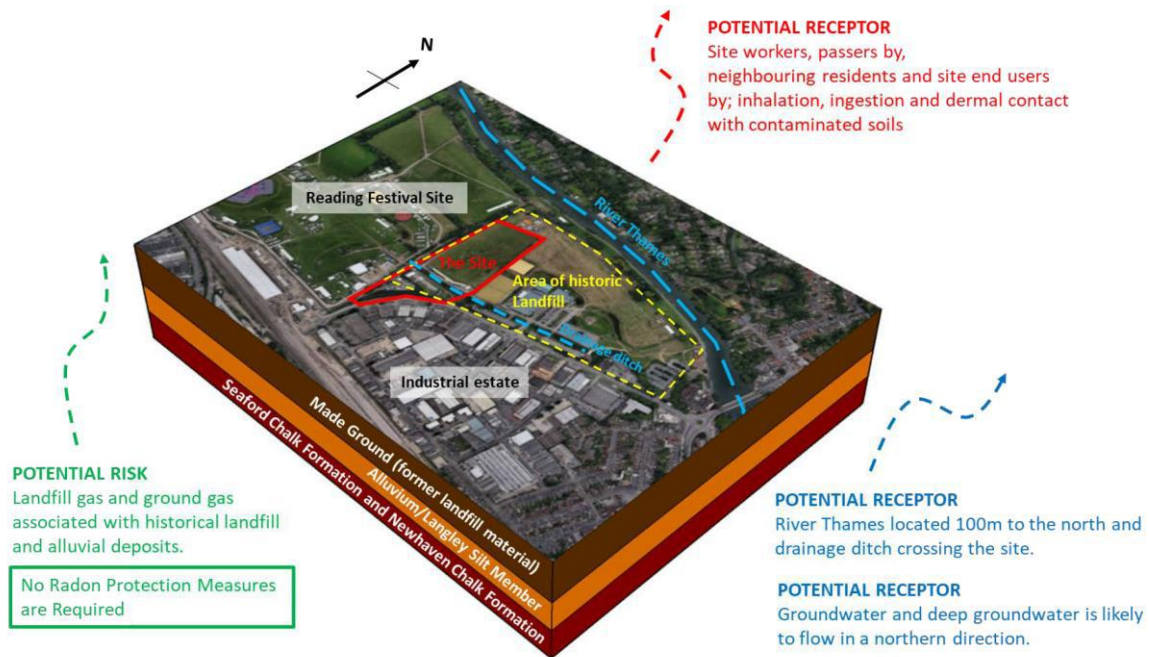


Figure 5.1 – CSM extracted from TerraFirma Phase 1 report

5.2.2 Risk to Surface Water Features

A small east-west trending surface water drainage ditch is present on site which first appeared on historical maps from circa 1960. During the site walkover, the feature was observed to be circa 1.50-2.00m below the surrounding ground level. The drainage stream was noted to contain numerous discarded items such as clothing, various metal objects, vehicle parts and wooden objects. The surface water was noted on online mapping to run into the Thames approximately 640m to the northwest of site.

With consideration to the underlying geology, specifically the granular deposits of the Kempton Park Gravel, it is understood that the Secondary A Aquifer of this stratum likely supporting the base flow of the nearby Thames. During the ground investigation water was recorded within this stratum from between 3.10 and 3.40mbgl. During the single monitoring visit, water was recorded at 2.28mbgl.

Based on anticipated groundwater flow direction, it is considered that there is a potential risk to the River Thames posed by contamination on the site. However, given the numerous other potential contaminant sources within the vicinity of the site and the relatively low levels on contamination encountered, it is considered that the residual risk is low. Furthermore, given the urban nature of the site's location, it is not uncommon that slight elevations of metal, PAH and TPH concentrations are monitored within near surface aquifers.





5.2.3 Risk to Groundwater, Aquifers & Potable Water Supply

It was concluded that the Secondary A and Principal Aquifer underlying the site have hydraulic continuity, as concluded from monitoring information which indicated that groundwater levels within standpipes employed within the Kempton Park Gravels are reflected within the monitoring standpipes that were installed within the underlying chalk. Due to this, concern for the quality of the water is high given the site history and identified landfill material which was observed on site.

Upon review of the chemical analysis undertaken on the water samples it was identified that there were no chemical exceedances within the groundwaters when compared against drinking water standards.

The site was not found to lie within 2.0km of a Source Protection Zone and the nearest active groundwater abstraction licence was found to be operated by the Hilier Group of Companies 144m south, with water being used as 'process water'. As such, it is considered that the site does not pose a significant risk to drinking waters within the underlying aquifer.

5.3 Ground Gas

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in BS8485:2015. It is recommended that the full ground gas assessment and recommended protection measures are agreed with the local authority prior to their adoption on-site. Furthermore, all protection measures adopted should be validated by a suitably qualified engineer.

During the single ground gas monitoring visit completed to date, the concentrations of CO₂ were found to be highly elevated within all six installed borehole locations with concentrations being well above the level requiring action to be taken. In addition to this, Methane was also identified within boreholes BH01, BH02, BH03 and BH06, with values ranging from 2.30%v/v within BH03 to a maximum identified concentration of 25.9%v/v within BH01. Furthermore, Oxygen levels were found to be significantly depleted within all borehole locations with a minimum sustain concentration of 0.50%. It is understood that the oxygen is depleted due to the elevated presence of CO₂ CH₄ and elevated levels of volatile vapours as outlined within Table 5.5, as shown overleaf.





Table 5.5 Summary of Gas Monitoring Data

Date	Well	Flow (l/hr)		Low O ₂ %v/v	Concentration CH ₄		CH ₄ Qhg l/hr	Concentration CO ₂		CO ₂ Qhg l/hr	Atmospheric Dynamic	Response Zone (mbgl)	Depth to Water (mbgl)	Response zone flooded?	In-Situ Volatile Reading (ppm)
		Peak	Steady		Peak %v/v	Steady %v/v		Peak %v/v	Steady %v/v						
04/10/2018	BH01	<0.1	<0.1	1.3	25.9	25.3	0.025	23.9	23.4	0.025	Falling	1.00 – 2.50	2.28	No	2.3
	BH02	<0.1	<0.1	1.1	12	12	0.012	22	21.0	0.023	Steady	1.00 – 2.50	2.40	No	3.6
	BH03	<0.1	<0.1	0.5	2.3	2.1	0.0023	19.3	18.2	0.019		1.00 – 2.00	2.00	No	12.6
	BH04	<0.1	<0.1	2.4	<0.1	<0.1	<0.0001	17.7	17.3	0.017	falling	1.00 – 2.00	Dry	No	42.3
	BH05	<0.1	<0.1	3.3	<0.1	<0.1	<0.0001	18.2	18.2	0.018	Steady	1.00 – 3.00	2.25	No	13.6
	BH06	<0.1	<0.1	0.5	5.3	5.3	0.0053	16.9	16.5	0.016	Falling	1.00 – 3.00	2.42	No	1.3



In accordance with the methodology outlined within BS8485:2015, REC have utilised the results of the ground gas monitoring visits to calculate an interim borehole hazardous gas flow rate (Qhg), previously known as a Gas Screening Value (GSV).

Table 5.6 Calculation of maximum implied characteristic situation

Flow rate (L/h)	Maximum CH ₄ (%)	Maximum CO ₂ (%)	CH ₄ Qhg (L/h)	CO ₂ Qhg Rate (L/h)	Interim Implied CH ₄ CS	Interim Implied CO ₂ CS
0.1	25.9	23.9	2.59	2.39	3	3

CS : Characteristic Situation

Qhg : Hazardous gas flow rate

The maximum implied characteristic situation for the site has therefore been calculated by combining the maximum observed flow rate and maximum observed concentrations during any monitoring event. This methodology provides a 'worst case scenario' in order to characterise the highest potential risk to human health from ground gas at the site.

On the basis of measurements in Table 5.6, the site maximum site hazardous bulk ground gas flow rate is considered to be 2.59 L/h, which is the worst case for methane. A maximum site hazardous gas flow rate of 2.59 L/h lies well within the upper range of GSV values for CS3 (<3.5 L/h).

Given that PID readings were identified within most samples tested during both intrusive works and return monitoring visit and that elevated concentrations of PAH and TPH species were identified within the soils and groundwater, the Local Planning Authority may require that a vapour (foil backed) membrane is install within any proposed structures in order to mitigate against the potential for build-up of hazardous gases within buildings. This assessment could be revised following additional sampling, analysis and volatile gas monitoring. Additionally, any remedial measures undertaken on the site could provide sufficient betterment to effectively remove the residual risk.





5.4 Conceptual Site Model

The Phase II Site Investigation identified asbestos in soil and exceedances of heavy metals, PAH and TPH within the soils with additional contamination identified within the ground water, which consisted of Metals and PAH contamination. A CSM is given as Table 5.7.

Table 5.7 Revised Conceptual Site Model

Receptor	Potential Risk	Current Residual Risk	Mitigation
Human Health	<i>Uptake of contaminants by food plants grown in contaminated soil</i>	YES	Due to the site being used as an athletic and playing fields it is believed that this potential risk is not present. However, should private gardens be proposed where edible plants grown, REC recommends that a clean cover system of a minimum thickness of 600mm is used and 1000mm where asbestos was found to be present.
	<i>Ingestion</i>	YES	Given that the site is proposed to comprise a secondary school with soft landscaped areas and playing fields it is believed that without a suitably established and managed clean cover system a risk is posed to the future site users.
	<i>Inhalation</i>		
	<i>Skin contact</i>		
	<i>Irradiation</i>	NO	Site is not within an area where radon gas is present in any significant quantities.
	<i>Fire and explosion</i>	YES	Given the high concentrations of VOCs recorded from chemical testing, gas protection measures should be introduced within the footprint of any newly built structures.
Buildings	<i>Fire and explosion</i>	YES	
	<i>Chemical attack on building materials and services</i>	YES	Concrete within any of the underlying materials should be designed in line with sulphate class DS-1 /AC-1s. Due to groundwater and soils contamination, and perched water within the made ground all pipework and services should be made from suitably protective material and independently validated.





Receptor	Potential Risk	Current Residual Risk	Mitigation
Natural Environment	Contamination of Controlled waters	YES	PAH contaminants identified within the groundwater are thought to derive from an on-site source. Nickel identified within the groundwater are considered to be derived from the overlying Made Ground. Given the site history identified on-site sources, and nearby receptors the risk posed to controlled waters from site is considered to be low.

It is recommended that appropriate asbestos mitigation measures (i.e. wearing appropriate PPE/RPE, damping down of soils during any excavation and stockpiling exercises, including covering open excavations and stockpiled soils with plastic sheeting) are employed during groundworks and construction in order to ensure that workers are not exposed to asbestos fibres which may be present. In addition to this, due to the high percentage of loose fibres present within soils in the location of BH05 it is recommended that air quality monitoring is performed during excavations in this area in order to assess ongoing risk during works. Furthermore, soils being removed from site should be tested for asbestos to determine the safest and most appropriate method of disposal. Following this all PPE/ RPE should be carefully disposed of in a secure and clearly labelled fashion.

REC recommends that a Clean Cover System (CCS) is employed within areas of proposed soft landscaping, REC recommends that this CSS is of a thickness of no less than 600mm and comprises proven chemically inert material in order to sever the pathway from the underlying contamination. Where asbestos was identified REC recommends that the clean cover thickness, I advanced to 1000mm to sever the pathway for this determinant. REC also recommends that edible plants are not grown within the soils underlying the site in order to mitigate ingestion of known contamination. A RS (Remediation Strategy) will be required as part of this and subsequent validation of the installation of this will need addressing. For areas where hard landscaping is proposed it is believed that this will form an impermeable barrier and will therefore, severe the contamination pathway.

It is understood that a piling foundation option is to be utilised on site, as such, a Piling Risk Assessment (PRA) will be required in order to adequately assess the risk posed by the contaminants identified within the Made Ground, with respect to consideration to the most appropriate piling methodology given the underlying conditions, care must be taken when piling as this has the potential to create a pathway for contamination from the made ground and landfill material to the underlying principal aquifer. Potential for made ground material, and therefore, contamination to be transported to depths where the underlying chalk deposits are encountered is consider to be high for piling foundation options.

Contaminants in the groundwater are considered not to pose a significant risk to controlled waters, nearby surface water features and potable water abstraction operations.





It is recommended that all pipework and services are designed to withstand attack from Sulphate, PAH, TPHs.

Given the identified elevated carbon dioxide, methane and volatile vapour concentrations within the ground gas and largely depleted oxygen concentration generated from the landfill material. It has been determined that the ground gasses on site pose a moderate risk to future site users with a characteristic ground gas situation of CS3 being identified from ground gas monitoring undertaken by REC. In addition to the elevated characteristic situation PID readings from on-site sampling and monitoring identified a risk posed by VOCs, therefore REC recommends that a vapour (foil backed) membrane is install within any proposed structures in order to mitigate against the potential for build-up of hazardous gases within buildings. Independent visual inspection of said membrane will be require prior to the advancement of construction.

As such from the above, a Remediation Strategy (RS) would therefore be required for any new build structures included within the proposed development, in order to provide a specification for both the Contractor and regulatory approval by the Local Authority.





6. GEOTECHNICAL ASSESSMENT

6.1 Proposed Development

REC understands that the proposed development comprises the construction of a new secondary school with proposed school buildings and associated playing fields and athletics spaces. Proposed parking and private roads are to be located in the southern portion of the site.

6.2 Summary of Ground and Groundwater Conditions

The site is underlain by Made Ground up to 3.00m in thickness believed to be a result of the sites historical use as a landfill. Directly underlying the Made Ground within the Boreholes was the Kempton Park Gravel Member, which was in turn underlain by the Seaford and Newhaven Chalk Formation to the base of the investigation.

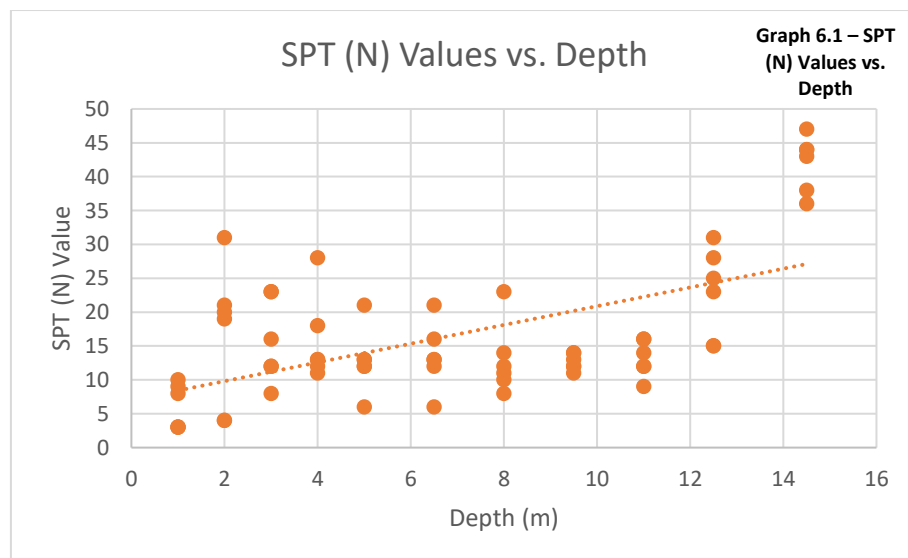
Localised flint obstructions and flint cobbles were identified within BH01 from 10.00mbgl, BH02 from 10.50mbgl, BH03 from 13.50mbgl, BH04 from 12.00mbgl and BH05 from 12.00mbgl.

Groundwater was encountered within the Made Ground of BH06 from 0.80mbgl as perched water above the underlying Landfill clay matrix. Groundwater strikes were noted within the Kempton Park Gravel Member from depths of 3.00mbgl and within the Seaford Chalk Formation. It is therefore believed that the Secondary (A) Aquifer (Kempton Park Gravel Member) and the underling Principal Aquifer (Seaford and Newhaven Chalk Formation) are in hydraulic continuity.

6.3 Foundation Conditions and Bearing Capacity

It is understood that given the local geotechnical conditions and the historic use of the site as a landfill that piled foundation solution is to be utilised for the scheme.

SPT values utilised in calculating preliminary pile capacities have been derived from Graph 6.1 as shown below:





5.3.1 Piled Foundations

It should be noted that for Continuous Flight Augur (CFA) piles there are certain practical constraints when considering the incorporation of large amounts of pile reinforcement and also their emplacement in ground with potential obstructions as identified within the Chalk. There is also the risk of collapse or necking of the pile bore should the flights be withdrawn and the hole left unsupported, this is particularly so within the coarse grained deposits encountered on site and within the CHALK where flint obstructions were encountered. For these reasons it is recommended that a competent and experienced specialist piling contractor undertakes all piling works, adopting appropriate controls and that their advice should be sought at the earliest opportunity.

The adhesion factor (α) has been conservatively taken as 0.5 for the Chalk Head. Piling Contractors often assess working capacities of piles using adhesion factors of up to 0.6, ultimately resulting in higher calculated shaft and overall pile capacities.

For Chalk, CIRIA C574 provides guidance on the selection of values for the shaft friction coefficient value (β) and for CFA piles a value of 0.45 is recommended for design purposes. The maximum unit shaft resistance (τ) is limited to 100 kN/m² in the absence of pile load tests. Should such tests be undertaken it may be appropriate to increase the value of τ to a maximum of 200 kN/m², dependent on test results. The CIRIA document rather than recommending N_q values, states that the unfactored ultimate unit area base resistance should be related to SPT N value by a factor k, where $q_{(u \text{ base})} = k \times \text{SPT } N$. CIRIA C574 recommends a 'k' value of 200 kN/m² for CFA piles. This document also recommends that the unfactored allowable unit area base resistance is restricted to between 600 and 800 kN/m² where SPT N values are generally less than 25. Where SPT values are greater than 25, the recommended unfactored allowable unit area base resistance is restricted to between 1000 and 1800 kN/m² as the majority of the material encountered is $<N = 25$ a value of 800 or 1800 kN/m² has been assumed for indicative designs reported herein dependent upon SPT results.

Variations in SPT N value with depth indicate that a potential weathering profile has developed within the Chalk. The degree of weathering appears to decrease linearly with depth. It is therefore recommended that piles bearing into the Chalk pass through the upper sections and bear onto the relatively less weathered, stronger chalk where bearing capacities should significantly improve.

For preliminary purposes the following initial pile carrying capacities have been calculated in Tables 10.1 & 10.2. When undertaking these preliminary calculations the following parameters have been used:

- ▶ C_u derived from SPT (N) values within fine grained strata;
- ▶ No positive skin friction from the Made Ground;
- ▶ Adhesion Factor of 0.45 within fine grained strata based on CFA piles;
- ▶ Beta Values limited to a maximum of 0.80 within all coarse grained strata;
- ▶ A worst case groundwater level of 2.00mbgl;
- ▶ Factors of safety of 1.5 on side resistance and 3.5 on base resistance; and,
- ▶ Global Factor of safety of 2.5.





Table 6.1 Initial Pile Capacities

Depth (mbgl)	Pile Carrying Capacity (kN)		
	300mm dia	450mm dia	600mm dia
10.00	145	280	450
15.00	315	590	945

The values above indicate carrying capacities at the specified depths. Consideration should be given the unknown nature of the geology beneath 15.00mbgl and that additional boreholes may be required to confirm the carry capacities at this depth.

6.4 Concrete Durability

Based upon the results of the chemical analyses summarised in Table 4.3, it is considered that subsurface concrete advanced into the Kempton Park Gravel Member or Seaford and Newhaven Chalk Formation can be designed in accordance with Design Sulphate Class DS-1, and Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1. Groundwater underlying the site was found to also be suitable for designs in accordance with Design Sulphate Class DS-1, and Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1.

6.5 Excavations

It is recommended that where man entry into excavations deeper than 1.20m is required that either excavations are shored or that the sides of excavations are battered to a safe angle of repose. Excavations should be protected during construction in order to avoid potentially excessive softening caused by wet weather or potential shrink and swell caused by periods of hot weather. Where excavations are extended into the granular deposits underlying the site it is recommended that suitable shoring is utilised to avoid slope or wall failure of the excavations.

It is also recommended that where man entry in the historic landfill is required that adequate PPE & RPE is worn to protect against the potential inhalation of dangerous gasses.

6.6 Floor Slabs

Given that a piled foundation solution is to be utilised for the scheme it is likely that a suspended floor slab will be utilised. This will negate the possibility for differential settlements between the floor slab and the shell of the proposed development.

It is recommended that advice should be sought from a suitably qualified structural engineer with regard to the design and construction of the floor slab.

6.7 Construction Activity and Inspection

The following activities and inspections should be incorporated in to the site works:

- ▶ It is recommended that sufficient allowance is made for the inspection of formation and sub





formations to foundations and floor slabs;

- ▶ Excavations where access is required should be subject to a risk assessment from a competent person and where appropriate mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 utilised;
- ▶ Excavations should be protected during construction in order to avoid potentially excessive softening caused by wet weather or shallow groundwater;
- ▶ Suitable PPE and RPE should be utilised when excavating areas within areas of significant contamination
- ▶ Suitable air quality monitoring should be undertaken during excavations to mitigate risk to site workers; and
- ▶ It is recommended that utilities are protected using appropriated pipe solutions in order to prevent potential damage from metal and TPH pollution; and,
- ▶ It is recommended that flexi jointing is used for utilities connections to mitigate against potential differential settlement rates relating to the underlying made ground.

6.8 Pavements and Construction

Results of the Atterberg Limit determination for clayey soils, identified the underlying Langley Silt Member as having a low to medium volume change potential with a Plasticity Index ranging between 9% and 21% between depths of 300 - 700mm. Such a Plasticity Index is indicative of a design CBR value of 4-5% assuming a low water table in average construction conditions in accordance with *Design Manual for Roads and Bridges Volume 7: Pavement Design and Maintenance*.

However, despite these Atterberg results for the southern portion of the site, in-situ testing using the MEXE Probe indicated an average value of 6%. It is therefore recommended that the conservative value of 4% is utilised in design.

As with good construction practice, it is recommended that the formation level be inspected and that any areas of soft/loose deleterious strata are replaced with an appropriately compacted coarse-grained medium. Likewise, any hard spots should also be removed to guard against reflective cracking in the pavement. Proof rolling/compaction of the formation level should be carried out prior to laying the new pavement.

6.9 Soak-away Feasibility

Due to the underlying secondary A and principal aquifers which were found to be within hydraulic conductivity from as shallow as 3.10mbgl during the exploratory investigation it is believed that deep bore soakaways cannot be adopted to the scheme as a drainage solution. In addition to this, it is believed that shallow soakaways should not be used due to the onsite landfill and use of such soakaways may have detrimental affects to the local environment.

REC therefore recommends that waste waters from the site should be drained off site via suitable drainage pipelines are diverted combined sewerage system. Given the observed hummocky nature of the site, it is recommended that 'flexi' joints are adopted to such a utility as to avoid potential damage caused by differential settlements due to the underlying landfill material.





7. CONCLUSIONS & RECOMMENDATIONS

Based on the findings of this report, the following conclusions can be made:

- ▶ It is concluded that the underlying soils pose a significant risk to future site users, REC recommends that a clean cover system of a minimum of 600mm is employed in all areas where soft landscaping is proposed. For areas where asbestos is identified the clean cover system should be advanced to a minimum thickness of 1000mm or cover with hardstanding. Additional sampling works could be undertaken within the area where asbestos was encountered in order to undertake further delineation;
- ▶ REC recommends that a RS is prepared for the recommended clean cover system; following this REC recommend that validation works and reporting are completed to ensure the suitability of the employed clean cover system;
- ▶ It is recommended that a Piling Risk Assessment is undertaken;
- ▶ It is concluded that no significant risk is posed to controlled waters;
- ▶ Hazardous leachable material was identified from the WAC testing and therefore treatment of soils may be required prior to disposal, REC recommend that relevant enquiries are made to relevant waste providers based on the WAC findings;
- ▶ Based on the preliminary pile capacities REC recommends that a maximum initial pile capacity of 945kN can be achieved within the Seaford and Newhaven Chalk Formation from 15.00mbgl using a shaft and base diameter of 600mm; and,
- ▶ REC recommends that Piles are founded within the Seaford and Newhaven Chalk formation.

END OF REPORT





APPENDIX I LIMITATIONS

APPENDIX I LIMITATIONS





1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between REC Ltd and the Client as indicated in Section 1.2.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. In addition to the above REC Ltd note that when investigating, or developing, potentially contaminated land it is important to recognise that sub-surface conditions may vary spatially and also with time. The absence of certain ground, ground gas, and contamination or groundwater conditions at the positions tested is not a guarantee that such conditions do not exist anywhere across the site. Due to the presence of existing buildings and structures access could not be obtained to all areas. Additional contamination may be identified following the removal of the buildings or hard standing.
7. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
8. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
9. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
10. This report presents an interpretation of the geotechnical information established by excavation, observation and testing. Whilst every effort is made in interpretative reporting to assess the soil conditions over the Site it should be noted that natural strata vary from point to point and that man made deposits are subject to an even greater diversity. Groundwater conditions are dependent on seasonal and other factors. Consequently there may be conditions present not revealed by this investigation.
11. REC can not be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by REC is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by REC in this connection without their explicit written agreement there to by REC.
12. Rather, this investigation has been undertaken to provide a preliminary characterisation of the existing sub-surface geotechnical characteristics and make up and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.
13. This investigation has been undertaken to reasonably characterise existing sub-surface conditions and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.





APPENDIX II GLOSSARY

APPENDIX II

GLOSSARY





TERMS

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Poly Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
Sp.TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCs	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation

UNITS

m	Metres
km	Kilometres
%	Percent
%v/v	Percent volume in air
mb	Milli Bars (atmospheric pressure)
l/hr	Litres per hour
µg/l	Micrograms per Litre (parts per billion)
ppb	Parts Per Billion
mg/kg	Milligrams per kilogram (parts per million)
ppm	Parts Per Million
mg/m ³	Milligram per metre cubed
m bgl	Metres Below Ground Level
m bcl	Metre Below Cover Level
mAOD	Metres Above Ordnance Datum (sea level)
kN/m ²	Kilo Newtons per metre squared
µm	Micro metre



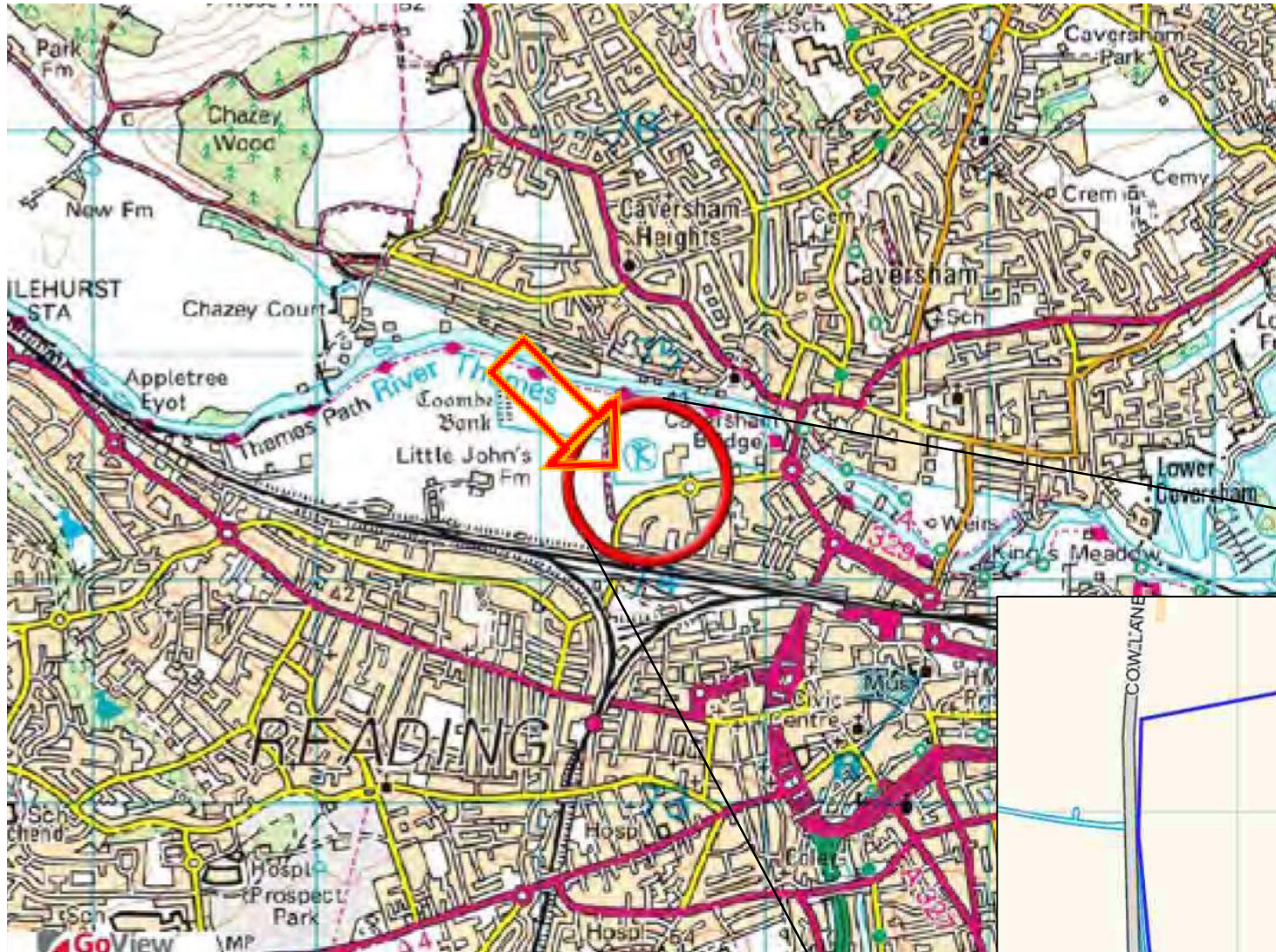


APPENDIX III DRAWINGS

APPENDIX III DRAWINGS



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Job Title:

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Client:

Hampshire County
Council

Job No:	1CO106158
Drawn By:	AB
Approved by:	CT

Notes:

Drawing Title:

1CO106158-001
Site Location Plan

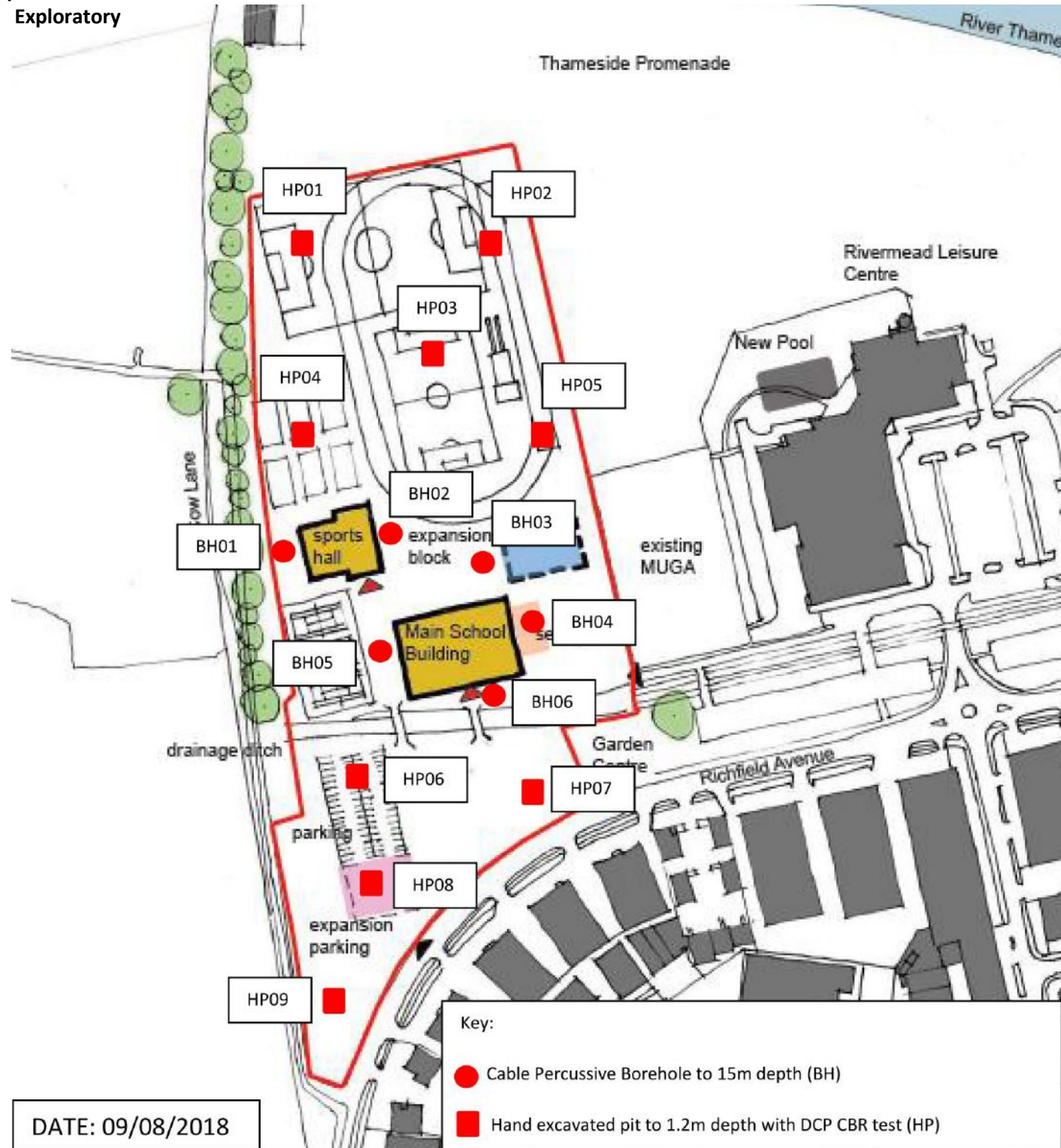


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				Drawn By: AB		
				Approved by: CT		

KEY:



Note that exploratory location on this plan are proposed and not actual. For actual exploratory hole locations please see drawing ref. 1CO106158-004 Exploratory Hole Location Plan.



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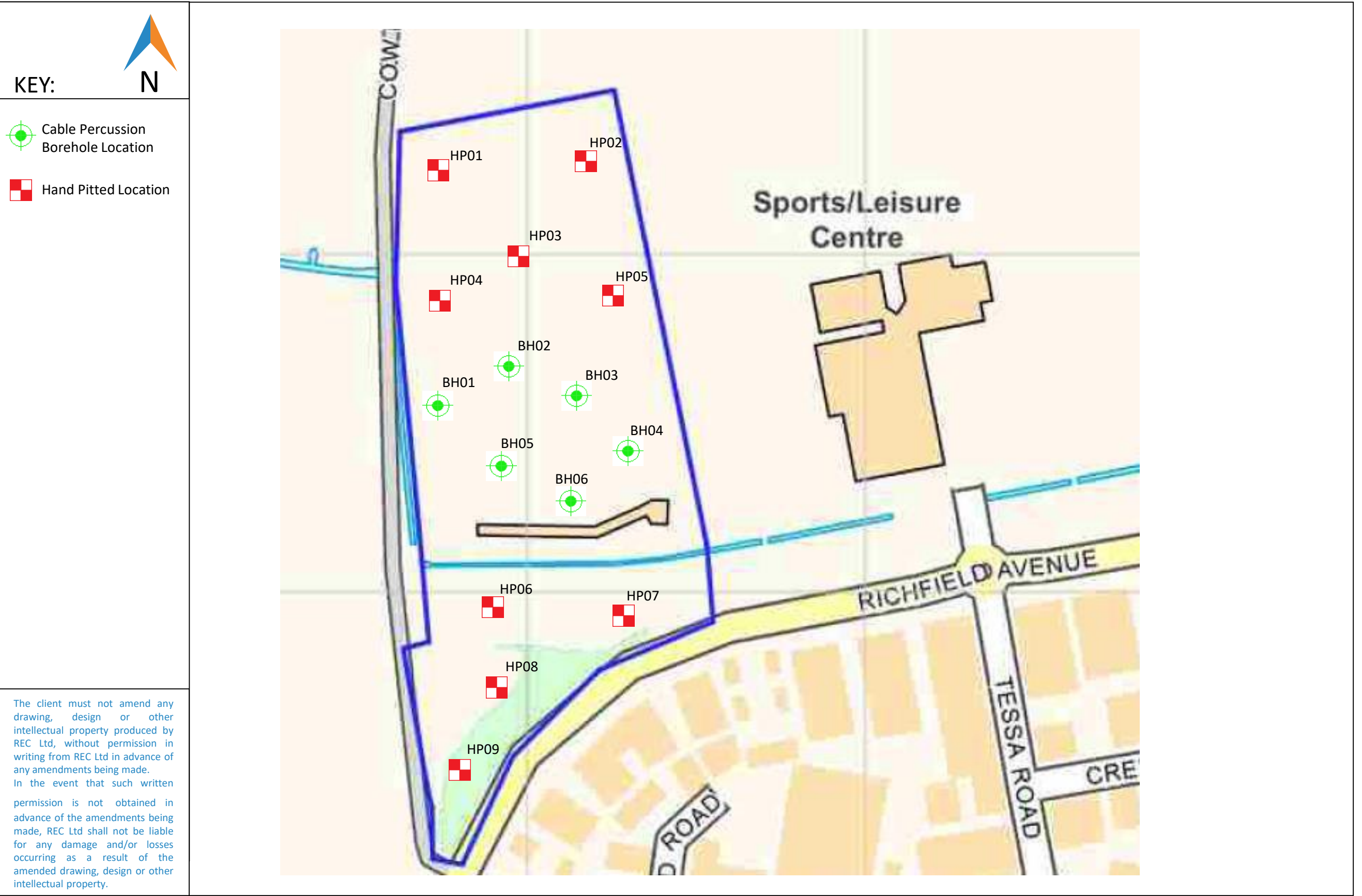
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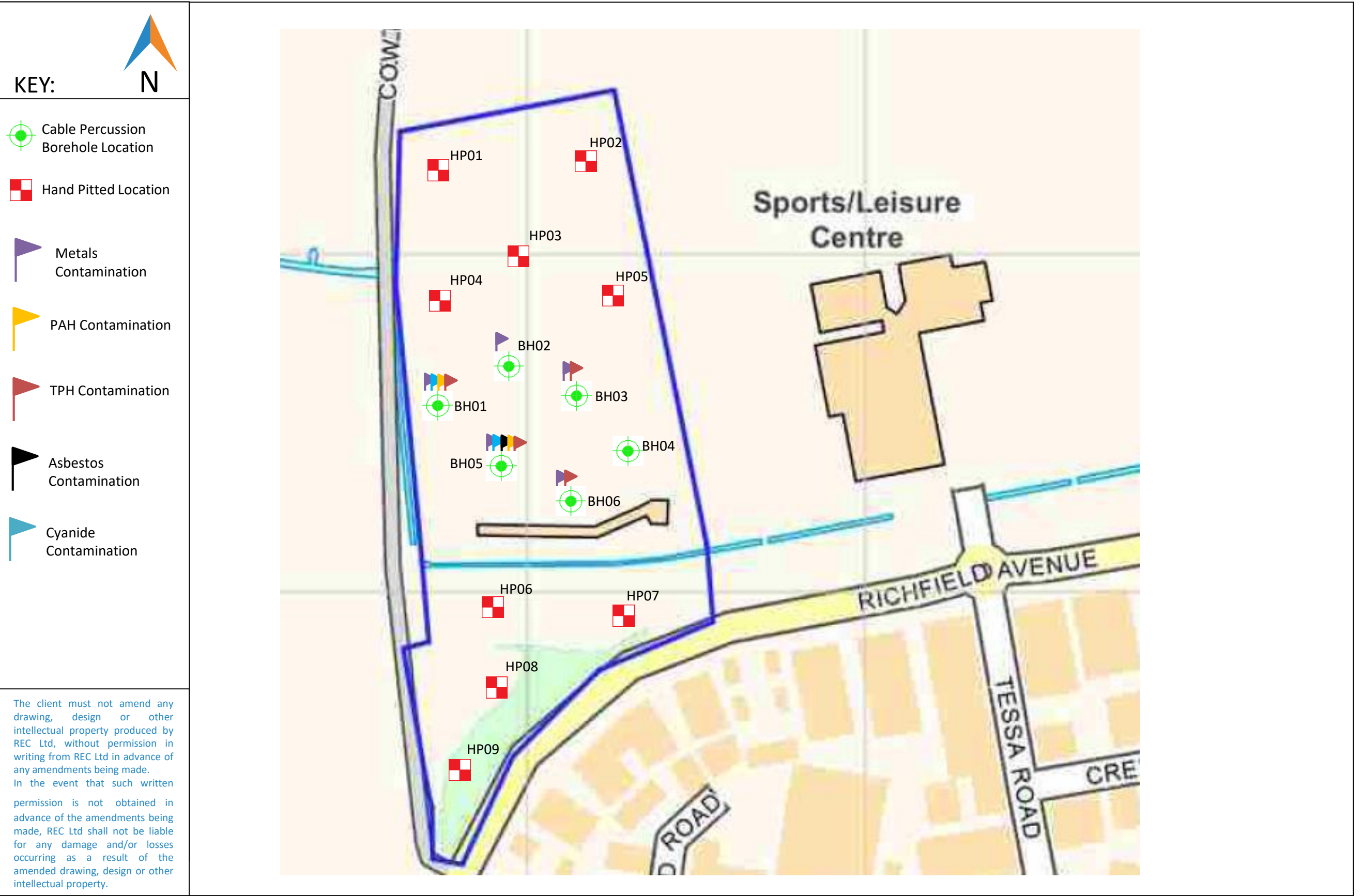
Client provided
Plan

Drawing Title:

1CO106158-003 Proposed
Development and
Exploratory Hole Location
Plan



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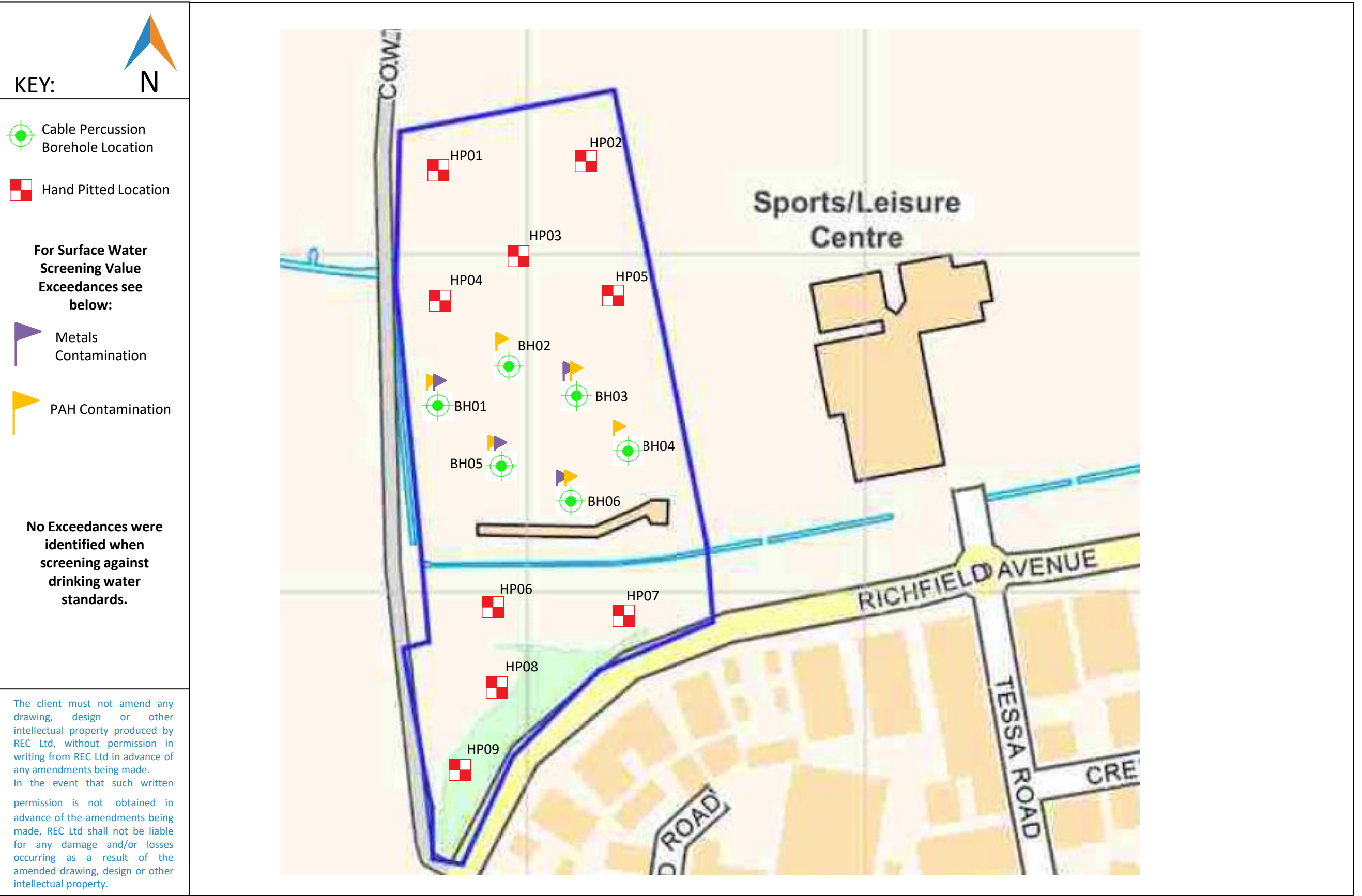
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Notes:

Drawing Title:

1CO106158-005 Soils
Contamination Plan



	REC Ltd Capital Business Centre, 22 Carlton Road, South Croydon, CR2 0BS t + 44 2034 788076 recltd.co.uk	Job Title: Proposed Reading Secondary School, RG1 8EQ	Client: Hampshire County Council	Job No: 1CO106158	Notes:	Drawing Title: 1CO106158-006 Waters Contamination Plan
				Drawn By: AB		
				Approved by: CT		



APPENDIX IV PHOTOGRAPHS

**APPENDIX IV
PHOTOGRAPHS**





PLATE 1: HP01 TOPSOIL MATERIAL



PLATE 2: HP01 LANDFILL MATERIAL





PLATE 3: HP02 BITUMINOUS MATERIAL



PLATE 4: HP02 RECOVERED LANDFILL MATERIAL





PLATE 5: HP03 RECOVERED MATERIAL (TOP TO BOTTOM IS FROM LEFT TO RIGHT)



PLATE 6: HP04 RECOVERED MATERIAL (TOP TO BOTTOM IS FROM LEFT TO RIGHT)





PLATE 7: HP07 SHOWING DOWNHOLE ENCOUNTERED MATERIAL.





PLATE 8: HP08 SHOWING DOWNHOLE ENCOUNTERED MATERIAL





PLATE 9: HP09 SHOWING DOWNHOLE ENCOUNTERED MATERIAL





PLATE 10: BH01 MATERIAL FROM 0.50MBGL



PLATE 11: BH01 MATERIAL FROM 1.00MBGL





PLATE 12: BH01 SLUDGE MATERIAL FROM 1.50MBGL





PLATE 13: BH01 MATERIAL FROM 2.00MBGL





PLATE 14: BH01 CHALK MATERIAL



PLATE 15: BH02 LANDFILL MATERIAL





PLATE 16: BH03 LANDFILL MATERIAL





PLATE 17: BH04 LANDFILL MATERIAL





PLATE 18: BH05 LANDFILL MATERIAL





PLATE 19: BH05 MATERIAL FROM 4.50 - 5.00MBGL



PLATE 20: BH05 MATERIAL FROM 6.00MBGL





PLATE 21: BH03 FLINT COBBLES FROM 13.50MBGL



PLATE 22: BH01 MATERIAL FROM 3.00MBGL



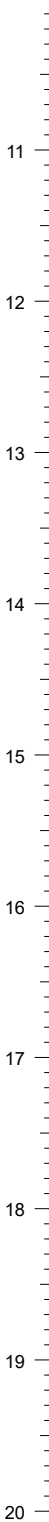


APPENDIX V

REC EXPLORATORY LOGS



REC DELIVERING SOLUTIONS		QUALITY ASSURANCE MANAGEMENT ISO 9001		ENVIRONMENTAL MANAGEMENT SYSTEM ISO 14001		OHSAS 18001		Borehole Log			Borehole No. BH01 Sheet 1 of 2	
Project Name: Reading Secondary School						Proj. ID: 1CO106158			Easting: Northing:		Hole Type BH	
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS						Plant: Dando 2500			Level (m AOD): Final Depth (m): 15.00		Scale: 1:50	
Client: Hampshire County Council						Crew: BDS Drilling			Start Date: 20/09/2018 End Date: 20/09/2018		REC Engineer: AB	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.50 - 0.60 0.50	ES1 PID	PID=0	1.30			Grass over dry and friable brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded to rounded fine to coarse flint. [MADE GROUND]		1		
		1.00 1.00 - 1.10 1.00 1.00	D1 ES2 SPT PID	N=3 (1,0/1,1,0,1) PID=1				..From 1.00mbgl: Gravel is angular to rounded glass, plastic, ceramic and brick.				
		1.50 - 1.60 1.50	ES3 PID	PID=62				Soft black to dark grey with brown mottling slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse metal, glass, plastic, ceramic, wood, bituminous material and flint. [MADE GROUND]				
		2.00 2.00 - 2.10 2.00	D2 ES4 SPT PID	N=19 (3,4/5,4,5,5) PID=23								
		2.50 - 2.60 2.50	ES5									
		2.80			2.80			Medium dense brown slightly sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]		3		
		3.00 3.00 - 3.10 3.00	D3 ES6 SPT	N=23 (3,5/6,5,6,6)								
		4.00 - 4.50 4.00	B4 SPT	N=13 (2,2/3,2,4,4)				Medium dense brown sandy gravel. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]				
		5.00 5.00	D5 SPT	N=13 (2,2/3,4,3,3)	4.00					4		
		6.00	D6									
		6.50	SPT	N=13 (2,3/3,4,3,3)								
		7.00	D7									
		8.00 - 8.50 8.00	B8 SPT	N=8 (2,3/2,2,2,2)	8.70			..Below 8.00mbgl: Becomes loose		8		
		9.00	D9					Chalk recovered as off-white subangular to subrounded fine to coarse GRAVEL with high cobble content. Cobbles are subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]				
		9.50 9.50	SPT1 0 SPT	N=12 (6,5/4,3,2,3)								
		10.00 - 10.50	B11									
								Continued on Next Sheet			10	
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered at 3.30mbgl rising to 2.00mbgl after 20 minutes. Hydraulic continuity was found throughout the granular and chalk deposits Chissleing undertaken from 10.00mbgl to 10:50mbgl for 60 minutes. Location was installed with separate ground gas and groundwater monitoring standpipes set within a flush fitting cover.												CONCEPT LIFE SCIENCES DELIVERING SCIENCE

		  		Borehole Log			Borehole No. BH01 Sheet 2 of 2				
Project Name:		Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type BH			
Location:		Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Dando 2500		Level (m AOD): Final Depth (m): 15.00		Scale: 1:50			
Client:		Hampshire County Council		Crew: BDS Drilling		Start Date: 20/09/2018 End Date: 20/09/2018		REC Engineer: AB			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		11.00	D12	N=16 (3,4/4,4,4,4)	15.00		 	At 10.00mbgl: Flint obstruction.			
		11.00	SPT1					N=25 (3,4/6,7,6,6)		From 10.50mbgl: High cobble content. Cobbles are angular to subangular black flint and chalk.	
		11.00	SPT								
		12.00	D14	N=43 (3,5/5,12,12,14)							
		12.50	SPT1								
		12.50	SPT								
		13.00	D16								
		14.00	D17								
		14.50	SPT1								
		14.50	SPT								
End of Borehole at 15.00m											
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered at 3.30mbgl rising to 2.00mbgl after 20 minutes. Hydraulic continuity was found throughout the granular and chalk deposits Chissleing undertaken from 10.00mbgl to 10:50mbgl for 60 minutes. Location was installed with seperate ground gas and groundwater monitoring standpipes set within a flush fitting cover.											
 CONCEPT LIFE SCIENCES DELIVERING SCIENCE											

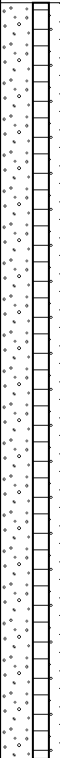
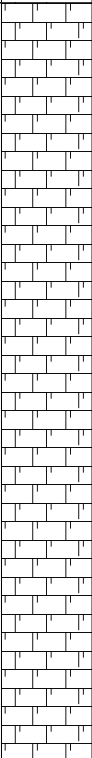
   		Borehole Log		Borehole No. BH02 Sheet 1 of 2	
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:	
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Dando 2500		Level (m AOD): Final Depth (m): 15.00	
Client: Hampshire County Council		Crew: BDS Drilling		Start Date: 20/09/2018 End Date: 20/09/2018	
REC Engineer: AB					

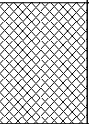
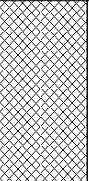
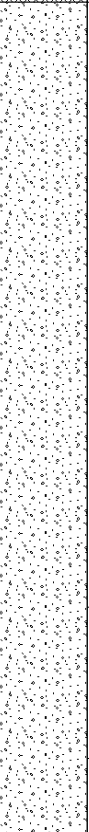
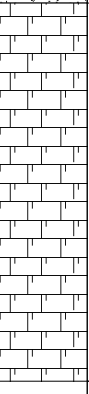
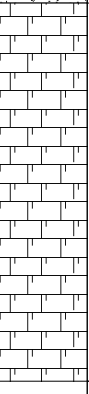
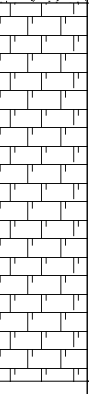
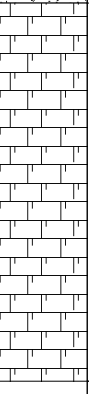
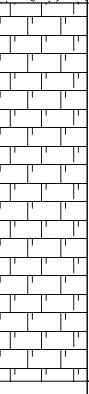
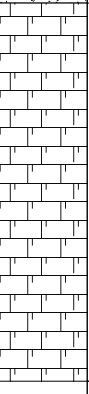
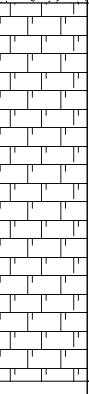
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	PID	PID=0	0.20		Grass over dry and friable brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. [TOPSOIL]		
		0.50 - 0.60	ES1		0.80		Soft brown to light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded. Gravel is fine to coarse flint, brick and occasional glass and ceramic. [MADE GROUND]	1	
		1.00	D1				Firm grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse flint, paper, plastic, flint, wood, fabric, ceramic and metal objects. [MADE GROUND]		
		1.00 - 1.10	ES2						
		1.00	SPT	N=3 (1,0/1,0,1,1)					
		1.00	PID	PID=59					
		1.50 - 1.60	ES3						
		1.50	PID	PID=34					
		2.00	D2						
		2.00 - 2.10	ES4						
		2.00	SPT	N=4 (1,1/1,1,1,1)					
		2.00	PID	PID=6					
		2.50 - 2.60	ES5						
		2.50	PID	PID=71	2.80		Loose to medium dense grey to dark grey sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]	3	
		3.00	D3						
		3.00	SPT	N=8 (1,2/1,2,2,3)					
		4.00	B4						
		4.00	SPT	N=12 (1,2/3,3,3,3)			Below 4.00mbgl: Slightly clayey.	4	
	5.00	D5							
	5.00	SPT	N=21 (1,3/4,6,5,6)			Below 5.20mbgl: Yellowish brown.	5		
	6.00	D6							
	6.50	SPT	N=21 (2,4/5,6,4,6)	6.40		Medium dense yellowish brown slightly sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]	7		
	7.00	D7							
	8.00	B8							
	8.00	SPT	N=11 (2,3/3,3,2,3)	8.60					
	9.00	D9				CHALK recovered as: off-white GRAVEL with high cobble content. Gravel is subangular to subrounded fine to coarse flint and chalk. Cobbles are subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]	9		
	9.50	D10							
	9.50	SPT	N=11 (2,2/2,3,3,3)						
	10.00	B11							

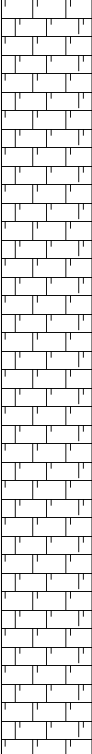
Remarks:
 Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered at 3.20mbgl rising to 2.50mbgl after 10 minutes. Hydraulic continuity was found throughout the granular and chalk deposits. Location was installed with separate ground gas and groundwater monitoring standpipes set within flush fitting cover.

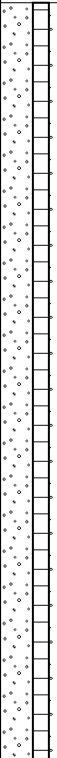

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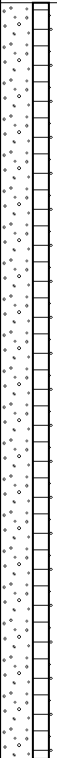
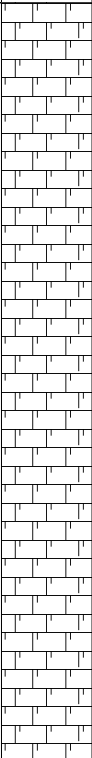
		  		Borehole Log			Borehole No. BH02 Sheet 2 of 2			
Project Name:		Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type BH		
Location:		Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Dando 2500		Level (m AOD): Final Depth (m): 15.00		Scale: 1:50		
Client:		Hampshire County Council		Crew: BDS Drilling		Start Date: 20/09/2018 End Date: 20/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		11.00	D12	N=16 (3,4/4,3,4,5)	15.00			At 10.50mbgl: Cobbles are chalk and black flint .	11	
		11.00	SPT1							
		11.00	3 SPT							
		12.00	D14							12
		12.50	SPT1	N=28 (3,4/6,7,7,8)						
		12.50	5 SPT							
		13.00	D16							
		14.00	B17							14
		14.50	SPT1	N=47 (3,7/9,12,12,14)						
		14.50	8 SPT							
End of Borehole at 15.00m								15		
								16		
								17		
								18		
								19		
								20		
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered at 3.20mbgl rising to 2.50mbgl after 10 minutes. Hydraulic continuity was found throughout the granular and chalk deposits. Location was installed with separate ground gas and groundwater monitoring standpipes set within flush fitting cover.										

   		Borehole Log		Borehole No. BH03 Sheet 1 of 2						
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:						
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Dando 2500		Level (m AOD): Final Depth (m): 15.00						
Client: Hampshire County Council		Crew: BDS Drilling		Start Date: 19/09/2018 End Date: 19/09/2018						
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.40 - 0.50 0.40	ES1 PID	PID=0	0.80			Grass over dry and friable slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint and occasional glass and brick. [MADE GROUND]	1	
		0.70 - 0.80 0.70	ES2 PID	PID=0						
		1.00 1.00	D1 SPT	N=9 (1,0/1,5,2,1)						
		1.20 - 1.30 1.20	ES3 PID	PID=1						
		2.00 2.00	D2 SPT	N=31 (7,8/8,8,7,8)	2.00			Firm dark grey to brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, wood, glass, ceramic, paper and bituminous material. [MADE GROUND]	2	
			3.00 3.00	D3 SPT	N=12 (1,2/4,3,2,3)	7.50			Medium dense grey to brown very sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]	3
		4.00 4.00	B4 SPT	N=28 (5,6/8,7,6,7)	7.50			CHALK recovered as: off white clayey GRAVEL. Gravel is subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]	4	
		5.00 5.00	D5 SPT	N=13 (3,4/3,3,4,3)	7.50			CHALK recovered as: off white clayey GRAVEL. Gravel is subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]	5	
		6.00	D6		7.50			CHALK recovered as: off white clayey GRAVEL. Gravel is subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]	6	
		6.50	SPT	N=16 (1,2/3,3,4,6)						
		7.00	B7							
		8.00 8.00 8.00	D8 SPT9 SPT	N=23 (3,4/6,8,5,4)	7.50			CHALK recovered as: off white clayey GRAVEL. Gravel is subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]	7	
		9.00	B10		7.50			CHALK recovered as: off white clayey GRAVEL. Gravel is subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]	8	
		9.50 9.50	SPT11 SPT	N=14 (3,4/4,3,3,4)						
		10.00	D12		7.50			CHALK recovered as: off white clayey GRAVEL. Gravel is subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]	9	
					7.50			CHALK recovered as: off white clayey GRAVEL. Gravel is subangular to subrounded fine to coarse chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]	10	
Continued on Next Sheet										
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered at 3.40mbgl rising to 2.00mbgl after 20 minutes. Hydraulic continuity was found throughout the granular and chalk deposits. Location was installed with separate ground gas and groundwater monitoring standpipes set within a flush fitting cover.										

		  		Borehole Log			Borehole No. BH03 Sheet 2 of 2				
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type BH					
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Dando 2500		Level (m AOD): Final Depth (m): 15.00		Scale: 1:50					
Client: Hampshire County Council		Crew: BDS Drilling		Start Date: 19/09/2018 End Date: 19/09/2018		REC Engineer: AB					
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		11.00	D13 SPT1 4 SPT	N=14 (2,4/4,3,3,4)	15.00			..At 10.00mbgl: Gravel is subangular to subrounded chalk and black flint.	11		
		11.00									
		11.00									
		12.00	D15	N=31 (8,6/7,8,8,8)							12
		12.50									
		12.50									
		14.00	B17	N=44 (6,7/10,11,12,11)							14
		14.50									
		14.50									
		..At 13.50mbgl: Angular to subangular black flint cobbles.								15	
End of Borehole at 15.00m								16			
								17			
								18			
								19			
								20			
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered at 3.40mbgl rising to 2.00mbgl after 20 minutes. Hydraulic continuity was found throughout the granular and chalk deposits. Location was installed with separate ground gas and groundwater monitoring standpipes set within a flush fitting cover.											

		  		Borehole Log			Borehole No. BH04 Sheet 2 of 2		
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type BH			
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Dando 2500		Level (m AOD): Final Depth (m): 15.00		Scale: 1:50			
Client: Hampshire County Council		Crew: BDS Drilling		Start Date: 18/09/2018 End Date: 18/09/2018		REC Engineer: AB			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		11.00 11.00 11.00	D13 SPT1 4	N=9 (3,2/1,3,2,3)	15.00				11
		12.00 12.00 12.50	D15 SPT1 6	N=23 (1,2/3,6,8,6)			At 12.00mbgl: Large black flint cobbles	12	
		13.00	D17				From 13.00: Black flint and chalk gravel	13	
		14.00	B18					14	
		14.50 14.50	SPT1 9 SPT	N=44 (2,3/8,12,12,12)				15	
	End of Borehole at 15.00m							15	
								16	
								17	
								18	
								19	
							20		
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered as a seepage at 1.50mbgl and as a strike at 3.20mbgl rising to 2.00mbgl after 20 minutes. Hydraulic continuity was found throughout the granular and chalk deposits. Location was installed with seperate ground gas and groundwater monitoring standpipes set within a flush fitting cover.									

REC DELIVERING SOLUTIONS		QUALITY ASSURANCE MANAGEMENT ISO 9001		ENVIRONMENTAL MANAGEMENT SYSTEM ISO 14001		OHSAS 18001		Borehole Log			Borehole No. BH05 Sheet 1 of 2	
Project Name: Reading Secondary School						Proj. ID: 1CO106158		Easting: Northing:		Hole Type BH		
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS						Plant: Dando 2500		Level (m AOD): Final Depth (m): 15.00		Scale: 1:50		
Client: Hampshire County Council						Crew: BDS Drilling		Start Date: 21/09/2018 End Date: 21/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.50 - 0.60	ES1		1.00		Grass over brown slightly clayey gravelly SAND. Sand is fine to coarse. Gravel is angular to rounded fine to coarse flint and occasional ceramic, glass, metal and plastic plastic and bituminous material. [MADE GROUND]		1			
	1.00	D1		N=3 (1,1/0,1,1,1)				Soft to firm brown to dark grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse flint and occasional ceramic, glass, metal objects, bituminous material and plastic. [MADE GROUND]				
	1.00 - 1.10	ES2										
	1.00	SPT										
	1.50 - 1.60	ES3		3.00		Between 2.00mbgl to 2.50mbgl: Dark grey to black		2				
	2.00	D2										
	2.00 - 2.10	ES4										
	2.00	SPT										
	2.50 - 2.60	ES5		4.00		Medium dense grey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]		3				
	3.00	D3										
	3.00 - 3.10	ES6										
	3.00	SPT										
	4.00	B4		6.00		Below 5.00mbgl: Loose		4				
	4.00	SPT										
	5.00	D5										
	5.00	SPT										
6.00	D6		7.00		Medium dense light brown slighty gravelly SAND. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]		6					
6.50	SPT											
7.00	D7											
7.00	SPT											
8.00	B8		7.70		CHALK recovered as: off white very gravelly CLAY. Gravel is angular to subangular chalk and flint. [SEAFORD & NEWHAVEN CHALK FORMATION]		7					
8.00	SPT											
8.00	SPT											
8.00	SPT											
9.00	D9		8		CHALK recovered as: off white slightly clayey GRAVEL. Gravel is angular to subangular fine to coarse chalk and black flint. [SEAFORD & NEWHAVEN CHALK FORMATION]		8					
9.50	SPT1											
9.50	SPT											
9.50	SPT											
10.00	D11		9		From 9.40mbgl: Cobbles are angular chalk and occasional flint		9					
10.00	D11											
10.00	D11											
10.00	D11											
Continued on Next Sheet											10	
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered at 3.10mbgl rising to 2.00mbgl after 20 minutes. Hydraulic continuity was found throughout the granular and chalk deposits Location was installed with seperate ground gas and groundwater monitoring standpipes set within a flush fitting cover.												
CONCEPT LIFE SCIENCES DELIVERING SCIENCE												

		  		Borehole Log			Borehole No. BH05 Sheet 2 of 2					
Project Name:		Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type BH				
Location:		Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Dando 2500		Level (m AOD): Final Depth (m): 15.00		Scale: 1:50				
Client:		Hampshire County Council		Crew: BDS Drilling		Start Date: 21/09/2018 End Date: 21/09/2018		REC Engineer: AB				
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		11.00	D12 SPT1 3	N=12 (3,3/3,3,3,3)	15.00				11			
		11.00										
		11.00										
		12.00	D14								12	
		12.50	SPT1 5	N=15 (3,3/4,3,4,4)								
		12.50										
		13.00										13
		14.00	B17								14	
		14.50	SPT1 8	N=36 (3,3/5,6,13,12)								
		14.50										15
End of Borehole at 15.00m								15				
								16				
								17				
								18				
								19				
								20				

Remarks:
 Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered at 3.10mbgl rising to 2.00mbgl after 20 minutes. Hydraulic continuity was found throughout the granular and chalk deposits Location was installed with seperate ground gas and groundwater monitoring standpipes set within a flush fitting cover.


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REC DELIVERING SOLUTIONS		QUALITY ASSURANCE MANAGEMENT ISO 9001		ENVIRONMENTAL MANAGEMENT SYSTEM ISO 14001		OHSAS 18001		Borehole Log			Borehole No. BH06 Sheet 1 of 2		
Project Name: Reading Secondary School						Proj. ID: 1CO106158			Easting: Northing:		Hole Type BH		
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS						Plant: Dando 2500			Level (m AOD): Final Depth (m): 15.00		Scale: 1:50		
Client: Hampshire County Council						Crew: BDS Drilling			Start Date: 18/09/2018 End Date: 18/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description					
		Depth (m)	Type	Results									
		0.30 - 0.40	ES1	PID=0	1.10		Grass over dry and friable brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse flint and plastic. [MADE GROUND]		1				
		0.30	PID	PID=0									
		0.80 - 0.90	ES2	PID=0									
		0.80	PID	PID=0									
		1.00	D2		2.30		Soft to firm dark grey to black slightly sandy gravelly CLAY with occasional relic plant matter. Sand is fine to coarse. Gravel is angular to subrounded metal, ceramic, brick, flint and glass. [MADE GROUND]		2				
		1.00	SPT1	N=10 (3,3/4,3,2,1)									
		1.10 - 1.20	ES3	PID=2									
		1.10	PID	PID=2									
		1.60 - 1.70	ES4	PID=1	2.80		Medium dense dark grey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick, metal and ceramic objects. [MADE GROUND]		3				
		1.60	PID	PID=1									
		2.00	D4										
		2.00	SPT3	N=21 (3,4/4,3,7,7)									
		2.30 - 2.40	ES5	PID=0	3.40		Medium dense brown slightly silty gravelly SAND. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]		4				
		2.30	PID	PID=0									
		3.00	D5										
		3.00 - 3.10	ES6	N=23 (3,4/5,5,6,7)									
		3.00	SPT	PID=0	6.00		Medium dense grey sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]		5				
		3.00	PID	PID=0									
		3.50	B6										
		3.60 - 3.70	ES7										
		4.00	D7	N=18 (2,2/4,3,5,6)	7.40		Medium dense light brown slightly gravelly SAND. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. [KEMPTON PARK GRAVEL MEMBER]		6				
		4.00	SPT	N=18 (2,2/4,3,5,6)									
		5.00	D8	N=6 (1,2/2,1,2,1)									
		5.00	SPT	N=6 (1,2/2,1,2,1)									
		6.00	D9		8.00		CHALK recovered as: off white gravelly CLAY. Gravel is angular to subangular black flint and chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]		7				
6.50	SPT	N=13 (1,2/2,3,4,4)											
7.00	D10												
8.00	B12	N=14 (1,2/3,4,4,3)											
8.00	D11		9.00		CHALK recovered as: off white GRAVEL. Gravel is angular to subangular fine to coarse black flint and chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]		8						
8.00	SPT1	N=14 (1,2/3,4,4,3)											
8.00	2												
8.00	SPT	N=14 (1,2/3,4,4,3)											
9.00	B13		9.50		CHALK recovered as: off white GRAVEL. Gravel is angular to subangular fine to coarse black flint and chalk. [SEAFORD & NEWHAVEN CHALK FORMATION]		9						
9.50	D14	N=14 (2,3/4,3,4,3)											
9.50	SPT	N=14 (2,3/4,3,4,3)											
9.50	SPT	N=14 (2,3/4,3,4,3)											
Continued on Next Sheet									10				
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. Service inspection pit advanced to 1.20mbgl. Groundwater was encountered as a seepage at 1.00mbgl and as strike at 3.30mbgl rising to 2.00mbgl after 20 minutes. Hydraulic continuity was found throughout the granular and chalk deposits Location was installed with seperate ground gas and groundwater monitoring standpipes set within a flush fitting cover.												CONCEPT LIFE SCIENCES DELIVERING SCIENCE	

		  		Trial Pit Log			Borehole No. HP01		
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Sheet 1 of 1 Hole Type TP			
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 1.10		Scale: 1:20			
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 18/09/2018 End Date: 18/09/2018		REC Engineer: AB			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.30	ES1		0.40			Grass over dry and friable light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. [MADE GROUND]	1
	0.30	PID	PID=0						
	0.50 - 0.60	ES2		1.10			Dry and friable brown slightly sandy gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, metal, glass, plastic and ceramic. Cobbles are angular metal, glass and plastic. [MADE GROUND]		
	0.50	PID	PID=0						
		1.00 - 1.10	ES3					End of Borehole at 1.10m	2
		1.00	PID	PID=0					3
									4

Remarks:
 Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered.
 Location backfilled with arisings in reverse order and made safe upon completion.

Stability: Stable

Pit Dimensions
 Length: 0.30
 Width: 0.30
 Depth: 1.10


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		  		Trial Pit Log			Borehole No. HP02	
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type TP		
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 0.80		Scale: 1:20		
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 19/09/2018 End Date: 19/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 0.30 0.20	ES1 PID	PID=0	0.75 0.80			Grass over dry and friable brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick, concrete and glass. Cobbles are subangular concrete. [MADE GROUND]
		0.70 - 0.80 0.70	ES2 PID	PID=0				Soft brown to grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse metal, paper, ceramic, glass, fabric, bituminous material and concrete. [MADE GROUND]
								End of Borehole at 0.80m
								1
								2
								3
								4
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered. Location backfilled with arisings in reverse order and made safe upon completion.							Pit Dimensions Length: 0.30 Width: 0.30 Depth: 0.80	
Stability: Stable							 CONCEPT LIFE SCIENCES DELIVERING SCIENCE	

		  		Trial Pit Log			Borehole No. HP03	
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type TP		
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 0.80		Scale: 1:20		
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 19/09/2018 End Date: 19/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 0.30 0.20	ES1 PID	PID=0	0.50			Grass over dry and friable light brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded flint and occasional brick. [MADE GROUND]
		0.60 - 0.70 0.60	ES2 PID	PID=0				Dry and friable brown slightly sandy gravelly CLAY. Sand is fine and coarse. Gravel is angular subrounded fine to coarse flint and occasional brick. [MADE GROUND]
					0.80			End of Borehole at 0.80m
								1
								2
								3
								4
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered. Location backfilled with arisings in reverse order and made safe upon completion.							Pit Dimensions Length: 0.30 Width: 0.30 Depth: 0.80	
Stability: Stable							 CONCEPT LIFE SCIENCES DELIVERING SCIENCE	

		  		Trial Pit Log			Borehole No. HP04	
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type TP		
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 0.80		Scale: 1:20		
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 18/09/2018 End Date: 18/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.20 0.10	ES1 PID	PID=0	0.30 0.60 0.80		Grass over dry and friable dark brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is angular to subrounded fine to coarse flint, metal objects and bituminous material. [MADE GROUND]	
		0.40 - 0.50 0.40	ES2 PID	PID=0			Dry and friable brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse brick, flint and occasional bituminous material. Cobbles are angular brick. [MADE GROUND]	
		0.70 - 0.80 0.70	ES3 PID	PID=2			Dry and friable brown mottled orangish brown slightly sandy gravelly CLAY. Sand is fine and coarse. Gravel is angular to subrounded fine to coarse bituminous material, metal, glass, flint, fabric. [MADE GROUND]	
End of Borehole at 0.80m								
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered. Location backfilled with arisings in reverse order and made safe upon completion. Stability: Stable Pit Dimensions Length: 0.30 Width: 0.30 Depth: 0.80  CONCEPT LIFE SCIENCES DELIVERING SCIENCE								

		  		Trial Pit Log			Borehole No. HP05	
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type TP		
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 0.80		Scale: 1:20		
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 18/09/2018 End Date: 18/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.20 0.10	ES1 PID	PID=0	0.25			Grass over dry and friable brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint and occasional metal objects and bituminous material. [MADE GROUND]
		0.50 - 0.60 0.50	ES2 PID	PID=0				Dry and friable light brown slightly sandy clayey GRAVEL with high cobble content. Sand is fine to coarse. Gravel is angular to subangular concrete, brick, flint and glass. Cobbles are angular to subangular concrete flint and brick. [MADE GROUND]
					0.80			End of Borehole at 0.80m
								1
								2
								3
								4
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered. Location backfilled with arisings in reverse order and made safe upon completion.							Pit Dimensions Length: 0.30 Width: 0.30 Depth: 0.80	
Stability: Stable							 CONCEPT LIFE SCIENCES DELIVERING SCIENCE	

		  		Trial Pit Log			Borehole No. HP06	
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type TP		
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 0.70		Scale: 1:20		
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 20/09/2018 End Date: 20/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.20 0.10	ES1 PID	PID=0				Grass over slightly clayey gravelly SAND with frequent rootlets. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse granite, flint, chalk, brick, concrete and ceramic. [MADE GROUND]
		0.40 - 0.50 0.40 0.50 - 0.60	ES2 PID D1	PID=0	0.30 0.32			Dark grey to orangeish brown slightly gravelly CLAY. Gravel is angular to subangular flint, bituminous material and rare metal material. [MADE GROUND]
					0.70			Dry and friable brown to light grey slightly sandy very gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, chalk, bituminous material, concrete and brick. Cobbles are angular brick and concrete. [MADE GROUND]
End of Borehole at 0.70m								
								1
								2
								3
								4
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered. Location backfilled with arisings in reverse order and made safe upon completion.							Pit Dimensions Length: 0.30 Width: 0.30 Depth: 0.70	
Stability: Stable							 CONCEPT LIFE SCIENCES DELIVERING SCIENCE	

		  		Trial Pit Log			Borehole No. HP07		
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type TP			
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 0.90		Scale: 1:20			
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 20/09/2018 End Date: 20/09/2018		REC Engineer: AB			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20 0.10	ES1 PID	PID=0	0.25			Grass over dry and friable brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick and occasional glass. [MADE GROUND]	
		0.40 - 0.50	D1						
		0.50 - 0.60 0.50	ES2 PID	PID=0				Dry and friable grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse flint, brick and occasional bituminous material and rare plastic. [MADE GROUND]	
		0.70 - 0.80	D2						
		0.80 - 0.90 0.80	ES3 PID	PID=0	0.90				
	End of Borehole at 0.90m								
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered. Location backfilled with arisings in reverse order and made safe upon completion.								Pit Dimensions Length: 0.30 Width: 0.30 Depth: 0.90	 CONCEPT LIFE SCIENCES DELIVERING SCIENCE
Stability: Stable									

		  		Trial Pit Log			Borehole No. HP08		
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Sheet 1 of 1 Hole Type TP			
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 0.80		Scale: 1:20			
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 20/09/2018 End Date: 20/09/2018		REC Engineer: AB			
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES1		0.25			Orangeish brown very gravelly SAND. Sand is fine to coarse. Gravel is angular to subangular granite. [MADE GROUND]	1
		0.30 - 0.40 0.30 - 0.40	D1 ES2					Grey to brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse flint. [LANGELY SILT MEMBER] ..At 0.25mbgl: <u>Geotextile membrane</u> .	
		0.70 - 0.80 0.70 - 0.80	D2 ES3		0.80		End of Borehole at 0.80m	2 3 4	
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered. Location backfilled with arisings in reverse order and made safe upon completion.								Pit Dimensions Length: 0.30 Width: 0.30 Depth: 0.80	
Stability: Stable								 CONCEPT LIFE SCIENCES DELIVERING SCIENCE	

		  		Trial Pit Log			Borehole No. HP09	
Project Name: Reading Secondary School		Proj. ID: 1CO106158		Easting: Northing:		Hole Type TP		
Location: Former Golf Driving Range, Richfield Avenue, Reading, RG1 8JS		Plant: Insulated hand pitting tools		Level (m AOD): Final Depth (m): 0.90		Scale: 1:20		
Client: Hampshire County Council		Crew: REC Ltd		Start Date: 20/09/2018 End Date: 20/09/2018		REC Engineer: AB		
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 0.30 0.20	ES1 PID	PID=0	0.20		 Light grey very gravelly SAND with high cobble content. Sand is fine to coarse. Gravel is angular to subrounded brick, flint. Cobbles are angular brick. [MADE GROUND]	
					0.30		 Grey very gravelly SAND with high cobble content. Sand is fine to coarse. Gravel is angular to subrounded brick and flint. Cobbles are angular brick. [MADE GROUND]	
		0.50 - 0.60 0.50	ES2 PID	PID=0			 Greenish grey to brown slightly gravelly CLAY with occasional rootlets. Gravels are subangular to subrounded fine flint. [LANGELY SILT MEMBER]	
		0.70 - 0.80 0.70	D1 ES3 PID	PID=0	0.80		 At 0.25mbgl: Black geotextile membrane Greenish grey to brown slightly gravelly CLAY with occasional rootlets. Gravels are subangular to subrounded fine flint. [LANGELY SILT MEMBER]	
					0.90		 End of Borehole at 0.90m	
Remarks: Location cleared for buried services using a Cable Avoidance Tool [CAT]. No groundwater encountered. Location backfilled with arisings in reverse order and made safe upon completion. Stability: Stable Pit Dimensions Length: 0.30 Width: 0.30 Depth: 0.90  CONCEPT LIFE SCIENCES DELIVERING SCIENCE								



APPENDIX VI
CHEMICAL LABORATORY RESULTS

APPENDIX VI **CHEMICAL LABORATORY RESULTS**



Concept Life Sciences

Certificate of Analysis

3 Crittall Drive
Springwood Industrial
Estate
Braintree
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CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

Report Number: Supplement 1 to Report Number 771403-2

Date of Report: 05-Nov-2018

Customer: Resource Environmental Consultants Ltd
UNIT 47
Basepoint Business Center
1 Winnall Valley Road
Winchester
Hampshire
SO23 0LD

Customer Contact: Miss Charlotte Toth

Customer Job Reference: 1CO106158

Customer Purchase Order: 005540

Customer Site Reference: Reading School

Date Job Received at Concept: 28-Sep-2018

Date Analysis Started: 04-Oct-2018

Date Analysis Completed: 12-Oct-2018

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual



Report checked
and authorised by :
Aislinn Arthey
Customer Service Advisor

Issued by :
Aislinn Arthey
Customer Service Advisor



Soil Suite E1	Concept Reference: 771403		
	Project Site: Reading School		
	Customer Reference: 1CO106158		
	Soil Analysed as Soil		

Concept Reference: 771403
Project Site: Reading School
Customer Reference: 1CO106158

Soil
Suite E1

Analysed as Soil

Concept Reference					771403 009	771403 011	771403 012	771403 014	771403 015
Customer Sample Reference					BH04 ES5 @ 2.20-2.30m	BH05 ES3 @ 1.50-1.60m	BH05 ES4 @ 2.00-2.10m	BH06 ES3 @ 1.10-1.20m	BH06 ES4 @ 1.60-1.70m
Date Sampled					18-SEP-2018	21-SEP-2018	21-SEP-2018	17-SEP-2018	17-SEP-2018
Matrix Class					Fill	Sandy Soil	Fill	Fill	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Arsenic	T257	A40	2.0	mg/kg	21	52	23	25	38
Cadmium	T257	A40	0.1	mg/kg	0.2	1.3	2.8	2.3	2.8
Boron (water-soluble)	T82	A40	1	mg/kg	<1	<1	<1	1	<1
Chromium	T257	A40	0.5	mg/kg	14	44	36	34	42
Copper	T257	A40	2	mg/kg	6	320	190	91	80
Lead	T257	A40	2	mg/kg	18	710	620	270	81
Mercury	T245	A40	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	T257	A40	0.5	mg/kg	15	65	210	40	49
Selenium	T257	A40	3	mg/kg	<3	<3	<3	<3	<3
Zinc	T257	A40	2	mg/kg	26	670	1800	270	180
Ammonia expressed as NH4	T4	A40	0.5	mg/kg	23	7.7	3.1	190	290
Asbestos ID	T27	A40			Asbestos not detected	Asbestos not detected	Chrysotile Detected	Asbestos not detected	Asbestos not detected
							Asbestos Cement		
							Loose Fibre		
Chromium VI	T6	A40	1	mg/kg	<1	<1	<1	<1	<1
pH	T7	A40			8.3	7.9	8.0	7.7	7.9
Soil Organic Matter	T287	A40	0.1	%	0.2	16	8.8	10	3.6
SO4(Total)	T102	A40	0.02	%	0.04	0.16	0.37	0.30	0.12
Sulphide	T4	A40	10	mg/kg	<10	<10	180	73	27
Sulphur (total)	T6	A40	0.01	%	0.02	0.09	0.26	0.26	0.10
Cyanide(Total)	T921	M105	1	mg/kg	<1	<1	6	3	<1
Cyanide(free)	T921	M105	1	mg/kg	<1	<1	<1	<1	<1
Phenols(Mono)	T921	M105	1	mg/kg	<1	4	4	2	<1
TPH (C10-C40)	T219	M105	10	mg/kg	12	370	1100	2300	90



Concept Reference:	771403
Project Site:	Reading School
Customer Reference:	1CO106158
Soil	Analysed as Soil
Suite E1	

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158									
Soil		Analysed as Soil							
Miscellaneous									
Concept Reference				771403 003	771403 005	771403 008	771403 010	771403 013	
Customer Sample Reference				BH01 D5 @ 5.00m	BH02 D6 @ 6.00m	BH03 D12 @ 10.00m	BH04 D15 @ 12.00m	BH05 SPT18 (D18) @ 14.50m	
Date Sampled				21-SEP-2018	20-SEP-2018	19-SEP-2018	18-SEP-2018	22-SEP-2018	
Matrix Class				Fill	Fill	Other	Other	Other	
Determinand		Method	Test Sample	LOD	Units				
pH		T7	A40			8.9	8.7	9.2	9.3
(Water Soluble) SO4 expressed as SO4		T242	A40	0.01	g/l	0.01	0.02	0.02	0.02

Produced by Concept Life Sciences, 3 Crittall Drive, Springwood Industrial Estate, Braintree, Essex, CM7 2RT Page 4 of 11

Supplement 1 to Report Number 771403-2

Concept Reference: 771403
Project Site: Reading School
Customer Reference: 1CO106158

Soil Analysed as Soil
BS 3882:2015 Topsoil (SE)

Concept Reference					771403 020	771403 021	771403 022	771403 023	771403 024
Customer Sample Reference					HP1 ES1 @ 0.20-0.30m	HP02 ES1 @ 0.20-0.30m	HP03 ES1 @ 0.20-0.30m	HP04 ES1 @ 0.10-0.20m	HP05 ES1 @ 0.10-0.20m
Date Sampled					18-SEP-2018	19-SEP-2018	19-SEP-2018	18-SEP-2018	19-SEP-2018
Determinand	Method	Test Sample	LOD	Units					
Copper	T312	A40	1	mg/kg	26	98	19	40	61
Nickel	T312	A40	1	mg/kg	28	35	21	19	21
Zinc	T312	A40	1	mg/kg	89	550	66	280	240
Mg (Extractable BS 3882)	T272	A40	10	mg/l	98	15	23	23	53
Phosphorous	T956	A40	10	mg/l	31	26	39	30	64
K (Extractable BS 3882)	T272	A40	10	mg/l	150	27	43	33	140
Carbon / Nitrogen ratio	T85	A40			Ratio 19:1	Ratio 18:1	Ratio 19:1	Ratio 18:1	Ratio 20:1
Electrical Conductivity	T271	A40	10	µS/cm	1800	1800	2000	1300	2100
LOI (OM) (125-440)C	T873	A40		%	7.4	8.6	5.6	11.5	6.6
Neutralising Value (expressed as CaCO3)	T22	A40	0.1	%	1.0	3.8	2.1	2.3	2.9
Nitrogen (Total)	T267	A40		%m/m	0.23	0.28	0.17	0.38	0.19
pH (2.5:1 extract)	T274	A40			5.7	7.9	7.9	7.0	8.1
Sand Content	T2	A40	1.0	%	68	69	67	57	65
Silt Content	T2	A40	1.0	%	17	16	20	28	22
Clay Content	T2	A40	1.0	%	15	15	13	15	13
Retained on 2mm	T2	A40	0.1	%	41.8	54.3	31.8	6.4	8.6
Retained on 20mm	T2	A40	0.1	%	14.9	30.5	8.0	3.0	4.9
Retained on 50mm	T2	A40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1
Sharps	T2	AR		Number/kg	2.0	5.0	N.D.	2.0	2.0
Texture	T26	A40			Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Visible Contaminants	T161	AR	0.5	%	<0.5	1.9	<0.5	<0.5	<0.5
Visible Contaminants (Plastics)	T2	AR	0.25	%	<0.25	<0.25	<0.25	<0.25	<0.25



Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158 Soil Analysed as Soil BS 3882:2015 Topsoil (SE)									
Concept Reference					771403 025	771403 026	771403 027	771403 028	771403 029
Customer Sample Reference					HP06 ES2 @ 0.40-0.50m	BH06 ES1 @ 0.30-0.40m	BH02 ES1 @ 0.50-0.60m	HP07 ES1 @ 0.10-0.20m	HP09 ES1 @ 0.20-0.30m
Date Sampled					20-SEP-2018	17-SEP-2018	20-SEP-2018	20-SEP-2018	20-SEP-2018
Determinand	Method	Test Sample	LOD	Units					
Copper	T312	A40	1	mg/kg	98	27	22	20	45
Nickel	T312	A40	1	mg/kg	17	17	23	20	13
Zinc	T312	A40	1	mg/kg	130	57	73	78	140
Mg (Extractable BS 3882)	T272	A40	10	mg/l	41	29	31	27	<10
Phosphorous	T956	A40	10	mg/l	34	49	59	37	46
K (Extractable BS 3882)	T272	A40	10	mg/l	95	52	61	93	240
Carbon / Nitrogen ratio	T85	A40			Ratio 22:1	Ratio 23:1	Ratio 25:1	Ratio 25:1	Ratio 49:1
Electrical Conductivity	T271	A40	10	µS/cm	1900	1900	2000	2000	2000
LOI (OM) (125-440)C	T873	A40		%	5.3	5.0	5.2	4.2	4.2
Neutralising Value (expressed as CaCO3)	T22	A40	0.1	%	7.6	3.7	7.9	9.2	28.4
Nitrogen (Total)	T267	A40		%m/m	0.14	0.13	0.12	0.10	0.05
pH (2.5:1 extract)	T274	A40			8.6	8.3	8.2	8.2	10.9
Sand Content	T2	A40	1.0	%	64	63	81	84	85
Silt Content	T2	A40	1.0	%	20	24	11	10	10
Clay Content	T2	A40	1.0	%	16	13	8.0	6.0	5.0
Retained on 2mm	T2	A40	0.1	%	17.6	37.8	37.4	12.5	13.5
Retained on 20mm	T2	A40	0.1	%	11.9	15.5	15.3	11.0	10.3
Retained on 50mm	T2	A40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1
Sharps	T2	AR		Number/kg	2.0	N.D.	N.D.	2.0	N.D.
Texture	T26	A40			Sandy Loam	Sandy Loam	Loamy Sand	Loamy Sand	Loamy Sand
Visible Contaminants	T161	AR	0.5	%	<0.5	<0.5	<0.5	<0.5	<0.5
Visible Contaminants (Plastics)	T2	AR	0.25	%	<0.25	<0.25	<0.25	<0.25	<0.25

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158 Soil Analysed as Soil Total and Speciated USEPA16 PAH (SE) (MCERTS)									
Concept Reference					771403 001	771403 002	771403 004	771403 006	771403 007
Customer Sample Reference					BH01 ES3 @ 1.50-1.60m	BH01 ES6 @ 3.00-3.10m	BH02 ES5 @ 2.50-2.60m	BH03 ES2 @ 0.70-0.80m	BH03 ES3 @ 1.20-1.30m
Date Sampled					20-SEP-2018	20-SEP-2018	20-SEP-2018	19-SEP-2018	19-SEP-2018
Matrix Class					Other	Fill	Other	Topsoil	Clay
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T16	M105	0.1	mg/kg	20	<0.1	0.2	<0.1	<0.1
Acenaphthylene	T16	M105	0.1	mg/kg	0.8	<0.1	<0.1	0.1	<0.1
Acenaphthene	T16	M105	0.1	mg/kg	41	<0.1	<0.1	<0.1	<0.1
Fluorene	T16	M105	0.1	mg/kg	26	<0.1	0.2	<0.1	<0.1
Phenanthrene	T16	M105	0.1	mg/kg	45	<0.1	1.0	0.4	<0.1
Anthracene	T16	M105	0.1	mg/kg	11	<0.1	0.1	0.1	<0.1
Fluoranthene	T16	M105	0.1	mg/kg	13	<0.1	0.8	1.1	0.2
Pyrene	T16	M105	0.1	mg/kg	8.5	<0.1	0.6	1.0	0.2
Benzo(a)Anthracene	T16	M105	0.1	mg/kg	1.9	<0.1	0.2	0.7	0.1
Chrysene	T16	M105	0.1	mg/kg	2.0	<0.1	0.3	0.7	0.1
Benzo(b)fluoranthene	T16	M105	0.1	mg/kg	1.5	<0.1	0.2	0.9	0.1
Benzo(k)fluoranthene	T16	M105	0.1	mg/kg	1.1	<0.1	0.1	0.7	0.1
Benzo(a)Pyrene	T16	M105	0.1	mg/kg	1.1	<0.1	0.1	0.9	0.1
Indeno(123-cd)Pyrene	T16	M105	0.1	mg/kg	0.7	<0.1	<0.1	0.6	<0.1
Dibenzo(ah)Anthracene	T16	M105	0.1	mg/kg	0.4	<0.1	<0.1	0.2	<0.1
Benzo(ghi)Perylene	T16	M105	0.1	mg/kg	0.7	<0.1	<0.1	0.6	<0.1
PAH(total)	T16	M105	0.1	mg/kg	170	<0.1	3.7	8.0	1.0

Concept Reference:	771403
Project Site:	Reading School
Customer Reference:	1CO106158
Soil	Analysed as Soil
Total and Speciated USEPA16 PAH (SE) (MCERTS)	

Concept Reference					771403 009	771403 011	771403 012	771403 014	771403 015
Customer Sample Reference					BH04 ES5 @ 2.20-2.30m	BH05 ES3 @ 1.50-1.60m	BH05 ES4 @ 2.00-2.10m	BH06 ES3 @ 1.10-1.20m	BH06 ES4 @ 1.60-1.70m
Date Sampled					18-SEP-2018	21-SEP-2018	21-SEP-2018	17-SEP-2018	17-SEP-2018
Matrix Class					Fill	Sandy Soil	Fill	Fill	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T16	M105	0.1	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Acenaphthylene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	T16	M105	0.1	mg/kg	<0.1	<0.1	0.2	0.3	<0.1
Fluorene	T16	M105	0.1	mg/kg	<0.1	<0.1	0.2	0.5	<0.1
Phenanthrene	T16	M105	0.1	mg/kg	<0.1	0.1	1.0	2.4	0.2
Anthracene	T16	M105	0.1	mg/kg	<0.1	<0.1	0.3	0.2	<0.1
Fluoranthene	T16	M105	0.1	mg/kg	<0.1	0.3	1.5	1.8	0.2
Pyrene	T16	M105	0.1	mg/kg	<0.1	0.3	1.3	1.4	0.2
Benzo(a)Anthracene	T16	M105	0.1	mg/kg	<0.1	0.2	1.0	0.5	<0.1
Chrysene	T16	M105	0.1	mg/kg	<0.1	0.2	1.0	0.5	<0.1
Benzo(b)fluoranthene	T16	M105	0.1	mg/kg	<0.1	0.3	1.0	0.4	<0.1
Benzo(k)fluoranthene	T16	M105	0.1	mg/kg	<0.1	0.2	0.7	0.3	<0.1
Benzo(a)Pyrene	T16	M105	0.1	mg/kg	<0.1	0.2	0.9	0.3	<0.1
Indeno(123-cd)Pyrene	T16	M105	0.1	mg/kg	<0.1	0.2	0.5	0.2	<0.1
Dibenzo(ah)Anthracene	T16	M105	0.1	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Benzo(ghi)Perylene	T16	M105	0.1	mg/kg	<0.1	0.2	0.5	0.2	<0.1
PAH(total)	T16	M105	0.1	ma/ka	<0.1	2.2	10	8.9	0.5

Concept Reference:	771403
Project Site:	Reading School
Customer Reference:	1CO106158
Soil	Analysed as Soil
Total and Speciated USEPA16 PAH (SE) (MCERTS)	

Concept Reference					771403 016	771403 018	771403 019
Customer Sample Reference					BH06 ES5 @ 2.30-2.40m	HP08 ES3 @ 0.70-0.80m	HP09 ES2 @ 0.50-0.90m
Date Sampled					17-SEP-2018	20-SEP-2018	20-SEP-2018
Matrix Class					Sandy Soil	Clay	Clay
Determinand	Method	Test Sample	LOD	Units			
Naphthalene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Fluorene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Anthracene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Pyrene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(a)Anthracene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Chrysene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(a)Pyrene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	T16	M105	0.1	mg/kg	<0.1	<0.1	<0.1
PAH(total)	T16	M105	0.1	mg/ka	<0.1	<0.1	<0.1

Soil	Analysed as Soil
MCERTS	

Concept Reference					771403 001	771403 002	771403 003	771403 004	771403 005
Customer Sample Reference					BH01 ES3 @ 1.50-1.60m	BH01 ES6 @ 3.00-3.10m	BH01 D5 @ 5.00m	BH02 ES5 @ 2.50-2.60m	BH02 D6 @ 6.00m
Date Sampled					20-SEP-2018	20-SEP-2018	21-SEP-2018	20-SEP-2018	20-SEP-2018
Matrix Class					Other	Fill	Fill	Other	Fill
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	54	10	9.1	33	7.3
Retained on 2mm	T2	A40	0.1	%	3.5	53.9	63.9	0.6	44.3

Soil	Analysed as Soil
MCERTS	

Concept Reference					771403 006	771403 007	771403 008	771403 009	771403 010
Customer Sample Reference					BH03 ES2 @ 0.70-0.80m	BH03 ES3 @ 1.20-1.30m	BH03 D12 @ 10.00m	BH04 ES5 @ 2.20-2.30m	BH04 D15 @ 12.00m
Date Sampled					19-SEP-2018	19-SEP-2018	19-SEP-2018	18-SEP-2018	18-SEP-2018
Matrix Class					Topsoil	Clay	Other	Fill	Other
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	8.8	16	14	7.3	18
Retained on 2mm	T2	A40	0.1	%	7.7	32.8	<0.1	<0.1	<0.1

Soil	Analysed as Soil
MCERTS	

Concept Reference					771403 011	771403 012	771403 013	771403 014	771403 015
Customer Sample Reference					BH05 ES3 @ 1.50-1.60m	BH05 ES4 @ 2.00-2.10m	BH05 SPT18 (D18) @ 14.50m	BH06 ES3 @ 1.10-1.20m	BH06 ES4 @ 1.60-1.70m
Date Sampled					21-SEP-2018	21-SEP-2018	22-SEP-2018	17-SEP-2018	17-SEP-2018
Matrix Class					Sandy Soil	Fill	Other	Fill	Sandy Soil
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	19	21	19	26	13
Retained on 2mm	T2	A40	0.1	%	12.8	<0.1	4.8	16.0	6.9

Soil	Analysed as Soil
MCERTS	

Concept Reference					771403 016	771403 017	771403 018	771403 019	771403 020
Customer Sample Reference					BH06 ES5 @ 2.30-2.40m	BH06 SPT12 @ 8.00m	HP08 ES3 @ 0.70-0.80m	HP09 ES2 @ 0.50-0.90m	HP1 ES1 @ 0.20-0.30m
Date Sampled					17-SEP-2018	18-SEP-2018	20-SEP-2018	20-SEP-2018	18-SEP-2018
Matrix Class					Sandy Soil	Other	Clay	Clay	
Determinand	Method	Test Sample	LOD	Units					
Moisture @105C	T162	AR	0.1	%	15	19	16	16	-
Retained on 2mm	T2	A40	0.1	%	49.1	<0.1	<0.1	9.1	41.8

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158														
Soil		Analysed as Soil												
MCERTS														
Concept Reference					771403 021		771403 022		771403 023		771403 024		771403 025	
Customer Sample Reference					HP02 ES1 @ 0.20-0.30m		HP03 ES1 @ 0.20-0.30m		HP04 ES1 @ 0.10-0.20m		HP05 ES1 @ 0.10-0.20m		HP06 ES2 @ 0.40-0.50m	
Date Sampled					19-SEP-2018		19-SEP-2018		18-SEP-2018		19-SEP-2018		20-SEP-2018	
Matrix Class														
Determinand		Method	Test Sample	LOD	Units									
Retained on 2mm		T2	A40	0.1	%	54.3	31.8	6.4	8.6	17.6				

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158 Soil MCERTS Analysed as Soil												
Concept Reference					771403 026		771403 027		771403 028		771403 029	
Customer Sample Reference					BH06 ES1 @ 0.30-0.40m		BH02 ES1 @ 0.50-0.60m		HP07 ES1 @ 0.10-0.20m		HP09 ES1 @ 0.20-0.30m	
Date Sampled					17-SEP-2018		20-SEP-2018		20-SEP-2018		20-SEP-2018	
Matrix Class												
Determinand		Method	Test Sample	LOD	Units							
Retained on 2mm		T2	A40	0.1	%	37.8	37.4	12.5	13.5			

Index to symbols used in Supplement 1 to Report Number 771403-2

Value	Description
A40	Assisted dried < 40C
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
AR	As Received
N.D.	Not Detected
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Supplement 1: Report reissued to show results for sample 005
Retained on 2mm is removed before analysis
Nitrogen (total) and PSD laser analysis transferred to NRM
Asbestos subcontracted to REC Limited

Method Index

Value	Description
T245	ICP/OES (Aqua Regia Extraction)
T271	Probe CaSO4
T82	ICP/OES (Sim)
T4	Colorimetry
T956	Colorimetry (Sodium Hydrogen Carbonate Extract)
T274	Probe (BS 3882)
T312	ICP-OES (Nitric Acid Extraction)
T6	ICP/OES
T85	Calc
T287	Calc TOC/0.58
T22	Titration
T26	Microscopy (Low Mag.)
T7	Probe

T257	ICP/OES (SIM) (Aqua Regia Extraction)
T272	ICP/OES (Ammonium Nitrate)
T102	ICP/OES (HCl extract)
T219	GC/FID (SE)
T267	GC/TCD (Dumas)
T921	Colorimetry (CF) (MCERT)
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T161	Visual
T162	Grav (1 Dec) (105 C)
T2	Grav
T16	GC/MS
T27	PLM
T873	Grav (4 Dec) (Dry 125 C)(Ign 440 C)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Arsenic	T257	A40	2.0	mg/kg	N	001,004
Arsenic	T257	A40	2.0	mg/kg	U	002,009,012,014
Arsenic	T257	A40	2	mg/kg	M	006-007,011,015-016,018-019
Boron (water-soluble)	T82	A40	1	mg/kg	N	001-002,004,006-007,009,011-012,014-016,018-019
Cadmium	T257	A40	0.1	mg/kg	N	001,004
Cadmium	T257	A40	0.1	mg/kg	U	002,009,012,014
Cadmium	T257	A40	0.1	mg/kg	M	006-007,011,015-016,018-019
Chromium	T257	A40	0.5	mg/kg	N	001,004
Chromium	T257	A40	0.5	mg/kg	U	002,009,012,014
Chromium	T257	A40	0.5	mg/kg	M	006-007,011,015-016,018-019
Copper	T257	A40	2	mg/kg	N	001,004
Copper	T257	A40	2	mg/kg	U	002,009,012,014
Copper	T257	A40	2	mg/kg	M	006-007,011,015-016,018-019
Lead	T257	A40	2	mg/kg	N	001,004
Lead	T257	A40	2	mg/kg	U	002,009,012,014
Lead	T257	A40	2	mg/kg	M	006-007,011,015-016,018-019
Mercury	T245	A40	1.0	mg/kg	N	001,004
Mercury	T245	A40	1.0	mg/kg	U	002,006-007,009,011-012,014-016,018-019
Nickel	T257	A40	0.5	mg/kg	N	001,004
Nickel	T257	A40	0.5	mg/kg	U	002,009,012,014
Nickel	T257	A40	0.5	mg/kg	M	006-007,011,015-016,018-019
Selenium	T257	A40	3	mg/kg	N	001,004
Selenium	T257	A40	3	mg/kg	U	002,006-007,009,011-012,014-016,018-019
Zinc	T257	A40	2	mg/kg	N	001,004
Zinc	T257	A40	2	mg/kg	U	002,009,012,014
Zinc	T257	A40	2	mg/kg	M	006-007,011,015-016,018-019
Ammonia expressed as NH4	T4	A40	0.5	mg/kg	N	001-002,004,006-007,009,011-012,014-016,018-019
Asbestos ID	T27	A40			SN	001,004
Asbestos ID	T27	A40			SU	002,006-007,009,011-012,014-016,018-019
Chromium VI	T6	A40	1	mg/kg	N	001-002,004,006-007,009,011-012,014-016,018-019
pH	T7	A40			N	001,004,008,010,013,017
pH	T7	A40			U	002-003,005,009,012,014
pH	T7	A40			M	006-007,011,015-016,018-019
Soil Organic Matter	T287	A40	0.1	%	N	001-002,004,006-007,009,011-012,014-016,018-019
SO4(Total)	T102	A40	0.02	%	N	001,004
SO4(Total)	T102	A40	0.02	%	U	002,009,012,014
SO4(Total)	T102	A40	0.02	%	M	006-007,011,015-016,018-019
Sulphide	T4	A40	10	mg/kg	N	001-002,004,006-007,009,011-012,014-016,018-019
Sulphur (total)	T6	A40	0.01	%	N	001,004
Sulphur (total)	T6	A40	0.01	%	U	002,009,012,014
Sulphur (total)	T6	A40	0.01	%	M	006-007,011,015-016,018-019
Cyanide(Total)	T921	M105	1	mg/kg	N	001,004
Cyanide(Total)	T921	M105	1	mg/kg	U	002,009,012,014
Cyanide(Total)	T921	M105	1	mg/kg	M	006-007,011,015-016,018-019
Cyanide(free)	T921	M105	1	mg/kg	N	001,004
Cyanide(free)	T921	M105	1	mg/kg	U	002,009,012,014
Cyanide(free)	T921	M105	1	mg/kg	M	006-007,011,015-016,018-019
Phenols(Mono)	T921	M105	1	mg/kg	N	001,004
Phenols(Mono)	T921	M105	1	mg/kg	U	002,009,012,014
Phenols(Mono)	T921	M105	1	mg/kg	M	006-007,011,015-016,018-019
TPH (C10-C40)	T219	M105	10	mg/kg	N	001,004
TPH (C10-C40)	T219	M105	10	mg/kg	U	002,009,012,014
TPH (C10-C40)	T219	M105	10	mg/kg	M	006-007,011,015-016,018-019

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	U	003,005
(Water Soluble) SO4 expressed as SO4	T242	A40	0.01	g/l	N	008,010,013,017
Copper	T312	A40	1	mg/kg	N	020-029
Nickel	T312	A40	1	mg/kg	N	020-029
Zinc	T312	A40	1	mg/kg	N	020-029
Mg (Extractable BS 3882)	T272	A40	10	mg/l	N	020-029
Phosphorous	T956	A40	10	mg/l	N	020-029
K (Extractable BS 3882)	T272	A40	10	mg/l	N	020-029
Carbon / Nitrogen ratio	T85	A40			N	020-029
Electrical Conductivity	T271	A40	10	µS/cm	N	020-029
LOI (OM) (125-440)C	T873	A40		%	N	020-029
Neutralising Value (expressed as CaCO3)	T22	A40	0.1	%	N	020-029
Nitrogen (Total)	T267	A40		%m/m	SN	020-029
pH (2.5:1 extract)	T274	A40			N	020-029
Sand Content	T2	A40	1.0	%	SN	020-029
Silt Content	T2	A40	1.0	%	SN	020-029
Clay Content	T2	A40	1.0	%	SN	020-029
Retained on 20mm	T2	A40	0.1	%	N	020-029
Retained on 50mm	T2	A40	0.1	%	N	020-029
Sharps	T2	AR		Number/kg	N	020-029
Texture	T26	A40			SN	020-029
Visible Contaminants	T161	AR	0.5	%	N	020-029
Visible Contaminants (Plastics)	T2	AR	0.25	%	N	020-029
Naphthalene	T16	M105	0.1	mg/kg	N	001,004
Naphthalene	T16	M105	0.1	mg/kg	U	002,006-007,009,011-012,014-016,018-019
Acenaphthylene	T16	M105	0.1	mg/kg	N	001,004
Acenaphthylene	T16	M105	0.1	mg/kg	U	002,006-007,009,011-012,014-016,018-019
Acenaphthene	T16	M105	0.1	mg/kg	N	001,004
Acenaphthene	T16	M105	0.1	mg/kg	U	002,009,012,014
Acenaphthene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
Fluorene	T16	M105	0.1	mg/kg	N	001,004
Fluorene	T16	M105	0.1	mg/kg	U	002,009,012,014
Fluorene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
Phenanthrene	T16	M105	0.1	mg/kg	N	001,004
Phenanthrene	T16	M105	0.1	mg/kg	U	002,006-007,009,011-012,014-016,018-019
Anthracene	T16	M105	0.1	mg/kg	N	001,004
Anthracene	T16	M105	0.1	mg/kg	U	002,009,012,014
Anthracene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
Fluoranthene	T16	M105	0.1	mg/kg	N	001-002,004,006-007,009,011-012,014-016,018-019
Pyrene	T16	M105	0.1	mg/kg	N	001-002,004,006-007,009,011-012,014-016,018-019
Benzo(a)Anthracene	T16	M105	0.1	mg/kg	N	001,004
Benzo(a)Anthracene	T16	M105	0.1	mg/kg	U	002,009,012,014
Benzo(a)Anthracene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
Chrysene	T16	M105	0.1	mg/kg	N	001,004
Chrysene	T16	M105	0.1	mg/kg	U	002,009,012,014
Chrysene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
Benzo(b)fluoranthene	T16	M105	0.1	mg/kg	N	001,004
Benzo(b)fluoranthene	T16	M105	0.1	mg/kg	U	002,006-007,009,011-012,014-016,018-019
Benzo(k)fluoranthene	T16	M105	0.1	mg/kg	N	001-002,004,006-007,009,011-012,014-016,018-019
Benzo(a)Pyrene	T16	M105	0.1	mg/kg	N	001,004
Benzo(a)Pyrene	T16	M105	0.1	mg/kg	U	002,009,012,014
Benzo(a)Pyrene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
Indeno(123-cd)Pyrene	T16	M105	0.1	mg/kg	N	001,004
Indeno(123-cd)Pyrene	T16	M105	0.1	mg/kg	U	002,009,012,014
Indeno(123-cd)Pyrene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
Dibenzo(ah)Anthracene	T16	M105	0.1	mg/kg	N	001,004
Dibenzo(ah)Anthracene	T16	M105	0.1	mg/kg	U	002,009,012,014
Dibenzo(ah)Anthracene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
Benzo(ghi)Perylene	T16	M105	0.1	mg/kg	N	001,004
Benzo(ghi)Perylene	T16	M105	0.1	mg/kg	U	002,009,012,014
Benzo(ghi)Perylene	T16	M105	0.1	mg/kg	M	006-007,011,015-016,018-019
PAH(total)	T16	M105	0.1	mg/kg	N	001,004
PAH(total)	T16	M105	0.1	mg/kg	U	002,006-007,009,011-012,014-016,018-019
Moisture @105C	T162	AR	0.1	%	N	001-019
Retained on 2mm	T2	A40	0.1	%	N	001-029

Concept Life Sciences

Certificate of Analysis

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Report Number: 771403-2 WAC

Date of Report: 12-Oct-2018

Customer: Resource Environmental Consultants Ltd
UNIT 47
Basepoint Business Center
1 Winnall Valley Road
Winchester
Hampshire
SO23 0LD

Customer Contact: Miss Charlotte Toth

Customer Job Reference: 1CO106158

Customer Purchase Order: 005540

Customer Site Reference: Reading School

Date Job Received at Concept: 28-Sep-2018

Date Analysis Started: 04-Oct-2018

Date Analysis Completed: 12-Oct-2018

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual



Report checked
and authorised by :
Aislinn Arthey
Customer Service Advisor

Issued by :
Aislinn Arthey
Customer Service Advisor

Waste Acceptance Criteria

Customer Sample Reference : BH01 ES3 @ 1.50-1.60m

Our Sample Reference : 771403 001

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 87.5

Date Sampled : 20-SEP-2018

Matrix Class : Other

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			N	7.3		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	N	38			10.0
Total Organic Carbon	OX/IR	0.1	%	N	20	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	N	0.37	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	1.7			
PAH (Sum)	Calc	1.6	mg/kg	N	170	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	N	7800	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	54			
Retained on 2mm	Grav	0.1	%	N	3.5			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.17	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.025	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.87	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	46	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.023	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	410	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	0.68	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.14	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.26	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.048	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	0.45	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	2200	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	4100	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.16	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Waste Acceptance Criteria

Customer Sample Reference : BH01 ES6 @ 3.00-3.10m

Our Sample Reference : 771403 002

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 20-SEP-2018

Matrix Class : Fill

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			U	8.3		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	U	2.3			10.0
Total Organic Carbon	OX/IR	0.1	%	N	0.4	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	U	28	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	10			
Retained on 2mm	Grav	0.1	%	N	53.9			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.019	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.098	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	12	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0086	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	130	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	1.3	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.0049	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	6.1	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	520	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Waste Acceptance Criteria

Customer Sample Reference : BH02 ES5 @ 2.50-2.60m

Our Sample Reference : 771403 004

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 87.5

Date Sampled : 20-SEP-2018

Matrix Class : Other

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			N	8.3		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	N	4.3			10.0
Total Organic Carbon	OX/IR	0.1	%	N	1.5	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	N	0.50	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	3.7	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	N	7300	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	33			
Retained on 2mm	Grav	0.1	%	N	0.6			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.039	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.054	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.46	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	71	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.037	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.022	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	80	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	7.4	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.042	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.13	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.046	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.010	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	730	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	2300	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.093	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Waste Acceptance Criteria

Customer Sample Reference : BH03 ES2 @ 0.70-0.80m

Our Sample Reference : 771403 006

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 19-SEP-2018

Matrix Class : Topsoil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			M	8.1		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	M	7.2			10.0
Total Organic Carbon	OX/IR	0.1	%	N	3.6	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	8.0	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	170	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	8.8			
Retained on 2mm	Grav	0.1	%	N	7.7			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.069	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.019	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.47	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	22	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.011	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.12	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	230	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	6.0	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.013	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.098	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0060	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	66	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	1100	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.056	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

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Waste Acceptance Criteria

Customer Sample Reference : BH03 ES3 @ 1.20-1.30m

Our Sample Reference : 771403 007

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 19-SEP-2018

Matrix Class : Clay

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			M	7.9		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	M	7.1			10.0
Total Organic Carbon	OX/IR	0.1	%	N	3.9	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	71	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	16			
Retained on 2mm	Grav	0.1	%	N	32.8			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.039	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.020	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.54	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	18	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.017	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	160	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	2.2	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.25	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.015	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	1200	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	2600	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.049	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

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Waste Acceptance Criteria

Customer Sample Reference : BH04 ES5 @ 2.20-2.30m

Our Sample Reference : 771403 009

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 18-SEP-2018

Matrix Class : Fill

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			U	8.3		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	U	1.5			10.0
Total Organic Carbon	OX/IR	0.1	%	N	0.1	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	U	12	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	7.3			
Retained on 2mm	Grav	0.1	%	N	<0.1			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.037	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.064	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00048	mg/kg	N	(3) <0.00048	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	13	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0077	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	44	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	1.2	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.017	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	62	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	580	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

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Waste Acceptance Criteria

Customer Sample Reference : BH05 ES3 @ 1.50-1.60m

Our Sample Reference : 771403 011

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 21-SEP-2018

Matrix Class : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			M	7.9		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	M	14			10.0
Total Organic Carbon	OX/IR	0.1	%	N	9.5	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	2.2	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	370	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	19			
Retained on 2mm	Grav	0.1	%	N	12.8			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.11	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.0089	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.97	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	20	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.070	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	220	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	3.8	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.017	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.087	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.017	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	290	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	1600	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.053	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

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Waste Acceptance Criteria

Customer Sample Reference : BH05 ES4 @ 2.00-2.10m

Our Sample Reference : 771403 012

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 21-SEP-2018

Matrix Class : Fill

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			U	8.0		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	U	8.8			10.0
Total Organic Carbon	OX/IR	0.1	%	N	5.1	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	10	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	U	1100	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	21			
Retained on 2mm	Grav	0.1	%	N	<0.1			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	1.8	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.018	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	1.0	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	29	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.040	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	230	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	3.4	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.019	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	0.0020	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.12	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.35	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	1900	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	3600	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.54	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

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Waste Acceptance Criteria

Customer Sample Reference : BH06 ES3 @ 1.10-1.20m

Our Sample Reference : 771403 014

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 87.5

Date Sampled : 17-SEP-2018

Matrix Class : Fill

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			U	7.7		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	U	9.2			10.0
Total Organic Carbon	OX/IR	0.1	%	N	5.9	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	8.9	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	U	2300	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	26			
Retained on 2mm	Grav	0.1	%	N	16.0			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.052	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.024	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.78	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	120	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.014	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	80	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	2.0	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.023	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.27	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.023	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	2100	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	3700	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.062	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as ammended)

Note:- Sample failed to produce sufficient eluate within the specified time after vacuum filtration for 1 hour and centrifugation for 30 minutes. Therefore, the exact application of the two-step leaching test is precluded on technical grounds. (ref: Section 5.2.4 BS EN 12457-3:2002) Results are derived from a single step leaching at L/S 10/1 as prescribed by the EA guidance. (Ref Section C4.1.1 Guidance on Sampling and Testing of Wastes to meet Landfill Waste Acceptance Procedures Version 1 April 2005, Environment Agency)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Waste Acceptance Criteria

Customer Sample Reference : BH06 ES4 @ 1.60-1.70m

Our Sample Reference : 771403 015

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 17-SEP-2018

Matrix Class : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			M	7.9		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	M	6.8			10.0
Total Organic Carbon	OX/IR	0.1	%	N	2.1	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	90	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	13			
Retained on 2mm	Grav	0.1	%	N	6.9			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.040	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.023	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.52	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	37	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.025	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	170	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	2.4	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.13	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.022	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	710	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	2500	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.021	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Waste Acceptance Criteria

Customer Sample Reference : BH06 ES5 @ 2.30-2.40m

Our Sample Reference : 771403 016

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 17-SEP-2018

Matrix Class : Sandy Soil

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			M	8.1		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	M	4.7			10.0
Total Organic Carbon	OX/IR	0.1	%	N	1.1	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	38	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	15			
Retained on 2mm	Grav	0.1	%	N	49.1			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.026	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.023	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.19	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	22	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.018	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	57	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	2.3	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.061	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	150	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	1100	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

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Waste Acceptance Criteria

Customer Sample Reference : HP08 ES3 @ 0.70-0.80m

Our Sample Reference : 771403 018

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 20-SEP-2018

Matrix Class : Clay

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			M	7.8		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	M	3.3			10.0
Total Organic Carbon	OX/IR	0.1	%	N	0.5	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	15	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	16			
Retained on 2mm	Grav	0.1	%	N	<0.1			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.012	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.031	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.22	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	42	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.077	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.048	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	170	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	4.6	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.032	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.051	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	49	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	300	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.22	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

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Waste Acceptance Criteria

Customer Sample Reference : HP09 ES2 @ 0.50-0.90m

Our Sample Reference : 771403 019

Project Site : Reading School

Customer Reference : 1CO106158

Test Portion Mass (g) : 175

Date Sampled : 20-SEP-2018

Matrix Class : Clay

Soil Summary					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
pH	Probe			M	8.2		>6.0	
Loss on Ignition @450C	Ign @450C/Grav	0.1	%	M	3.1			10.0
Total Organic Carbon	OX/IR	0.1	%	N	0.6	3.0	5.0	6.0
Acid Neutralising Capacity (pH 7)	Titration	2.0	Mol/kg	N	<2.0			
PCB EC7 (Sum)	Calc	0.00035	mg/kg	N	<0.14	1.0		
BTEX (Sum)	Calc	0.040	mg/kg	U	<0.040	6.0		
Coronene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1			
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
TPH (C10-C40)	GC/FID (SE)	10	mg/kg	M	23	500.0		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	16			
Retained on 2mm	Grav	0.1	%	N	9.1			

10:1 Leachate					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	Technique	LOD	Units	Symbol				
Antimony (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.013	0.06	0.7	5.0
Arsenic (Dissolved)	Calc / ICP/MS (Filtered)	0.0020	mg/kg	N	0.048	0.5	2.0	25.0
Barium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.17	20.0	100.0	300.0
Cadmium (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	(3) <0.00050	0.04	1.0	5.0
Chloride	Calc / Discrete Analyser	10	mg/kg	N	44	800.0	15000.0	25000.0
Chromium (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.027	0.5	10.0	70.0
Copper (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.074	2.0	50.0	100.0
Dissolved Organic Carbon	Calc / OX/IR	10	mg/kg	N	210	500.0	800.0	1000.0
Fluoride	Calc / Discrete Analyser	0.50	mg/kg	N	6.8	10.0	150.0	500.0
Lead (Dissolved)	Calc / ICP/MS (Filtered)	0.0030	mg/kg	N	0.043	0.5	10.0	50.0
Mercury (Dissolved)	Calc / ICP/MS (Filtered)	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.027	0.5	10.0	30.0
Nickel (Dissolved)	Calc / ICP/MS (Filtered)	0.010	mg/kg	N	0.040	0.4	10.0	40.0
Phenols(Mono)	Calc / Colorimetry (CF)	0.20	mg/kg	N	<0.20	1.0		
Selenium (Dissolved)	Calc / ICP/MS (Filtered)	0.0050	mg/kg	N	0.0072	0.1	0.5	7.0
SO4--	Calc / Discrete Analyser	5.0	mg/kg	N	91	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	100	mg/kg	N	770	4000.0	60000.0	100000.0
Zinc (Dissolved)	Calc / ICP/MS (Filtered)	0.020	mg/kg	N	0.12	4.0	50.0	200.0

From: EC Directive 99/31/EC and Landfill Regulations 2002 (as amended)

Notes:- Cumulative release at L/S=10 (mg/kg of dry matter) in accordance with BS EN 12457. Soil leaching procedure is not covered by our UKAS accreditation

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Concept Reference: 771403									
Project Site: Reading School									
Customer Reference: 1CO106158									
Soil									
Analysed as Soil									
Total and Speciated USEPA16 PAH (SE) (MCERTS)									
Concept Reference					771403 001	771403 002	771403 004	771403 006	771403 007
Customer Sample Reference					BH01 ES3 @ 1.50-1.60m	BH01 ES6 @ 3.00-3.10m	BH02 ES5 @ 2.50-2.60m	BH03 ES2 @ 0.70-0.80m	BH03 ES3 @ 1.20-1.30m
Test Sample					M105	M105	M105	M105	M105
Date Sampled					20-SEP-2018	20-SEP-2018	20-SEP-2018	19-SEP-2018	19-SEP-2018
Matrix Class					Other	Fill	Other	Topsoil	Clay
Determinand	Method	LOD	Units	Symbol					
Naphthalene	GC/MS	0.1	mg/kg	N	20	-	0.2	-	-
Naphthalene	GC/MS	0.1	mg/kg	U	-	<0.1	-	<0.1	<0.1
Acenaphthylene	GC/MS	0.1	mg/kg	N	0.8	-	<0.1	-	-
Acenaphthylene	GC/MS	0.1	mg/kg	U	-	<0.1	-	0.1	<0.1
Acenaphthene	GC/MS	0.1	mg/kg	N	41	-	<0.1	-	-
Acenaphthene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Acenaphthene	GC/MS	0.1	mg/kg	M	-	-	-	<0.1	<0.1
Fluorene	GC/MS	0.1	mg/kg	N	26	-	0.2	-	-
Fluorene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Fluorene	GC/MS	0.1	mg/kg	M	-	-	-	<0.1	<0.1
Phenanthrene	GC/MS	0.1	mg/kg	N	45	-	1.0	-	-
Phenanthrene	GC/MS	0.1	mg/kg	U	-	<0.1	-	0.4	<0.1
Anthracene	GC/MS	0.1	mg/kg	N	11	-	0.1	-	-
Anthracene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Anthracene	GC/MS	0.1	mg/kg	M	-	-	-	0.1	<0.1
Fluoranthene	GC/MS	0.1	mg/kg	N	13	<0.1	0.8	1.1	0.2
Pyrene	GC/MS	0.1	mg/kg	N	8.5	<0.1	0.6	1.0	0.2
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	N	1.9	-	0.2	-	-
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	M	-	-	-	0.7	0.1
Chrysene	GC/MS	0.1	mg/kg	N	2.0	-	0.3	-	-
Chrysene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Chrysene	GC/MS	0.1	mg/kg	M	-	-	-	0.7	0.1
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	N	1.5	-	0.2	-	-
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	U	-	<0.1	-	0.9	0.1
Benzo(k)fluoranthene	GC/MS	0.1	mg/kg	N	1.1	<0.1	0.1	0.7	0.1
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	N	1.1	-	0.1	-	-
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	M	-	-	-	0.9	0.1
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	N	0.7	-	<0.1	-	-
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	M	-	-	-	0.6	<0.1
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	N	0.4	-	<0.1	-	-
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	M	-	-	-	0.2	<0.1
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	N	0.7	-	<0.1	-	-
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	U	-	<0.1	-	-	-
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	M	-	-	-	0.6	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	N	170	-	3.7	-	-
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	U	-	<0.1	-	8.0	1.0

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158 Soil Analysed as Soil Total and Speciated USEPA16 PAH (SE) (MCERTS)									
Concept Reference				771403 009	771403 011	771403 012	771403 014	771403 015	
Customer Sample Reference				BH04 ES5 @ 2.20-2.30m	BH05 ES3 @ 1.50-1.60m	BH05 ES4 @ 2.00-2.10m	BH06 ES3 @ 1.10-1.20m	BH06 ES4 @ 1.60-1.70m	
Test Sample				M105	M105	M105	M105	M105	
Date Sampled				18-SEP-2018	21-SEP-2018	21-SEP-2018	17-SEP-2018	17-SEP-2018	
Matrix Class				Fill	Sandy Soil	Fill	Fill	Sandy Soil	
Determinand	Method	LOD	Units	Symbol					
Naphthalene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Naphthalene	GC/MS	0.1	mg/kg	U	<0.1	<0.1	0.3	<0.1	<0.1
Acenaphthylene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Acenaphthylene	GC/MS	0.1	mg/kg	U	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Acenaphthene	GC/MS	0.1	mg/kg	U	<0.1	-	0.2	0.3	-
Acenaphthene	GC/MS	0.1	mg/kg	M	-	<0.1	-	-	<0.1
Fluorene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Fluorene	GC/MS	0.1	mg/kg	U	<0.1	-	0.2	0.5	-
Fluorene	GC/MS	0.1	mg/kg	M	-	<0.1	-	-	<0.1
Phenanthrene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Phenanthrene	GC/MS	0.1	mg/kg	U	<0.1	0.1	1.0	2.4	0.2
Anthracene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Anthracene	GC/MS	0.1	mg/kg	U	<0.1	-	0.3	0.2	-
Anthracene	GC/MS	0.1	mg/kg	M	-	<0.1	-	-	<0.1
Fluoranthene	GC/MS	0.1	mg/kg	N	<0.1	0.3	1.5	1.8	0.2
Pyrene	GC/MS	0.1	mg/kg	N	<0.1	0.3	1.3	1.4	0.2
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	U	<0.1	-	1.0	0.5	-
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	M	-	0.2	-	-	<0.1
Chrysene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Chrysene	GC/MS	0.1	mg/kg	U	<0.1	-	1.0	0.5	-
Chrysene	GC/MS	0.1	mg/kg	M	-	0.2	-	-	<0.1
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	U	<0.1	0.3	1.0	0.4	<0.1
Benzo(k)fluoranthene	GC/MS	0.1	mg/kg	N	<0.1	0.2	0.7	0.3	<0.1
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	U	<0.1	-	0.9	0.3	-
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	M	-	0.2	-	-	<0.1
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	U	<0.1	-	0.5	0.2	-
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	M	-	0.2	-	-	<0.1
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	U	<0.1	-	0.3	<0.1	-
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	M	-	<0.1	-	-	<0.1
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	U	<0.1	-	0.5	0.2	-
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	M	-	0.2	-	-	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	N	-	-	-	-	-
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	U	<0.1	2.2	10	8.9	0.5

Concept Reference: 771403							
Project Site: Reading School							
Customer Reference: 1CO106158							
Soil Analysed as Soil							
Total and Speciated USEPA16 PAH (SE) (MCERTS)							
Concept Reference					771403 016	771403 018	771403 019
Customer Sample Reference					BH06 ES5 @ 2.30-2.40m	HP08 ES3 @ 0.70-0.80m	HP09 ES2 @ 0.50-0.90m
Test Sample					M105	M105	M105
Date Sampled					17-SEP-2018	20-SEP-2018	20-SEP-2018
Matrix Class					Sandy Soil	Clay	Clay
Determinand	Method	LOD	Units	Symbol			
Naphthalene	GC/MS	0.1	mg/kg	N	-	-	-
Naphthalene	GC/MS	0.1	mg/kg	U	<0.1	<0.1	<0.1
Acenaphthylene	GC/MS	0.1	mg/kg	N	-	-	-
Acenaphthylene	GC/MS	0.1	mg/kg	U	<0.1	<0.1	<0.1
Acenaphthene	GC/MS	0.1	mg/kg	N	-	-	-
Acenaphthene	GC/MS	0.1	mg/kg	U	-	-	-
Acenaphthene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Fluorene	GC/MS	0.1	mg/kg	N	-	-	-
Fluorene	GC/MS	0.1	mg/kg	U	-	-	-
Fluorene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Phenanthrene	GC/MS	0.1	mg/kg	N	-	-	-
Phenanthrene	GC/MS	0.1	mg/kg	U	<0.1	<0.1	<0.1
Anthracene	GC/MS	0.1	mg/kg	N	-	-	-
Anthracene	GC/MS	0.1	mg/kg	U	-	-	-
Anthracene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Fluoranthene	GC/MS	0.1	mg/kg	N	<0.1	<0.1	<0.1
Pyrene	GC/MS	0.1	mg/kg	N	<0.1	<0.1	<0.1
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	N	-	-	-
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	U	-	-	-
Benzo(a)Anthracene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Chrysene	GC/MS	0.1	mg/kg	N	-	-	-
Chrysene	GC/MS	0.1	mg/kg	U	-	-	-
Chrysene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	N	-	-	-
Benzo(b)fluoranthene	GC/MS	0.1	mg/kg	U	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	GC/MS	0.1	mg/kg	N	<0.1	<0.1	<0.1
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	N	-	-	-
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	U	-	-	-
Benzo(a)Pyrene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	N	-	-	-
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	U	-	-	-
Indeno(123-cd)Pyrene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	N	-	-	-
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	U	-	-	-
Dibenzo(ah)Anthracene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	N	-	-	-
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	U	-	-	-
Benzo(ghi)Perylene	GC/MS	0.1	mg/kg	M	<0.1	<0.1	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	N	-	-	-
Polyaromatic Hydrocarbons (Total)	GC/MS	0.1	mg/kg	U	<0.1	<0.1	<0.1

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158									
Soil		Analysed as Soil							
BTEX									
Concept Reference					771403 001	771403 002	771403 004	771403 006	771403 007
Customer Sample Reference					BH01 ES3 @ 1.50-1.60m	BH01 ES6 @ 3.00-3.10m	BH02 ES5 @ 2.50-2.60m	BH03 ES2 @ 0.70-0.80m	BH03 ES3 @ 1.20-1.30m
Test Sample					M105	M105	M105	M105	M105
Date Sampled					20-SEP-2018	20-SEP-2018	20-SEP-2018	19-SEP-2018	19-SEP-2018
Matrix Class					Other	Fill	Other	Topsoil	Clay
Determinand	Method	LOD	Units	Symbol					
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	69	-	41	-	-
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	<10	-	-	-
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	-	-	-	<10	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	150	-	23	-	-
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	<10	-	-	-
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	-	-	-	<10	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	22	-	16	-	-
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	<10	-	-	-
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	-	-	-	<10	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	99	-	190	-	-
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	<10	-	-	-
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	-	-	-	<10	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	25	-	230	-	-
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	<10	-	-	-
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	-	-	-	<10	<10

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158													
Soil		Analysed as Soil											
BTEX													
Concept Reference				771403 009		771403 011		771403 012		771403 014		771403 015	
Customer Sample Reference				BH04 ES5 @ 2.20-2.30m		BH05 ES3 @ 1.50-1.60m		BH05 ES4 @ 2.00-2.10m		BH06 ES3 @ 1.10-1.20m		BH06 ES4 @ 1.60-1.70m	
Test Sample				M105		M105		M105		M105		M105	
Date Sampled				18-SEP-2018		21-SEP-2018		21-SEP-2018		17-SEP-2018		17-SEP-2018	
Matrix Class				Fill		Sandy Soil		Fill		Fill		Sandy Soil	
Determinand		Method		LOD	Units	Symbol							
Benzene		GC/MS (Head Space)(MCERTS)		10	µg/kg	N	-	-	-	-	-	-	-
Benzene		GC/MS (Head Space)(MCERTS)		10	µg/kg	U	<10	-	<10	<10	<10	-	-
Benzene		GC/MS (Head Space)(MCERTS)		10	µg/kg	M	-	<10	-	-	-	<10	<10
Toluene		GC/MS (Head Space)(MCERTS)		10	µg/kg	N	-	-	-	-	-	-	-
Toluene		GC/MS (Head Space)(MCERTS)		10	µg/kg	U	<10	-	<10	<10	<10	-	-
Toluene		GC/MS (Head Space)(MCERTS)		10	µg/kg	M	-	<10	-	-	-	<10	<10
EthylBenzene		GC/MS (Head Space)(MCERTS)		10	µg/kg	N	-	-	-	-	-	-	-
EthylBenzene		GC/MS (Head Space)(MCERTS)		10	µg/kg	U	<10	-	<10	<10	<10	-	-
EthylBenzene		GC/MS (Head Space)(MCERTS)		10	µg/kg	M	-	<10	-	-	-	<10	<10
Meta/Para-Xylene		GC/MS (Head Space)(MCERTS)		10	µg/kg	N	-	-	-	-	-	-	-
Meta/Para-Xylene		GC/MS (Head Space)(MCERTS)		10	µg/kg	U	<10	-	<10	<10	<10	-	-
Meta/Para-Xylene		GC/MS (Head Space)(MCERTS)		10	µg/kg	M	-	<10	-	-	-	<10	<10
Ortho-Xylene		GC/MS (Head Space)(MCERTS)		10	µg/kg	N	-	-	-	-	-	-	-
Ortho-Xylene		GC/MS (Head Space)(MCERTS)		10	µg/kg	U	<10	-	<10	<10	<10	-	-
Ortho-Xylene		GC/MS (Head Space)(MCERTS)		10	µg/kg	M	-	<10	-	-	-	<10	<10

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158									
Soil		Analysed as Soil							
BTEX									
Concept Reference				771403 016		771403 018		771403 019	
Customer Sample Reference				BH06 ES5 @ 2.30-2.40m		HP08 ES3 @ 0.70-0.80m		HP09 ES2 @ 0.50-0.90m	
Test Sample				M105		M105		M105	
Date Sampled				17-SEP-2018		20-SEP-2018		20-SEP-2018	
Matrix Class				Sandy Soil		Clay		Clay	
Determinand		Method		LOD	Units	Symbol			
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	-	-	-	-	-
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	-	-	-	-	-
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	-	-	-	-	-
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	-	-	-	-	-
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	-	-	-	-	-
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	U	-	-	-	-	-
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158									
Soil		Analysed as Soil							
PCBs EC7 (SE)									
Concept Reference					771403 001	771403 002	771403 004	771403 006	771403 007
Customer Sample Reference					BH01 ES3 @ 1.50-1.60m	BH01 ES6 @ 3.00-3.10m	BH02 ES5 @ 2.50-2.60m	BH03 ES2 @ 0.70-0.80m	BH03 ES3 @ 1.20-1.30m
Test Sample					M105	M105	M105	M105	M105
Date Sampled					20-SEP-2018	20-SEP-2018	20-SEP-2018	19-SEP-2018	19-SEP-2018
Matrix Class					Other	Fill	Other	Topsoil	Clay
Determinand	Method	LOD	Units	Symbol					
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	N	<20	-	<20	-	-
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	U	-	<20	-	-	-
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	M	-	-	-	<20	<20
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	N	<20	-	<20	-	-
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	U	-	<20	-	-	-
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	M	-	-	-	<20	<20
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	N	<20	-	<20	-	-
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	U	-	<20	-	-	-
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	M	-	-	-	<20	<20
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	N	<20	-	<20	-	-
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	U	-	<20	-	-	-
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	M	-	-	-	<20	<20
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	N	<20	-	<20	-	-
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	U	-	<20	-	-	-
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	M	-	-	-	<20	<20
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	N	<20	-	<20	-	-
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	U	-	<20	-	-	-
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	M	-	-	-	<20	<20
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	N	<20	-	<20	-	-
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	U	-	<20	-	-	-
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	M	-	-	-	<20	<20

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158 Soil Analysed as Soil PCBs EC7 (SE)									
Concept Reference				771403 009	771403 011	771403 012	771403 014	771403 015	
Customer Sample Reference				BH04 ES5 @ 2.20-2.30m	BH05 ES3 @ 1.50-1.60m	BH05 ES4 @ 2.00-2.10m	BH06 ES3 @ 1.10-1.20m	BH06 ES4 @ 1.60-1.70m	
Test Sample				M105	M105	M105	M105	M105	
Date Sampled				18-SEP-2018	21-SEP-2018	21-SEP-2018	17-SEP-2018	17-SEP-2018	
Matrix Class				Fill	Sandy Soil	Fill	Fill	Sandy Soil	
Determinand	Method	LOD	Units	Symbol					
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	N	-	-	-	-	-
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	U	<20	-	<20	<20	-
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	M	-	<20	-	-	<20
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	N	-	-	-	-	-
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	U	<20	-	<20	<20	-
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	M	-	<20	-	-	<20
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	N	-	-	-	-	-
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	U	<20	-	<20	<20	-
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	M	-	<20	-	-	<20
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	N	-	-	-	-	-
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	U	<20	-	<20	<20	-
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	M	-	<20	-	-	<20
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	N	-	-	-	-	-
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	U	<20	-	<20	<20	-
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	M	-	<20	-	-	<20
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	N	-	-	-	-	-
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	U	<20	-	<20	<20	-
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	M	-	<20	-	-	<20
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	N	-	-	-	-	-
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	U	<20	-	<20	<20	-
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	M	-	<20	-	-	<20

Concept Reference: 771403 Project Site: Reading School Customer Reference: 1CO106158							
Soil		Analysed as Soil					
PCBs EC7 (SE)							
Concept Reference					771403 016	771403 018	771403 019
Customer Sample Reference					BH06 ES5 @ 2.30-2.40m	HP08 ES3 @ 0.70-0.80m	HP09 ES2 @ 0.50-0.90m
Test Sample					M105	M105	M105
Date Sampled					17-SEP-2018	20-SEP-2018	20-SEP-2018
Matrix Class					Sandy Soil	Clay	Clay
Determinand	Method	LOD	Units	Symbol			
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	N	-	-	-
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	U	-	-	-
Polychlorinated biphenyl BZ#28	GC/MS	20	µg/kg	M	<20	<20	<20
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	N	-	-	-
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	U	-	-	-
Polychlorinated biphenyl BZ#52	GC/MS	20	µg/kg	M	<20	<20	<20
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	N	-	-	-
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	U	-	-	-
Polychlorinated biphenyl BZ#101	GC/MS	20	µg/kg	M	<20	<20	<20
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	N	-	-	-
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	U	-	-	-
Polychlorinated biphenyl BZ#118	GC/MS	20	µg/kg	M	<20	<20	<20
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	N	-	-	-
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	U	-	-	-
Polychlorinated biphenyl BZ#153	GC/MS	20	µg/kg	M	<20	<20	<20
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	N	-	-	-
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	U	-	-	-
Polychlorinated biphenyl BZ#138	GC/MS	20	µg/kg	M	<20	<20	<20
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	N	-	-	-
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	U	-	-	-
Polychlorinated biphenyl BZ#180	GC/MS	20	µg/kg	M	<20	<20	<20

Index to symbols used in 771403-2 WAC

Value	Description
8:1	Leachate to BS EN 12457-3 (8:1)
AR	As Received
2:1	Leachate to BS EN 12457-3 (2:1)
A40	Assisted dried < 40C
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
3	LOD Raised Due to Elevated Blank
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Retained on 2mm is removed before analysis
pH, LOI & TOC were performed on assisted dried samples (<40 degree centigrade). All other results relate to samples as received.



Concept Life Sciences

Certificate of Analysis

Report Number: 778788-1

Date of Report: 06-Nov-2018

Customer: Resource Environmental Consultants Ltd
UNIT 47
Basepoint Business Center
1 Winnall Valley Road
Winchester
Hampshire
SO23 0LD

Customer Contact: Miss Charlotte Toth

Customer Job Reference: 1CO106158

Customer Purchase Order: 005540

Customer Site Reference: Reading School

Date Job Received at Concept: 28-Sep-2018

Date Analysis Started: 31-Oct-2018

Date Analysis Completed: 06-Nov-2018

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual

Report checked
and authorised by :
Aislinn Arthey
Customer Service Advisor

Issued by :
Aislinn Arthey
Customer Service Advisor



Concept Reference: 778788 Project Site: Reading School Customer Reference: 1CO106158 Soil Miscellaneous					
Analysed as Soil					
Concept Reference				778788 001	
Customer Sample Reference				BH05 ES4 @ 2.00-2.10m	
Date Sampled				21-SEP-2018	
Determinand	Method	Test Sample	LOD	Units	
Asbestos Quantification Stage 3	T413	AR	0.001	%	Chrysotile Detected
					Loose Fibre
					Asbestos Cement
					0.71

Index to symbols used in 778788-1

Value	Description
AR	As Received
S	Analysis was subcontracted
U	Analysis is UKAS accredited

Notes

Asbestos subcontracted to REC Limited

Method Index

Value	Description
T413	PLM/Grav

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Asbestos Quantification Stage 3	T413	AR	0.001	%	SU	001

Concept Life Sciences

Certificate of Analysis

3 Crittall Drive
Springwood Industrial
Estate
Braintree
Essex
CM7 2RT
Tel : 01376 560120
Fax : 01376 552923

Report Number: 772694-1

Date of Report: 12-Oct-2018

Customer: Resource Environmental Consultants Ltd
UNIT 47
Basepoint Business Center
1 Winnall Valley Road
Winchester
Hampshire
SO23 0LD

Customer Contact: Miss Charlotte Toth

Customer Job Reference: 1CO106158

Customer Purchase Order: 005540

Customer Site Reference: Reading School

Date Job Received at Concept: 08-Oct-2018

Date Analysis Started: 08-Oct-2018

Date Analysis Completed: 12-Oct-2018

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual



1549

Report checked
and authorised by :
Aislinn Arthey
Customer Service Advisor

Issued by :
Aislinn Arthey
Customer Service Advisor



Concept Reference: 772694 Project Site: Reading School Customer Reference: 1CO106158 Water Analysed as Water Suite F									
Concept Reference					772694 001	772694 002	772694 003	772694 004	772694 005
Customer Sample Reference					BH01 W1	BH02 W1	BH03 W1	BH04 W1	BH05 W1
Date Sampled					04-OCT-2018	04-OCT-2018	04-OCT-2018	04-OCT-2018	04-OCT-2018
Determinand	Method	Test Sample	LOD	Units					
As (Dissolved)	T281	F	0.0002	mg/l	0.0008	0.0003	0.0093	0.0003	0.0007
B (Dissolved)	T281	F	0.05	mg/l	0.21	0.22	0.57	0.16	0.18
Cd (Dissolved)	T281	F	0.00002	mg/l	⁽³⁾ <0.00005	⁽³⁾ <0.00005	⁽³⁾ <0.00005	⁽³⁾ <0.00005	⁽³⁾ <0.00005
Cr (Dissolved)	T281	F	0.001	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Cu (Dissolved)	T281	F	0.0005	mg/l	0.0009	<0.0005	<0.0005	0.0007	0.0007
Pb (Dissolved)	T281	F	0.0003	mg/l	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Hg (Dissolved)	T281	F	0.00005	mg/l	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Ni (Dissolved)	T281	F	0.001	mg/l	0.015	0.002	0.013	0.003	0.008
Se (Dissolved)	T281	F	0.0005	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
Zn (Dissolved)	T281	F	0.002	mg/l	<0.002	<0.002	0.004	0.003	<0.002
Cyanide(free)	T546	F	0.01	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Cyanide(Total)	T546	F	0.01	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Phenols(Mono)	T546	F	0.02	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium VI	T686	F	0.003	mg/l	<0.003	<0.003	<0.003	<0.003	<0.003
pH	T7	F			8.3	8.0	8.1	8.2	8.3
Sulphate	T686	F	0.5	mg/l	66	58	65	50	52
Sulphide	T222	AR	0.1	mg/l	<0.1	<0.1	1.7	<0.1	<0.1
Sulphur (total)	T154	AR	0.01	mg/l	22	19	22	16	16
Thiocyanate	T4	AR	1	mg/l	<1	<1	<1	<1	<1
TPH (C10-C40)	T219	AR	20	µg/l	130	160	280	140	120

Concept Reference: 772694 Project Site: Reading School Customer Reference: 1CO106158 Water Analysed as Water Suite F					
Concept Reference					772694 006
Customer Sample Reference					BH06 W1
Date Sampled					04-OCT-2018
Determinand	Method	Test Sample	LOD	Units	
As (Dissolved)	T281	F	0.0002	mg/l	0.0055
B (Dissolved)	T281	F	0.05	mg/l	0.48
Cd (Dissolved)	T281	F	0.00002	mg/l	⁽³⁾ <0.00005
Cr (Dissolved)	T281	F	0.001	mg/l	<0.001
Cu (Dissolved)	T281	F	0.0005	mg/l	<0.0005
Pb (Dissolved)	T281	F	0.0003	mg/l	<0.0003
Hg (Dissolved)	T281	F	0.00005	mg/l	<0.00005
Ni (Dissolved)	T281	F	0.001	mg/l	0.008
Se (Dissolved)	T281	F	0.0005	mg/l	<0.0005
Zn (Dissolved)	T281	F	0.002	mg/l	0.003
Cyanide(free)	T546	F	0.01	mg/l	<0.01
Cyanide(Total)	T546	F	0.01	mg/l	<0.01
Phenols(Mono)	T546	F	0.02	mg/l	<0.02
Chromium VI	T686	F	0.003	mg/l	<0.003
pH	T7	F			8.1
Sulphate	T686	F	0.5	mg/l	35
Sulphide	T222	AR	0.1	mg/l	0.5
Sulphur (total)	T154	AR	0.01	mg/l	11
Thiocyanate	T4	AR	1	mg/l	<1
TPH (C10-C40)	T219	AR	20	µg/l	320

Method Index

Value	Description
T7	Probe
T281	ICP/MS (Filtered)
T4	Colorimetry
T219	GC/FID (SE)
T149	GC/MS (SIR)
T222	Colorimetric (Ammonium Molybdate)
T154	ICP/OES (Sim)(PreconcB)
T546	Colorimetry (CF)
T686	Discrete Analyser

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
As (Dissolved)	T281	F	0.0002	mg/l	U	001-006
B (Dissolved)	T281	F	0.05	mg/l	U	001-006
Cd (Dissolved)	T281	F	0.00002	mg/l	U	001-006
Cr (Dissolved)	T281	F	0.001	mg/l	U	001-006
Cu (Dissolved)	T281	F	0.0005	mg/l	U	001-006
Pb (Dissolved)	T281	F	0.0003	mg/l	U	001-006
Hg (Dissolved)	T281	F	0.00005	mg/l	U	001-006
Ni (Dissolved)	T281	F	0.001	mg/l	U	001-006
Se (Dissolved)	T281	F	0.0005	mg/l	U	001-006
Zn (Dissolved)	T281	F	0.002	mg/l	U	001-006
Cyanide(free)	T546	F	0.01	mg/l	U	001-006
Cyanide(Total)	T546	F	0.01	mg/l	U	001-006
Phenols(Mono)	T546	F	0.02	mg/l	U	001-006
Chromium VI	T686	F	0.003	mg/l	U	001-006
pH	T7	F			N	001-006
Sulphate	T686	F	0.5	mg/l	U	001-006
Sulphide	T222	AR	0.1	mg/l	N	001-006
Sulphur (total)	T154	AR	0.01	mg/l	N	001-006
Thiocyanate	T4	AR	1	mg/l	N	001-006
TPH (C10-C40)	T219	AR	20	µg/l	U	001-006
Naphthalene	T149	AR	0.01	µg/l	U	001-006
Acenaphthylene	T149	AR	0.01	µg/l	U	001-006
Acenaphthene	T149	AR	0.01	µg/l	U	001-006
Fluorene	T149	AR	0.01	µg/l	U	001-006
Phenanthrene	T149	AR	0.01	µg/l	U	001-006
Anthracene	T149	AR	0.01	µg/l	U	001-006
Fluoranthene	T149	AR	0.01	µg/l	U	001-006
Pyrene	T149	AR	0.01	µg/l	U	001-006
Benzo(a)Anthracene	T149	AR	0.01	µg/l	U	001-006
Chrysene	T149	AR	0.01	µg/l	U	001-006
Benzo(b)fluoranthene	T149	AR	0.01	µg/l	N	001-006
Benzo(k)fluoranthene	T149	AR	0.01	µg/l	U	001-006
Benzo(a)Pyrene	T149	AR	0.01	µg/l	U	001-006
Indeno(123-cd)Pyrene	T149	AR	0.01	µg/l	U	001-006
Dibenzo(ah)Anthracene	T149	AR	0.01	µg/l	U	001-006
Benzo(ghi)Perylene	T149	AR	0.01	µg/l	U	001-006
PAH(total)	T149	AR	0.01	µg/l	N	001-006



APPENDIX VII
GEOTECHNICAL LABORATORY RESULTS

APPENDIX VII **GEOTECHNICAL LABORATORY RESULTS**





Contract Number: 41038

Client Ref: **1CO106158**

Report Date: **17-10-2018**

Client PO: **5553**

Client **REC Ltd**
Capital Business Centre
22 Carlton Road
South Croydon
CR2 0BS

Contract Title: **Proposed Reading Secondary School**
For the attention of: **alistair Brooke**

Date Received: **03-10-2018**

Date Commenced: **03-10-2018**

Date Completed: **17-10-2018**

Test Description	Qty
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	2
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	2
PSD Wet Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	7
Intact Dry Density ASTM - @ Non Accredited Test	3
Immediate Shear Strength - set of 3 60 x 60 mm Shear Box Specimens by Direct Shearing (note suitable for free draining material only) BS 1377:1990 - Part 7 : 4 - * UKAS	3
Disposal of samples for job	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

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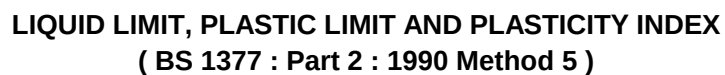
Approved Signatories:

Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager)

Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative/Accounts Assistant)

Wayne Honey (Administrative/Quality Assistant)





Contract Number

41038

Site Name

Proposed Reading Secondary School

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

The chart is a Liquid Limit - Plasticity Index (LL - PI) plot. The x-axis represents the Liquid Limit (LL) in percent, ranging from 0 to 120. The y-axis represents the Plasticity Index (PI) in percent, ranging from 0 to 90. The chart is divided into several regions by vertical and horizontal lines. The regions are labeled as follows:

- CL** (Clay Low Plasticity): LL < 40, PI < 7
- CI** (Clay Intermediate Plasticity): 40 < LL < 60, 7 < PI < 17
- CH** (Clay High Plasticity): 60 < LL < 80, PI > 17
- CV** (Clay Very High Plasticity): 80 < LL < 100, PI > 17
- CE** (Clay Extra High Plasticity): LL > 100, PI > 17
- ML** (Silt Low Plasticity): LL < 40, PI < 7
- MI** (Silt Intermediate Plasticity): 40 < LL < 60, PI < 7
- MH** (Silt High Plasticity): 60 < LL < 80, PI < 7
- MV** (Silt Very High Plasticity): 80 < LL < 100, PI < 7
- ME** (Silt Extra High Plasticity): LL > 100, PI < 7

A data point is plotted at approximately (42, 26), which falls within the **CI** region. The chart also shows a horizontal line at PI = 7 and a diagonal line (A-line) that defines the upper boundary for the liquid limit.





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

41038

Borehole/Pit No.

BH01

Site Name

Proposed Reading Secondary School

Sample No.

4

Soil Description

Brown fine to coarse sandy fine to coarse GRAVEL.

Depth Top

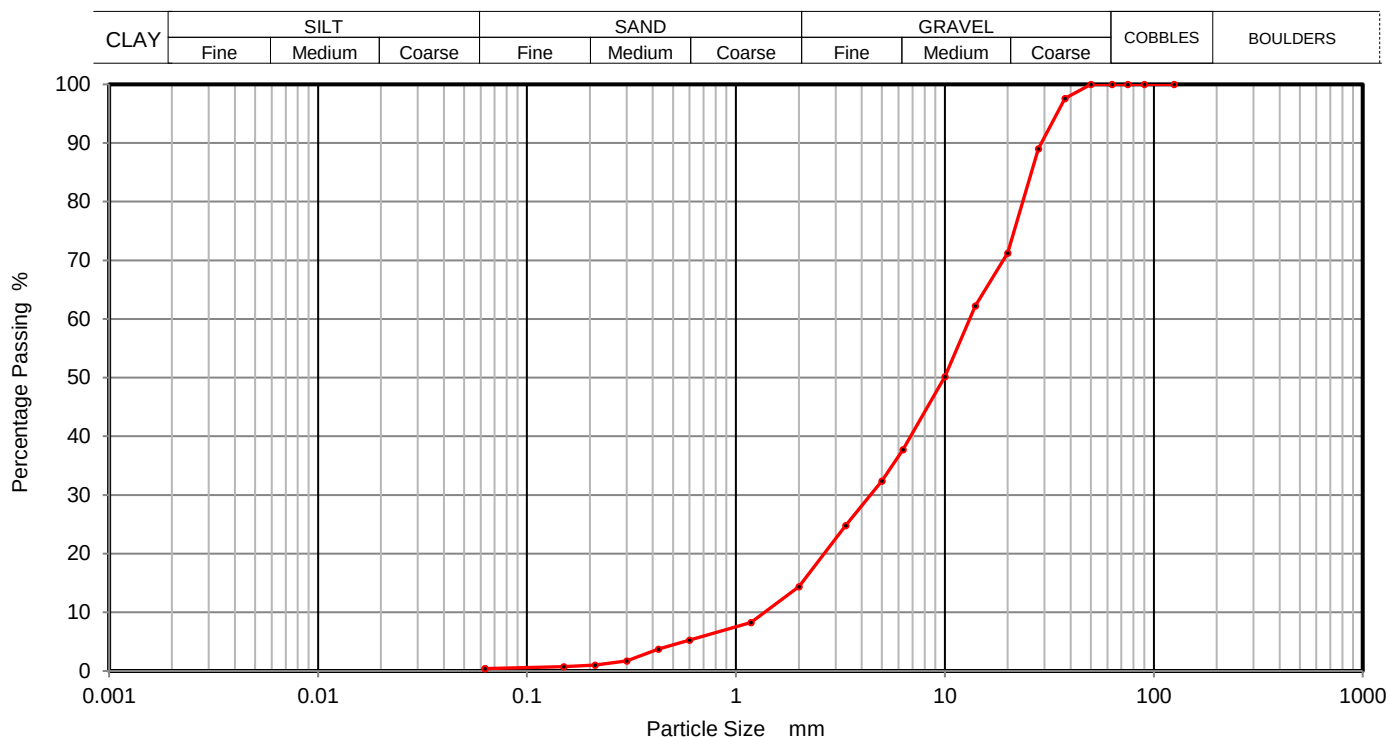
4.00

Depth Base

4.50

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	98		
28	89		
20	71		
14	62		
10	50		
6.3	38		
5	32		
3.35	25		
2	14		
1.18	8		
0.6	5		
0.425	4		
0.3	2		
0.212	1		
0.15	1		
0.063	0		

Sample Proportions	% dry mass
Cobbles	0
Gravel	86
Sand	14
Silt and Clay	0

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	16/10/2018	Emma Sharp	
RO/MH	Approved	17/10/2018	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

41038

Borehole/Pit No.

BH02

Site Name

Proposed Reading Secondary School

Sample No.

4

Soil Description

Brown silty fine to coarse sandy fine to coarse GRAVEL.

Depth Top

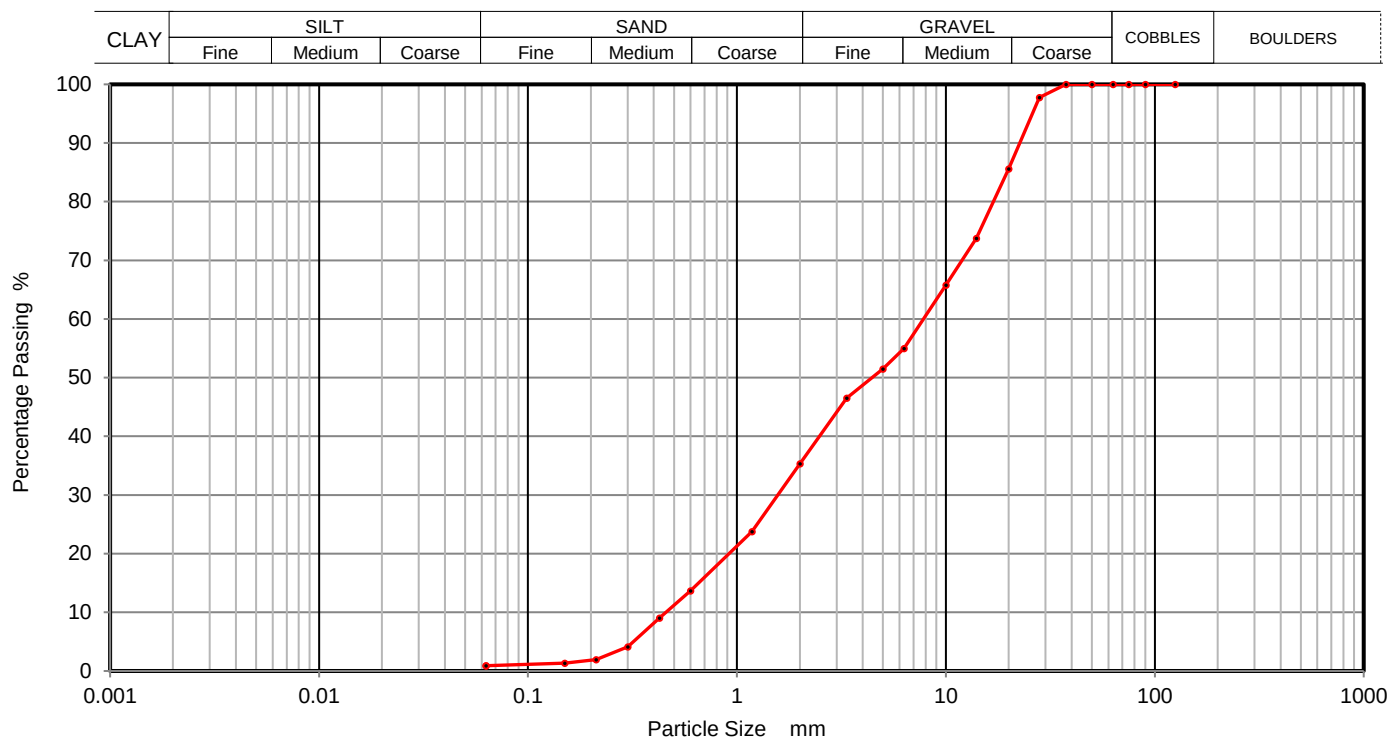
4.00

Depth Base

4.50

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	100		
37.5	100		
28	98		
20	86		
14	74		
10	66		
6.3	55		
5	51		
3.35	47		
2	35		
1.18	24		
0.6	14		
0.425	9		
0.3	4		
0.212	2		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Cobbles	0
Gravel	65
Sand	34
Silt and Clay	1

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	16/10/2018	Emma Sharp	
RO/MH	Approved	17/10/2018	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

41038

Borehole/Pit No.

BH02

Site Name

Proposed Reading Secondary School

Sample No.

8

Soil Description

Brown fine to coarse slightly sandy fine to coarse GRAVEL.

Depth Top

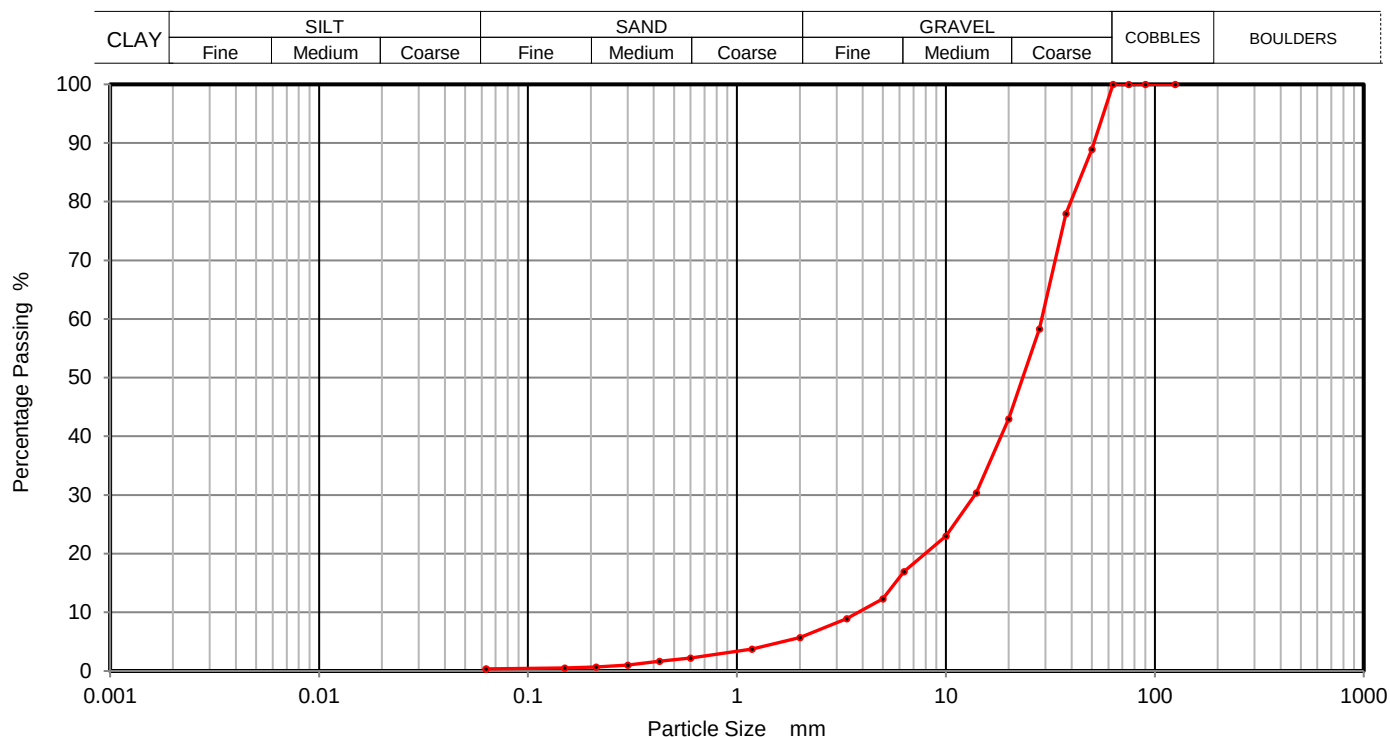
8.00

Depth Base

8.50

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	89		
37.5	78		
28	58		
20	43		
14	30		
10	23		
6.3	17		
5	12		
3.35	9		
2	6		
1.18	4		
0.6	2		
0.425	2		
0.3	1		
0.212	1		
0.15	1		
0.063	0		

Sample Proportions	% dry mass
Cobbles	0
Gravel	94
Sand	6
Silt and Clay	0

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	16/10/2018	Emma Sharp	
RO/MH	Approved	17/10/2018	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number **41038**

Borehole/Pit No. **BH03**

Site Name **Proposed Reading Secondary School**

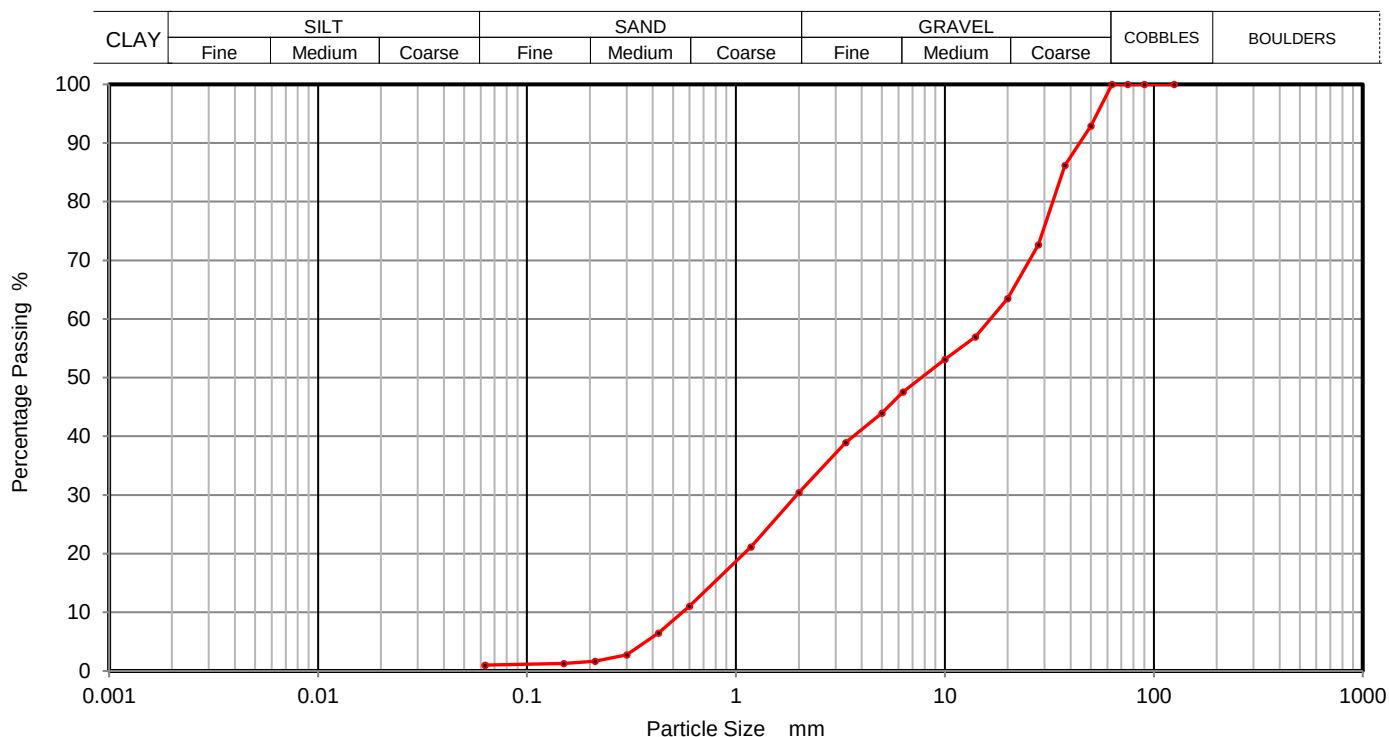
Sample No. **7**

Soil Description
Brown silty fine to coarse sandy fine to coarse GRAVEL.

Depth Top **7.00**

Depth Base **7.50**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	93		
37.5	86		
28	73		
20	64		
14	57		
10	53		
6.3	48		
5	44		
3.35	39		
2	30		
1.18	21		
0.6	11		
0.425	6		
0.3	3		
0.212	2		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Cobbles	0
Gravel	70
Sand	29
Silt and Clay	1

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	16/10/2018	Emma Sharp	
RO/MH	Approved	17/10/2018	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

41038

Borehole/Pit No.

BH04

Site Name

Proposed Reading Secondary School

Sample No.

5

Soil Description

Brown silty fine to coarse sandy fine to coarse GRAVEL.

Depth Top

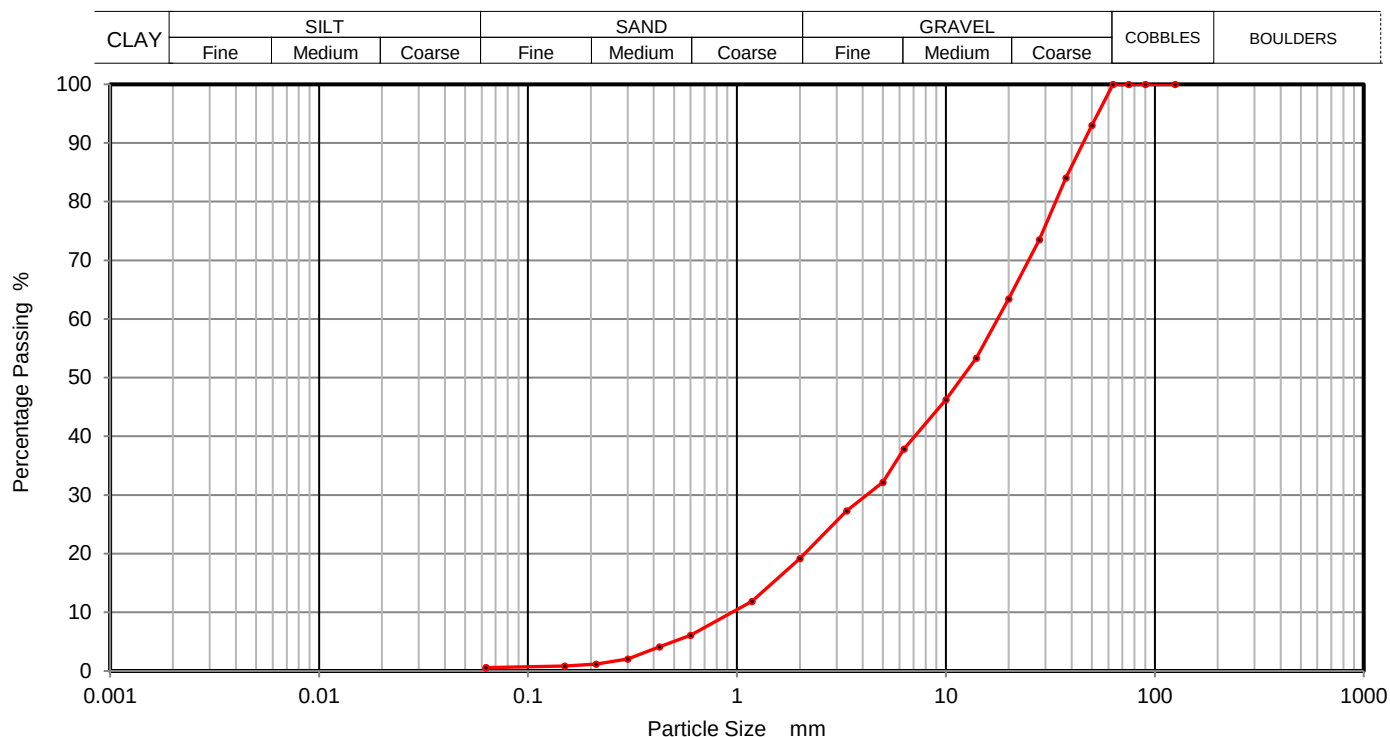
4.00

Depth Base

4.50

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	93		
37.5	84		
28	74		
20	63		
14	53		
10	46		
6.3	38		
5	32		
3.35	27		
2	19		
1.18	12		
0.6	6		
0.425	4		
0.3	2		
0.212	1		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Cobbles	0
Gravel	81
Sand	18
Silt and Clay	1

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	16/10/2018	Emma Sharp	
RO/MH	Approved	17/10/2018	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

41038

Borehole/Pit No.

BH04

Site Name

Proposed Reading Secondary School

Sample No.

8

Soil Description

Brown fine to coarse sandy fine to coarse GRAVEL.

Depth Top

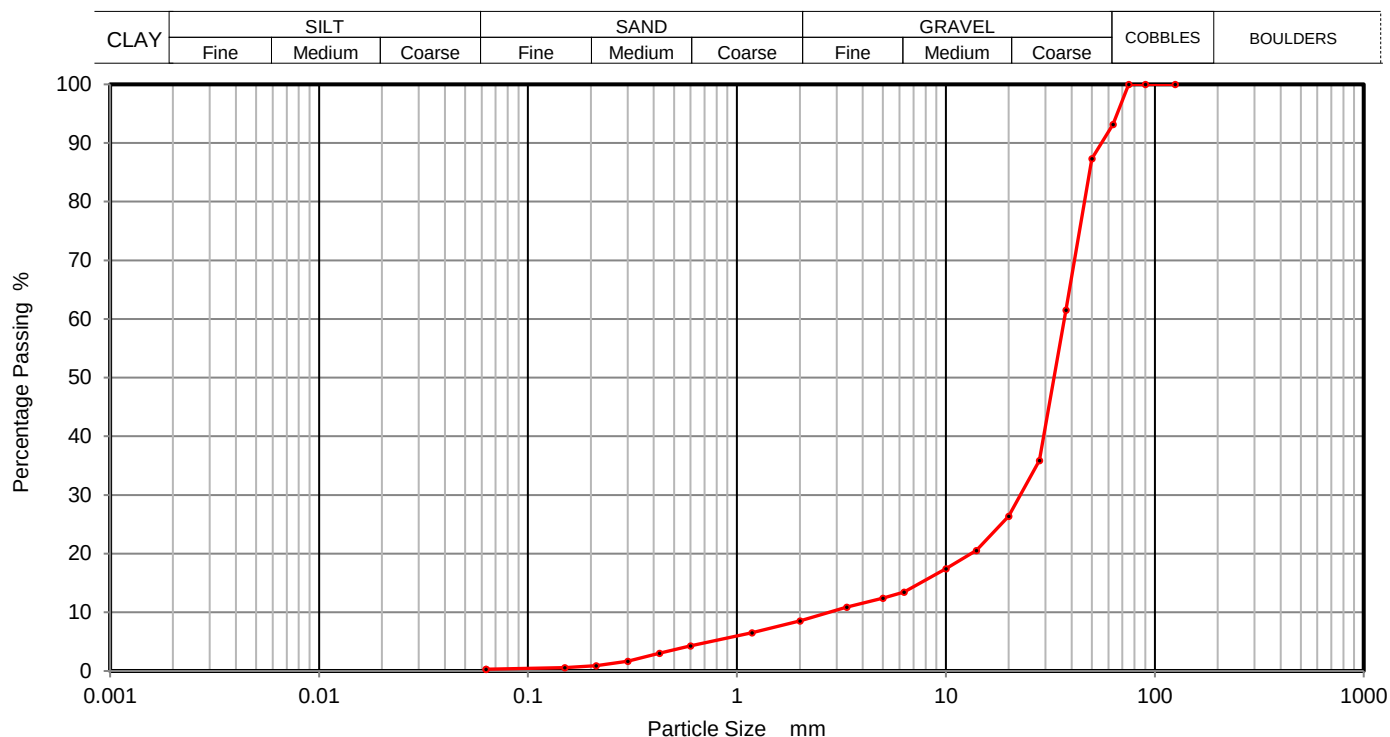
6.50

Depth Base

7.00

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	93		
50	87		
37.5	62		
28	36		
20	26		
14	21		
10	17		
6.3	13		
5	12		
3.35	11		
2	9		
1.18	7		
0.6	4		
0.425	3		
0.3	2		
0.212	1		
0.15	1		
0.063	0		

Sample Proportions	% dry mass
Cobbles	7
Gravel	84
Sand	9
Silt and Clay	0

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	16/10/2018	Emma Sharp	
RO/MH	Approved	17/10/2018	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number

41038

Borehole/Pit No.

BH05

Site Name

Proposed Reading Secondary School

Sample No.

4

Soil Description

Brown silty fine to coarse sandy fine to coarse GRAVEL.

Depth Top

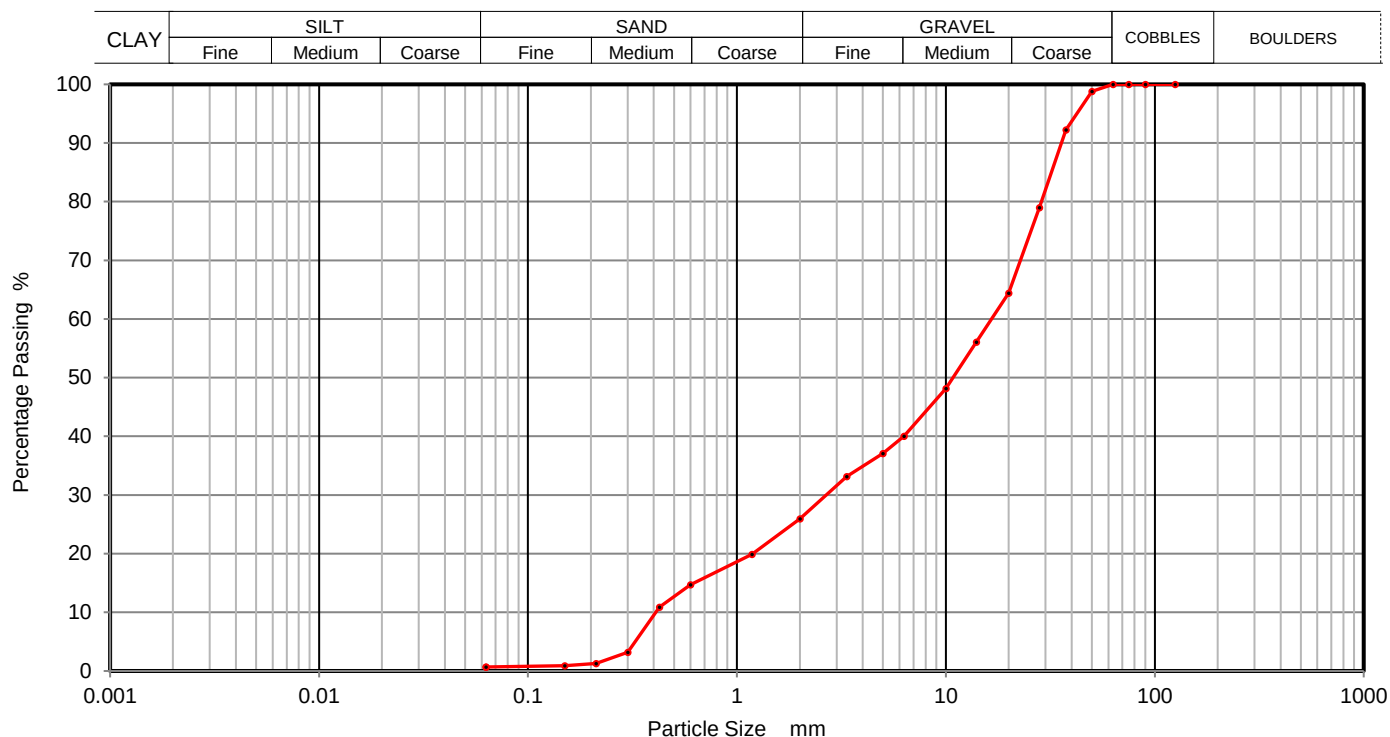
4.00

Depth Base

4.50

Sample Type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	
90	100	0.0060	
75	100	0.0019	
63	100		
50	99		
37.5	92		
28	79		
20	64		
14	56		
10	48		
6.3	40		
5	37		
3.35	33		
2	26		
1.18	20		
0.6	15		
0.425	11		
0.3	3		
0.212	1		
0.15	1		
0.063	1		

Sample Proportions	% dry mass
Cobbles	0
Gravel	74
Sand	25
Silt and Clay	1

Grading Analysis	
Uniformity Coefficient	

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operators	Checked	16/10/2018	Emma Sharp	
RO/MH	Approved	17/10/2018	Paul Evans	





Laboratory Report



GEO Site & Testing Services Ltd

Contract Number: 41384

Client Ref: **1CO106158**

Report Date: **29-10-2018**

Client PO: **5553**

Client **REC Ltd**
Capital Business Centre
22 Carlton Road
South Croydon
CR2 0BS

Contract Title: **Proposed Reading Secondary School**
For the attention of: **alistair Brooke**

Date Received: **25-10-2018**

Date Commenced: **25-10-2018**

Date Completed: **29-10-2018**

Test Description	Qty
Large Shear Box 300mm Peak with 3 confining pressures includes remoulding BS 1377:1990 - Part 7 : 5 and Specification for Highway Works Vol.1 Clause 636 Part 2 - @ Non Accredited Test	1
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:

Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager)

Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative/Accounts Assistant)

Wayne Honey (Administrative/Quality Assistant)

GEO Site & Testing Services Ltd

Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN

Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

Test Report: CONSOLIDATED DRAINED LARGE SHEARBOX TEST.

BS1377:Part 7:5 :1990.

Borehole Number: BH06 + BH03 Depth from (m): 3.50 - 4.0 + 4.0 - 4.5
Sample Number : 6 + 4 Depth to (m): 0.00

Sample Type:	B
Particle Density - Mg/m ³ :	2.65 (Assumed)
Specimen Tested:	At natural moisture content, Remoulded (Light Tamping) Material above 20mm removed.

Sample Description:

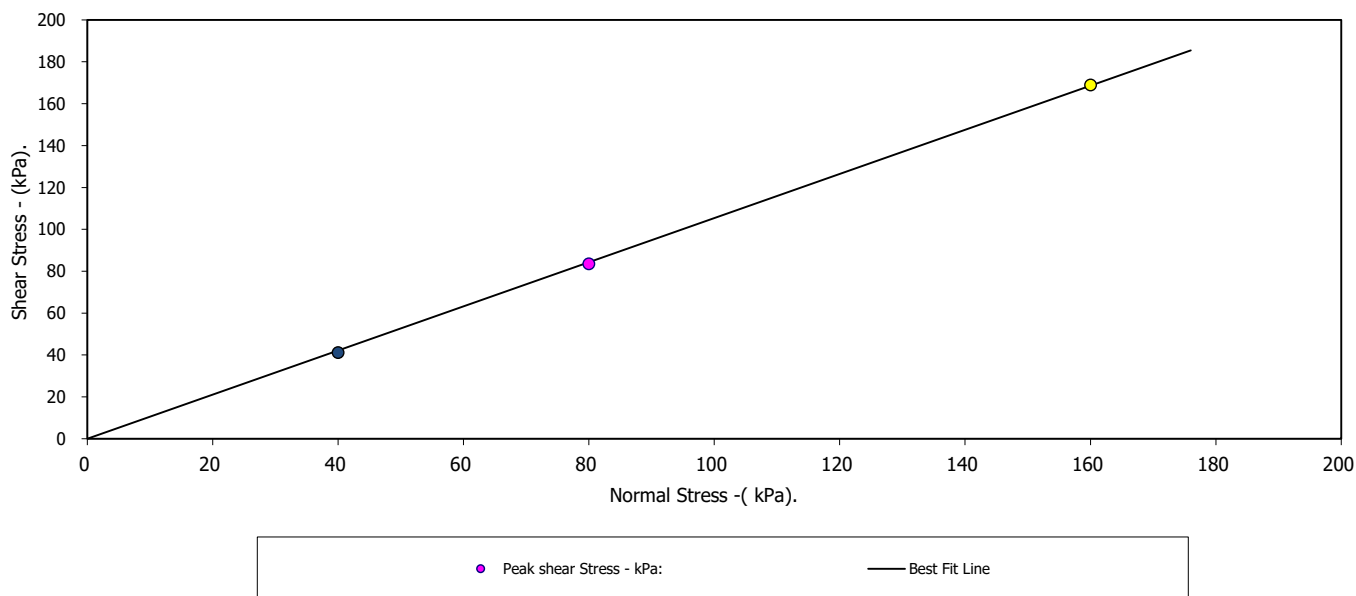
Brown fine to coarse sandy fine to medium GRAVEL

STAGE	1	2	3
Initial Conditions			
Height - mm:	131.00	131.00	131.00
Length - mm:	300.00	300.00	300.00
Moisture Content - %:	6	6	6
Bulk Density - Mg/m ³ :	1.93	1.93	1.93
Dry Density - Mg/m ³ :	1.83	1.83	1.83
Voids Ratio:	0.4512	0.4516	0.4510
Normal Pressure- kPa	40	80	160
Consolidation			
Consolidated Height - mm:	129.35	128.50	127.39
Shear			
Rate of Strain (mm/min)	1.500	1.500	1.500
Strain at peak shear stress (%)	16.85	26.30	24.65
Peak shear Stress - kPa:	41	84	169

PEAK

Angle of Shearing Resistance:(θ)	46.5
Effective Cohesion - kPa:	0

FAILURE CONDITIONS



D P Gans 29/10/18

Checked Pages 1-4 by: Date

D P Gans 29/10/18

Approved Pages 1-4 by: Date

Contract No.:

41384

Proposed Reading Secondary School

Client Ref Number:

1C0106158

Test Report: CONSOLIDATED DRAINED LARGE SHEARBOX TEST.

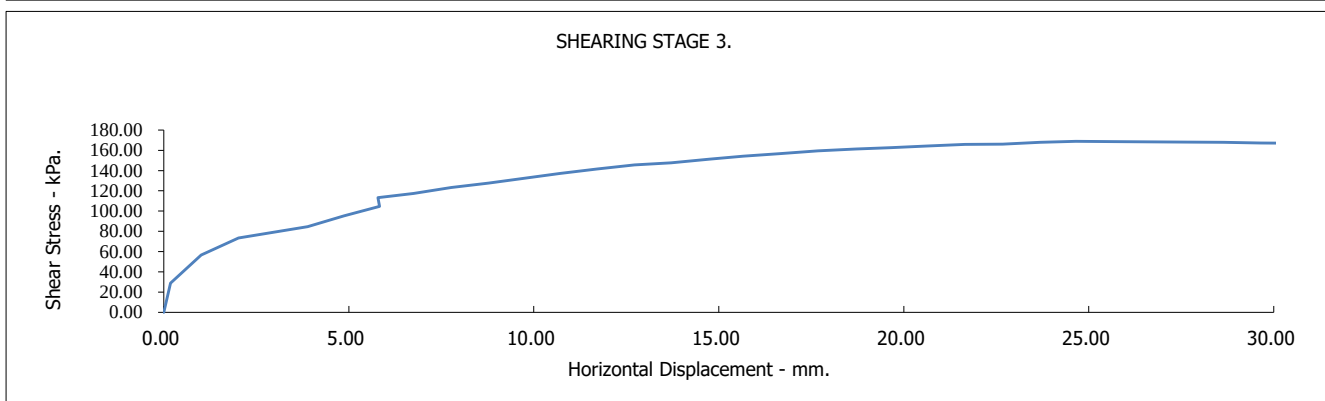
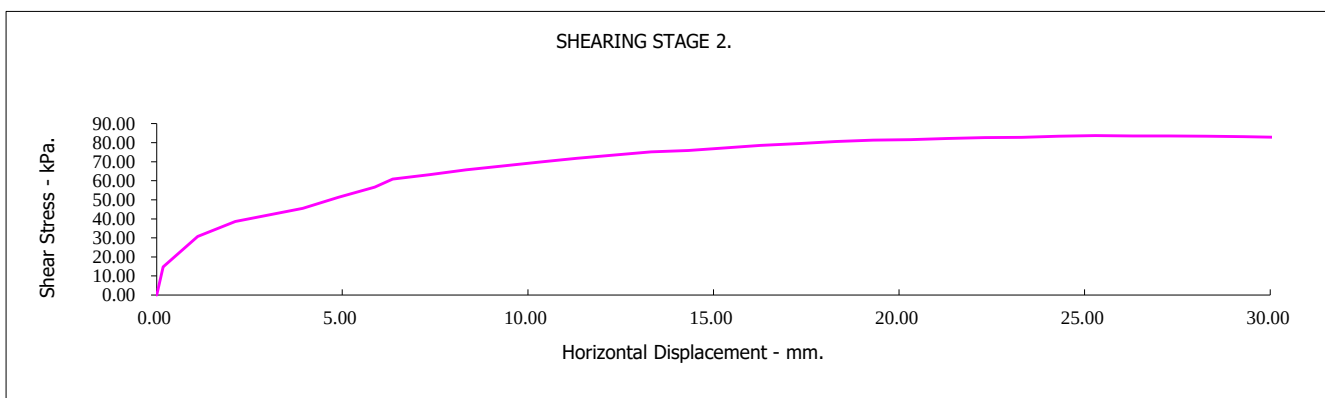
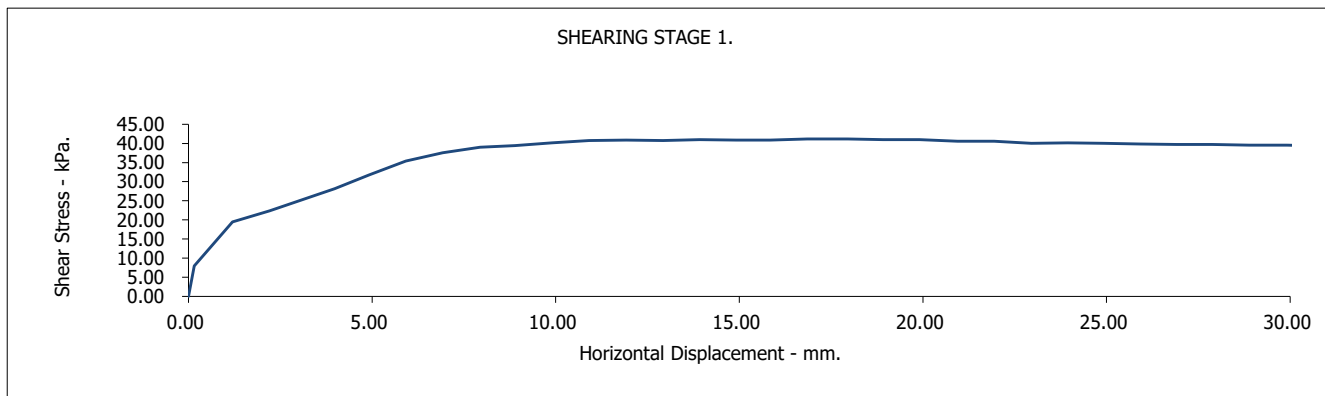
BS1377:Part 7:5 :1990.

Borehole/Sample Number:

BH06 + BH03

Depth (m):

3.50 - 4.0 + 4.0 - 4.5



Proposed Reading Secondary School

Contract No.:
41384

Client Ref Number:
1C0106158
Figure.

Test Report: CONSOLIDATED DRAINED LARGE SHEARBOX TEST.

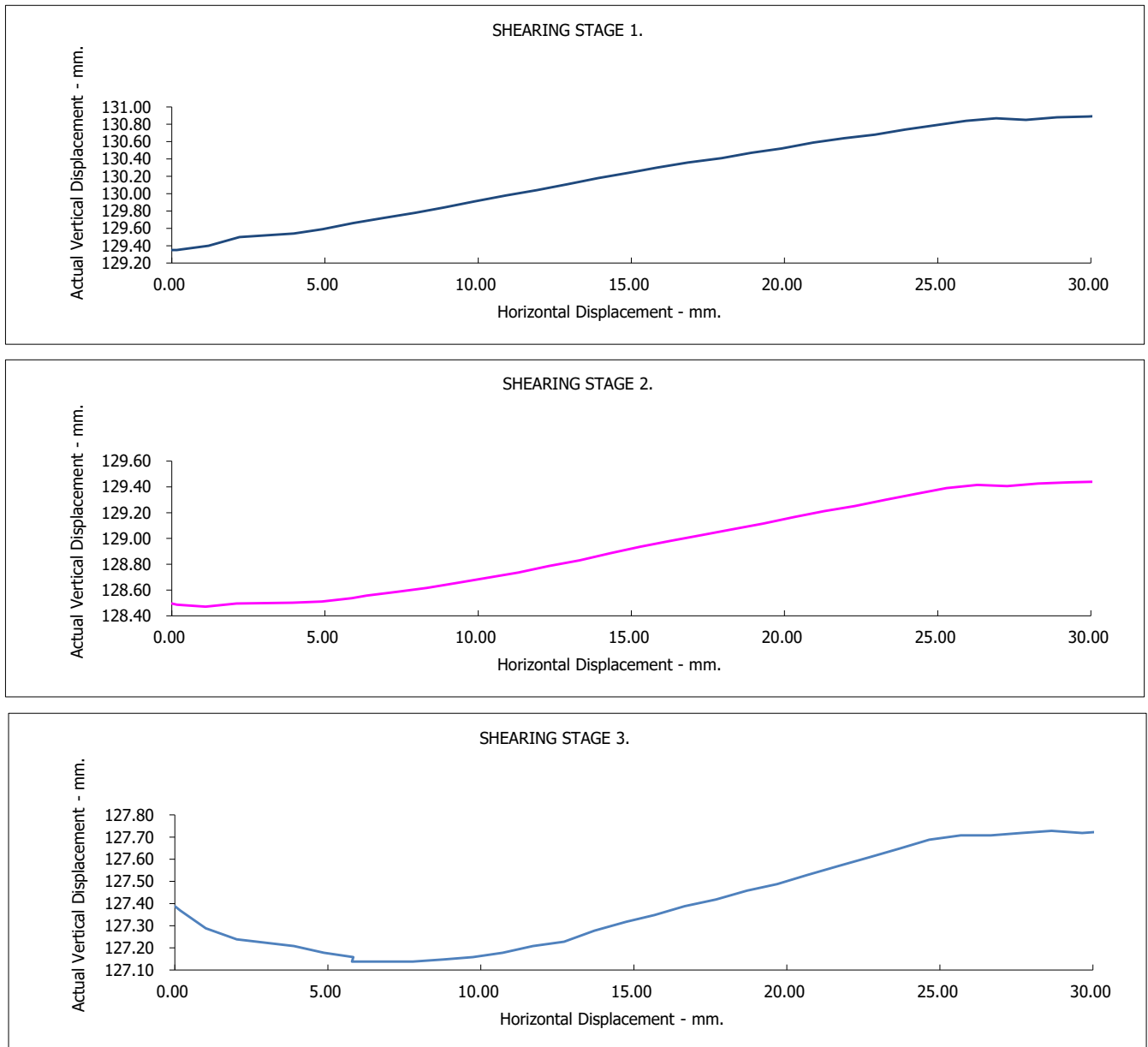
BS1377:Part 7:5 :1990.

Borehole/Sample Number:

BH06 + BH03

Depth (m):

3.50 - 4.0 + 4.0 - 4.5



Proposed Reading Secondary School

Contract No.:
41384

Client Ref Number:
1C0106158
Figure.

Test Report: CONSOLIDATED DRAINED LARGE SHEARBOX TEST.

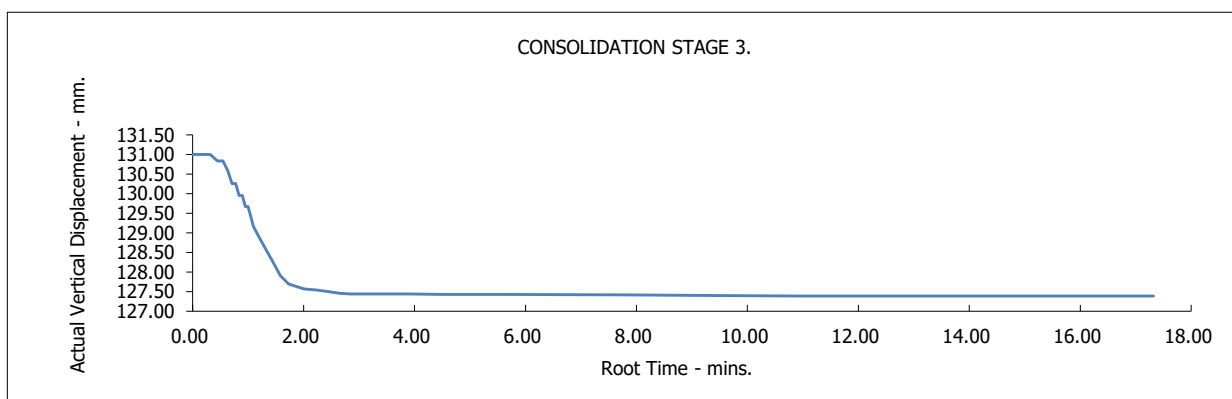
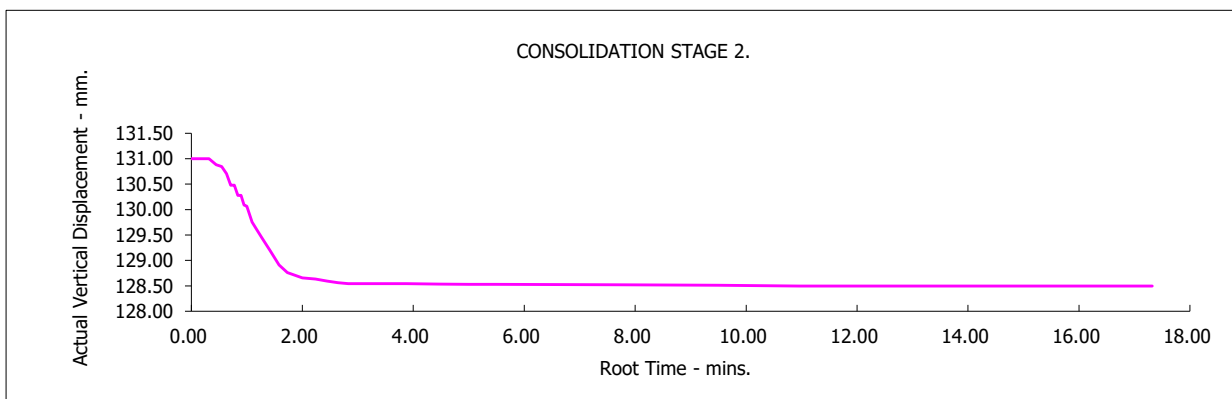
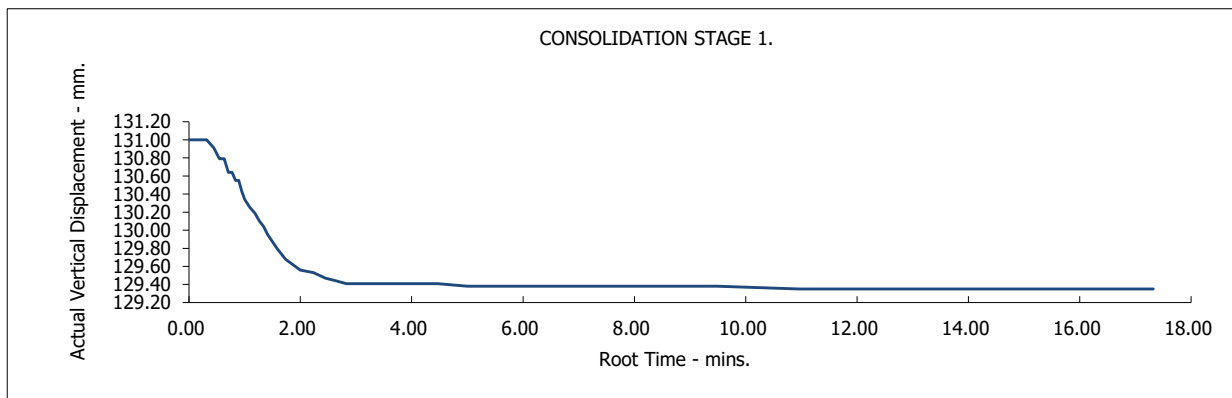
BS1377:Part 7:5 :1990.

Borehole/Sample Number:

BH06 + BH03

Depth (m):

3.50 - 4.0 + 4.0 - 4.5



Proposed Reading Secondary School

Contract No.:
41384

Client Ref Number:
1C0106158
Figure.