

Former Surgery at Hunter Street, Briton Ferry

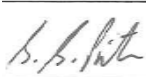
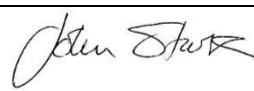
Ground Investigation & Mining Risk Assessment Interpretative Report

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FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

0.1 General

Recommendations made and opinions expressed in the report are based on the strata observed in the excavations, together with the results of site and laboratory tests. No responsibility can be held for conditions which have not been revealed by the Exploratory Holes or which occur between Exploratory Holes. Whilst the report may suggest the likely configuration of strata, both between Exploratory Holes and below the maximum depth of investigation, this is only indicative and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

0.2 Investigation Procedures

Cable Percussive Boreholes, Dynamic Probes and Machine Excavated Trial Pits for ground investigation have been employed within the project. All Exploratory Hole operations, sampling and logging of soils, rocks and in-situ testing complies with the recommendations of the British Code of Practice BS 5930: 2015 'Site Investigations', British Code of Practice BS 10175: 2011 +A1:2013 'Investigation of Potentially Contaminated Sites' and BS 1377: 1990, 'Methods of Test for Soils for Engineering Purposes'.

0.3 Routine Sampling

Representative bulk, disturbed and environmental samples of the different strata are taken following completion of logging. These samples are sealed and labelled in clear plastic bags and 2kg plastic tubs. Soil samples obtained for environmental testing are sampled and sealed in borosilicate amber jars or in specialist vessels where required. All samples are returned from site to QGL's laboratory for controlled storage within 24 hours of sampling to await test scheduling/requirements.

0.4 In-Situ Testing, Surveying & Instrumentation

In-situ testing comprised:

- Standard Penetration Testing within Boreholes (SPT)
- Dynamic probes
- Soakaway Testing

0.5 Groundwater

Where possible, the depth of entry of any influx of groundwater is recorded during the course of excavation or boring operations. The rate of inflow into the excavation or borehole is monitored during the course of the excavation or during boring procedures. Upon encountering any water strikes, work is temporarily halted and the water levels monitored for a standard twenty minute period recording the change in water level at the end of the twenty minutes.

Groundwater conditions observed in the excavations are those appertaining to the period of investigation. It should be noted, however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions or other causes.

0.6 Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded. Further to notifying the Engineer/ Client with one week's notice all soil and/or rock samples not tested will be discarded 28 days after submission of the approved final report.

1.0. INTRODUCTION

1.1 General

Upon the instruction of RB Planning (project engineer), acting on behalf of H Singh (the client), Quantum Geotechnical Ltd (QGL) has been commissioned to undertake a ground investigation for the proposed development of a new nursing home development on the site of the former surgery, Hunter's Street, Briton Ferry.

In this interpretative report, a factual account of the fieldwork, the strata encountered including contamination and groundwater observations are detailed. Guidance and recommendations on geotechnical matters and contamination issues are provided along with details on any remedial or mitigative measures deemed necessary.

1.2 Purpose of Ground Investigation

The investigation is required to address additional risks/outstanding geotechnical and geo-environmental issues identified from the initial desk top investigation report by Phlorum in 2017, this report was not available to QGL. In order to allow a site-specific geotechnical and environmental assessment of existing ground conditions which will aid foundation design, identify any other potential geotechnical issues that may be present within the shallow ground on site and assess any risk to human health or the environment from potential contamination sources. The intrusive investigation works comprised a series of cable percussion boreholes along with trial pits with in-situ soakaway tests and dynamic probe tests including post fieldwork geotechnical and environmental testing.

1.3 Scope of Work

The general scope of work undertaken in the preparation of this assessment was as follows:

- Obtain a Coal Authority report highlighting if coal/coal workings are present at the site.
- Provide an interpretative report presenting an analysis of the available information and offering recommendations on site suitability for the proposed development with regards to geotechnical parameters including bearing capacities and any revealed contamination and environmental issues.

General notes on the techniques employed by Quantum Geotechnical are described in the Foreword together with the limitations inherent in carrying out ground investigation work.

2.0 SITE DETAIL

2.1 Site Description

The area under investigation lies within the former surgery, carpark and grassed area to the rear of the surgery, Hunter Street, Briton Ferry. The site comprises an irregular shaped parcel of land approximately 80m by 45m. The proposed site is currently a derelict former surgery, flat level carpark and with a flat (approximately 15m by 20m) grassed area to the rear of the building.

The approximate National Grid Reference of the site is SN 274093, 194193 with the nearest postcode being SA11 2SF. The site location and development proposal is indicated in Figure 1 included in Appendix I.

2.2 Published Geology

The published geological map covering the site is British Geological Survey (BGS) Sheet 227 'Swansea' (solid and drift edition) – 1:50,000 Scale.

2.2.1 Superficial Geology

Tidal flat deposits are shown to underlay the site. This strata generally consists of clay, silt and sand.

2.2.2 Solid Geology

The site is shown to be underlain by the rocks of the Rhondda Member, typically comprising of Sandstone Bedrock.

2.2.3 Structural Geology

No faults are located within the site boundary with the closest being an unknown fault located approximately 3km south of the site, striking north to south, with a general dip direction of between 20-30°.

2.3 Mining

No evidence of non-metalliferous or mineral mining has been identified in the vicinity of the site.

2.4 Hydrology & Hydrogeology

The nearest river is the river Neath, located approximately 1km to the west of the site.

2.5 Statutory Service Information

QGL undertook full Cable Avoidance Tool (CAT) scans of each exploratory hole location before breaking the ground, on site services were checked and located. Safe digging practices in accordance with HS(G)47 were employed when breaking and excavating grounds with all traceable services demarcated prior to works commencing.

2.6 Coal Authority Mining Report

A Coal Authority Mining Report (Ref: 51001774745001) has been purchased by QGL and is presented in Appendix VIII.

The Mining Report states that the site is not within a surface area that could be affected by past underground mining.

The Mining report also states there are no known coal mine entries within, or within 20 metres of, the boundary of the property.

3.0 FIELDWORK

3.1 General

Between 22nd to the 29th of January 2018, Quantum undertook a Ground Investigation within the confines of the former surgery, Hunter Street, Port Talbot. Site supervision and attendance by an Engineering Geologist from Quantum was undertaken on all aspects of the site works and subsequent reinstatement works of all exploratory hole locations. All service plans were held onsite, with all Site Personnel inducted by QGL and briefed of the pertinent Risk Assessments and Method Statements relating to the tasks to be undertaken.

All exploratory hole locations were subject to the hand excavation of a 1.2m deep service/ utility inspection pit prior to any drilling. Also each area of investigation was fully CAT ('Cable Avoidance Tool') scanned prior to breaking ground.

A summary of the fieldworks is outlined below:

- 2 No. Cable Percussion boreholes
- 3 No. Trial Pits with in-situ soakaway testing
- 6 No. Dynamic probe tests

3.2 Exploratory Hole Locations

The exploratory hole locations were set out by a QGL Engineering Geologist at positions previously agreed with the Client. Upon completion each bore hole was backfilled using either bentonite pellets or a ground water/gas monitoring standpipe. Trial Pits were backfilled with arisings and compacted in 300mm layers.

An Exploratory Hole Location Plan is presented as Figure 2 in Appendix I.

3.3 Cable Percussion Boreholes

Light cable tool percussive techniques were used to sink two (2 No.) boreholes through the overlying Made Ground and Superficial deposits. Representative bulk disturbed and small disturbed samples were recovered from each borehole throughout the boring works for geotechnical characterisation of the underlying ground conditions. The samples recovered from the boreholes were logged in accordance with BS5930:2015; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004, and supervised at all times by an Engineering Geologist from QGL.

Table 1 below details the termination depths of the Cable Percussive Boreholes and the strata at the termination depth.

Table 1: Cable Percussion boreholes termination depth

Exploratory Hole ID	Termination Depth (mbgl)	Terminating Strata	Notes/Reason for Termination
BH01	13.30	Dense sandy Gravel with medium to high cobble and boulder content (Gravels)	BH refused within dense gravels
BH02	14.20	Dense sandy Gravel with medium to high cobble and boulder content (Gravels)	BH refused within dense gravels

A complete set of Engineering Geologist's logs for the Cable Percussive Boreholes are presented in Appendix II.

3.4 Machine Excavated Trial Pits

3 No. Trial Pits were excavated using an 5 Tonne tracked excavator at the positions shown on the exploratory hole location plan in Appendix I. The purpose of these pits was to assess the shallow ground conditions for contamination/ aid in foundation design and conduct in-situ soakaway tests within the base of the trial pits.

This method of investigation allows direct sampling of the near surface deposits for identification purposes, as well as assessment of any salient features and Made Ground or disturbed ground. The trial pits were logged in accordance with BS5930:2015; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004, and supervised at all times by an Engineering Geologist from QGL.

All of the trial pits were backfilled with compacted layers of arisings with suitable surface reinstatement where required.

Geotechnical and Environmental samples were taken within the superficial deposits for laboratory testing purposes.

Details of the Trial Pits, including final depths in metres below ground level (mbgl) are provided in Table 2:

Table 2: Trial Pit termination depth

Exploratory Hole ID	Terminated Depth (mbgl)	Reason for Termination	Comments
TP01	1.00	Concrete Encountered	
TP02	2.00	Natural Strata Encountered/Proven	Made Ground to 1.00mbgl
TP03	3.00	Natural Strata Encountered/Proven	Made Ground to 1.00mbgl

A complete set of Engineering Geologist's Machine Excavated Trial Pit logs are presented within Appendix III.

3.5 In-Situ Testing

3.5.1 Standard Penetration Testing

Standard penetration tests (SPTs) were undertaken throughout the superficial deposits in the boreholes at intervals of every 1.5m.

This is a dynamic test as described in BS1377 (Part 9) and as superseded by BS EN ISO 22476-3:2005 +A1:2011, and is a measure of the density of the soil or rock. Within fine grained or cohesive soils, the test incorporates a small diameter tube (650mm length, 50mm external diameter and 35mm internal diameter) with a cutting shoe known as the 'split barrel sampler'. The sampler is forced into the soil dynamically using blows from a 63.5kg hammer dropped through 760mm. The sampler is initially advanced 150mm into the soil with seating blows, then the number of blows required to advance the sampler each 75mm increment up to a depth of 300mm is recorded. This cumulative total number of blows over the 300mm test is referred to as the "N" value. For coarse gravels and bedrock the split barrel is replaced by a 60° cone [SPT(c)].

SPT and SPT(c) results are detailed within the relevant Borehole Logs in Appendices II.

3.5.2 Dynamic Probe Testing

Six super heavy dynamic probes (DP) were undertaken at agreed positions during the fieldwork at locations detailed on the exploratory hole plan presented as Figure 2 in Appendix I. Super Heavy Dynamic Probe testing involves recording the blow counts for every 100mm of driving (N100), using the automated 63.5kg drop hammer and 15cm² cone point. Dynamic probing determines the resistance of soils in-situ to the intermittent penetration of a 90° cone when driven dynamically in a standard manner, a continuous record is provided with respect to depth of the resistance of the cone. The information submitted is recorded as the number of blows to drive the cone each 100mm increment, it is then possible to convert this data and calculate the ground bearing capacity available.

Table 3 presents the details of the dynamic probes undertaken

Probe ID	Date Tested	Probe Type	Location	Termination Depth (mbgl)	Notes/Reason for Termination
DP01	29/01/18	DPSH-B*	On raised walkway	2.00	DP refusal
DP02	29/01/18	DPSH-B*	On raised walkway	5.40	DP refusal
DP03	29/01/18	DPSH-B*	On raised walkway	10.00	
DP04	29/01/18	DPSH-B*	Within grassed area	10.00	
DP05	29/01/18	DPSH-B*	Within carpark	10.00	
DP06	29/01/18	DPSH-B*	Within carpark	10.00	

Table 3: Details of Dynamic probes (*DPSH-B – Super Heavy Dynamic Probe)

Each of the holes were backfilled with bentonite pellets upon completion. A complete set of Dynamic probe logs are presented in Appendix IV.

3.5.3 Soakaway Tests

Two Soakaway tests were performed in Trial Pit 2 and Trial Pit 3 at 2.0mbgl, the results of which are presented in Appendix III.

3.6 Sampling - General

Geotechnical bulk and disturbed samples were taken where required within the superficial deposits for strata identification and laboratory testing purposes. In addition, environmental samples were taken for laboratory testing.

All environmental samples were sent to the laboratory within 24-36 hours of having been obtained, whilst geotechnical samples were returned from site to QGL's laboratory for controlled storage to await test scheduling/requirements. For specific details of laboratory testing see Section 4.0. Sample type and sample depth are recorded on the Engineering Geologist's Exploratory Hole Logs found within Appendices II and III.

3.7 Landgas and Groundwater Monitoring

Two boreholes were installed with 50mm Ø HDPE combined landgas and groundwater monitoring standpipes to permit post-fieldwork monitoring visits. Table 4 details the installations undertaken.

Table 4: Borehole Installation Detail

Exploratory Hole ID	Installation Depth (mbgl)	Installation Response Zone (mbgl)
BH01	7.00	1.00m-7.00m
BH02	7.00	1.00m-7.00m

Each post-fieldwork monitoring visit included the measurement of the following parameters:

- O₂ (% v/v)
- CH₄ (% v/v)
- H₂S (ppm)
- CO (% v/v)
- Flow Rate (l/hr)
- Atmospheric Pressure (mb)
- Groundwater Level (mbgl/ mAOD)

The results of these visits are presented in Appendix V and discussed further in Section 7.4.

4.0 LABORATORY TESTING

4.1 General

The laboratory testing was scheduled by Quantum and comprised a number of geotechnical and environmental tests on selected soil and soil leachate samples obtained during the investigation.

4.2 Geotechnical Laboratory Testing

All the geotechnical soil testing work was carried out in accordance with the procedures stipulated in the various sections of BS 1377:1990 Parts 1 - 9 Methods of test for soils for civil engineering purposes. Table 5 details the tests undertaken.

Table 5: Geotechnical Tests Undertaken

Type of Test	No of Tests
Moisture Content	4
PSD Wet Sieve	4

A full set of geotechnical laboratory test certificates are provided within Appendix VI

4.3 Geo-environmental Laboratory Testing

Geo-environmental testing was carried out on selected soil, soil leachate and groundwater samples gained from the ground investigation. The purpose of the testing is to gain a holistic view of any raised levels of contaminants that may exist onsite. Table 6 details Geo-environmental tests undertaken on selected soil samples with Table 7a listing tests undertaken on soil leachate and groundwater samples.

Table 6: Geo-environmental tests undertaken on soil samples

Analytical Parameter (Soil Analysis)	Accreditation Status	No of Tests	Analytical Parameter (Soil Analysis)	Accreditation Status	No of Tests
Asbestos in Soil	ISO 17025	4	Boron (water soluble)	MCERTS	4
General			Cadmium (aqua regia extractable)	MCERTS	4
pH - Automated	MCERTS	4	Chromium (aqua regia extractable)	MCERTS	4
Total Cyanide	MCERTS	4	Copper (aqua regia extractable)	MCERTS	4
Water Sol. Sulphate as SO ₄	MCERTS	4	Lead (aqua regia extractable)	MCERTS	4
Organic Matter	MCERTS	4	Mercury (aqua regia extractable)	MCERTS	4
			Nickel (aqua regia extractable)	MCERTS	4
			Selenium (aqua regia extractable)	MCERTS	4
Total Phenols			Vanadium (aqua regia extractable)	MCERTS	4
Total Phenols (monohydric)	MCERTS	4	Zinc (aqua regia extractable)	MCERTS	4

Speciated PAHs			Petroleum Hydrocarbons		
Naphthalene	MCERTS	4	TPH-CWG - Aliphatic >EC5 - EC6	MCERTS	4
Acenaphthylene	MCERTS	4	TPH-CWG - Aliphatic >EC6 - EC8	MCERTS	4
Acenaphthene	MCERTS	4	TPH-CWG - Aliphatic >EC8 - EC10	MCERTS	4
Fluorene	MCERTS	4	TPH-CWG - Aliphatic >EC10 - EC12	MCERTS	4
Phenanthrene	MCERTS	4	TPH-CWG - Aliphatic >EC12 - EC16	MCERTS	4
Anthracene	MCERTS	4	TPH-CWG - Aliphatic >EC16 - EC21	MCERTS	4
Fluoranthene	MCERTS	4	TPH-CWG - Aliphatic >EC21 - EC35	MCERTS	4
Pyrene	MCERTS	4	TPH-CWG - Aliphatic (EC5 - EC35)	MCERTS	4
Benzo(a)anthracene	MCERTS	4	TPH-CWG - Aromatic >EC5 - EC7	MCERTS	4
Chrysene	MCERTS	4	TPH-CWG - Aromatic >EC7 - EC8	MCERTS	4
Benzo(b)fluoranthene	MCERTS	4	TPH-CWG - Aromatic >EC8 - EC10	MCERTS	4
Benzo(k)fluoranthene	MCERTS	4	TPH-CWG - Aromatic >EC10 - EC12	MCERTS	4
Benzo(a)pyrene	MCERTS	4	TPH-CWG - Aromatic >EC12 - EC16	MCERTS	4
Indeno(1,2,3-cd)pyrene	MCERTS	4	TPH-CWG - Aromatic >EC16 - EC21	MCERTS	4
Dibenz(a,h)anthracene	MCERTS	4	TPH-CWG - Aromatic >EC21 - EC35	MCERTS	4
Benzo(ghi)perylene	MCERTS	4			
Total PAH					
Speciated Total EPA-16 PAHs	MCERTS	4			
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	MCERTS	4			
Barium (aqua regia extractable)	MCERTS	4			
Beryllium (aqua regia extractable)	MCERTS	4			

Table 6a: Geo-environmental tests undertaken on Soil Leachate and Groundwater samples

Analytical Parameter (Leachate & Groundwater Analysis)	Accreditation Status	No of Tests	Analytical Parameter (Leachate & Groundwater Analysis)	Accreditation Status	No of Tests
General			Boron (dissolved)	MCERTS	1
pH - Automated	MCERTS	1	Cadmium (dissolved)	MCERTS	1
Total Cyanide	MCERTS	1	Chromium (dissolved)	MCERTS	1
Sulphate as SO ₄	MCERTS	1	Copper (dissolved)	MCERTS	1
			Lead (dissolved)	MCERTS	1
			Mercury (dissolved)	MCERTS	1
			Nickel (dissolved)	MCERTS	1
			Selenium (dissolved)	MCERTS	1
Total Phenols			Vanadium (dissolved)	MCERTS	1
Total Phenols (monohydric)	MCERTS	1	Zinc (dissolved)	MCERTS	1
Speciated PAHs					
Naphthalene	MCERTS	1			
Acenaphthylene	MCERTS	1			
Acenaphthene	MCERTS	1			
Fluorene	MCERTS	1			
Phenanthrene	MCERTS	1			
Anthracene	MCERTS	1			
Fluoranthene	MCERTS	1			
Pyrene	MCERTS	1			
Benzo(a)anthracene	MCERTS	1			
Chrysene	MCERTS	1			
Benzo(b)fluoranthene	MCERTS	1			
Benzo(k)fluoranthene	MCERTS	1			
Benzo(a)pyrene	MCERTS	1			
Indeno(1,2,3-cd)pyrene	MCERTS	1			
Dibenz(a,h)anthracene	MCERTS	1			
Benzo(ghi)perylene	MCERTS	1			
Total PAH					
Speciated Total EPA-16 PAHs	MCERTS	1			
Heavy Metals / Metalloids					
Arsenic (dissolved)	MCERTS	1			
Barium (dissolved)	MCERTS	1			
Beryllium (dissolved)	MCERTS	1			

A full set of Geo-Environmental laboratory test certificates are provided within Appendix VII.

5.0 GROUND CONDITIONS ENCOUNTERED

5.1 General

The sequence of deposits encountered during the investigation is detailed within the Engineering Geologist's logs presented within Appendices II to III. The following sections summarise the findings of the exploratory holes.

5.2 Ground Conditions

5.2.1 Overview of Strata Encountered

The general ground conditions encountered across the site comprise of tarmac/grass over Made Ground overlying Alluvial deposits, comprising Peat, Silt and Gravel. Table 7 summarises the findings of the boreholes and machine excavated trial pits.

Table 7: Summary of Strata encountered in Boreholes and Trial Pits

Depth Range (mbgl)		Strata Encountered	Related Exploratory Holes
From	To		
Ground Level	0.20	Made Ground	Within all exploratory holes
2.00	6.80	Peat	BH01, BH02 and TP03
1.00	3.30	Alluvium – Gravelly CLAY	BH01 and BH02
0.40	3.80	Glacial till – sandy GRAVEL	Within BH01 and BH02

Strata Encountered Below the Proposed Building

Made Ground

Made Ground, generally described as grey sandy Gravel and black brown sandy gravelly Clay with frequent traces of bricks and ash was encountered across the site to depths of up to 2.10m.

Peat deposits

Peat deposits, generally consisting of very soft to soft brown peat were encountered within BH01, BH02 and TP03 underlying the Made Ground to depths of between 5.3 and 6.8mbgl.

Alluvium

Underlying the Peat, each exploratory hole encountered Alluvium. The upper layers of this strata generally comprised of firm to stiff grey slightly sandy silty gravelly CLAY with low to medium cobble content and soft grey green sandy gravelly SILT with low to medium cobble content.

Gravel deposits were encountered below the cohesive Alluvium, generally consisting of slightly clayey sandy Gravel with medium to high cobble content, was encountered within BH01 and BH02 below 7.8 and 7.5mbgl respectively.

5.2.2 Groundwater Conditions

Groundwater was encountered in each of the Boreholes drilled across the site, and TP01-TP04. Table 8 summarises groundwater conditions recorded during the borehole and trial pitting works.

Table 8: Groundwater strikes encountered during investigation works

Exploratory Hole ID	Final Drilled/ Excavated Depth (mbgl)	Depth of Groundwater Strike (mbgl)	Groundwater Behaviour
BH01	13.30	0.80	Slow water seepage at 0.80mbgl
BH01	13.30	7.50	Medium strike at 7.50m rose to 7.00m after 20 minutes
BH02	14.20	0.80	Slow water seepage at 0.80mbgl
BH02	14.20	7.60	Medium strike at 10.80m rose to 7.60m after 20 minutes
TP01	1.00	1.00	Slow water seepage at 1.00m rose to 0.80m after 20 minutes
TP02	2.00	2.00	Slow water seepage at 2.00m rose to 1.95m after 20 minutes
TP03	3.00	2.90	Slow water seepage at 2.90m rose to 2.88m after 20 minutes

Please Note: The groundwater conditions observed in these exploratory holes are those appertaining to the period of the investigation and monitoring. However, it should be noted that groundwater levels are subject to diurnal, seasonal and climatic conditions or may vary due to other causes.

5.2.3 Visual & Olfactory Evidence of Soil Contamination

It is evident that the site has been subject to some shallow ground disturbance through leveling/developing/raising the existing site and associated Made Ground was encountered.

No evidence of hydrocarbons or solvents were noted during the works however ashy material and slag was observed which can potentially contain elevated concentrations of heavy metals.

5.2.4 Visual & Olfactory Evidence of Groundwater & Surface Water Contamination

There was no evidence of any groundwater or surface water contamination during the investigation works.

6.0 GEOTECHNICAL ENGINEERING APPRAISAL

6.1 General

The purpose of this Ground Investigation and subsequent reporting is to determine and assess the existing ground conditions on site in preparation for the construction of the proposed new nursing home development.

The main aims of the ground investigation are to provide information relating to foundation design. In-situ testing and a limited amount laboratory testing has been undertaken to determine the engineering properties of the on-site strata.

Within this Geotechnical Engineering Appraisal section, foundation recommendations for the proposed building, trial pit stability observations, groundwater observations and soil infiltration rate and determination of concrete class are presented.

6.2 Engineering Properties of Strata

The soils revealed in this investigation comprised Topsoil / Hardstanding underlain by Made Ground of varying thickness overlying Tidal Deposits consisting of soft Silt/Clay and Silt with occasional bands of Gravel overlying medium dense to very dense Gravel.

Made Ground

The Made Ground was encountered within all exploratory holes, and was found to be variable across the site and contained occasional man-made inclusions such as clinker and ash. Below the existing car park the Made Ground was found to extend to depths of between 1.7 and 2.1mbgl. Within the grassed area to the west of the existing building, Made Ground was encountered to a depth of 1.0mbgl. The material may be excavated and re-used within the development as an Engineered Fill following classification and when laid in accordance with an appropriate specification. In addition the chemical composition of this material may dictate the type of concrete used in any new build that may be founded through this material or come into contact with this material. The results of the geotechnical laboratory testing and in-situ testing undertaken on the Made Ground are summarised in the table below.

Table 9: Summary of Made Ground Laboratory Results

Made Ground		Range	Mean	No. Tests
Particle Size Distribution	Cobbles (%)	0-35	17	2
	Gravel (%)	21-49	35	
	Sand (%)	11-67	39	
	Silt and Clay (%)	5-13	9	
Moisture Content (%)		18-25	21	2
pH		8.1-9	8.5	5
Water Soluble SO ₄ (mg/l)		330-2600	982	
SPT N Value		16 – 50/43mm		

The results of the Particle Size Distribution testing indicate the Made Ground material to be slightly clayey/silty very sandy Gravel generally consistent with the Engineers description.

Due to the potential variable nature, depth and physical properties of the Made Ground, and the uncertainty surrounding the selection / engineering of the strata, it is not considered suitable as a founding strata in its current form.

Peat and Cohesive Alluvium

Table 10: Summary of Peat and Cohesive Alluvium

Cohesive Tidal Flat Deposits		Range	Mean	No. Tests
Particle Size Distribution	Cobbles (%)	0		1
	Gravel(%)	12		
	Sand (%)	20		
	Silt and Clay (%)	69		
Moisture content		69		1
pH		7.3-7.4	7.3	2
Water Soluble SO ₄ (mg/l)		560-2300	1430	
SPT N Value		1-17	5	9

The results of the Particle Size Distribution testing indicate the Cohesive Tidal Flat Deposits material to be slightly gravelly sandy Silt / Clay and generally consistent with the Engineers description.

Table 11: Summary of Granular Alluvium

Granular Tidal Flat Deposits		Range	Mean	No. Tests
Particle Size Distribution	Cobbles (%)	0		1
	Gravel(%)	21		
	Sand (%)	67		
	Silt and Clay (%)	13		
Moisture content		25		1
pH		7.3-7.4	7.3	2
Water Soluble SO ₄ (mg/l)		560-2300	1430	
SPT N Value		23-50+	42	9

The results of the Particle Size Distribution testing indicate the granular Alluvium material tested to be slightly Silty / Clayey gravelly Sand and generally consistent with the Engineers description.

Based on the aforementioned information, it is recommended that the following characteristic effective shear strength parameters are used in general for the granular Alluvium:

$$\phi' = 35^\circ$$

$$c' = 0\text{kN/m}^2$$

6.3 Excavation Plant

On the basis of the observations made during the exploratory investigation, it is considered that shallow excavations within the soils can be undertaken by conventional excavation plant.

A grey concrete obstruction was encountered within Trial Pit TP01 at a depth of 0.9mbgl. If any such buried obstructions are encountered during construction, the use of breaking equipment may be required.

6.4 Stability of Excavation Sides

Excavations undertaken were locally unstable within the granular deposits encountered. Therefore in general shallow excavations are likely to remain stable, however it would be prudent to assume some instability may occur and allow for some shoring or temporary support, particularly if left open for a sustained period of time, unless battered back to a suitable safe angle.

6.5 Control of Groundwater

Groundwater levels encountered during the ground investigation ranged between 0.80 and 10.80mbgl whilst post fieldwork monitoring measured the water levels between 0.77 and 0.87mbgl. Given the depths at which groundwater has been encountered it is likely groundwater will be encountered within any excavations during construction.

Sump pumping/on site pumps should be adequate for dewatering excavations where groundwater seepage is encountered, or where surface water ingress occurs.

6.6 Structural Assessment

6.6.1 Foundations

Given the presence of the Made Ground and the underlying soft and compressible deposits, the use of shallow trench fill, pad or strip foundations are not considered suitable for the proposed development. The Made Ground would result in bearing strata of varying stiffness underlying the proposed structures, which in combination with the underlying soft and compressible deposits may cause potentially unacceptable settlement / differential settlements.

It is recommended the deeper lying Granular Alluvium Deposits, encountered within Borehole BH01 and BH02 at depths of 7.8 and 7.5mbgl respectively, be targeted as a suitable founding strata.

It is recommended that a Piled foundations system be opted for, socketed into the Gravels at depth to accommodate the loading and any differential movement.

The piled foundations should be designed by an experienced and competent specialist piling contractor who should select appropriate design parameters and guarantee safe working loads together with maximum total and differential settlements, which should be within acceptable tolerances for the proposed structures.

The choice of piling technique should be agreed with the contractor. Soil parameters for the strata to be penetrated will depend on the piling technique selected and the precise method of working. Driven piles should only be considered if vibrations and environmental constraints can be maintained within acceptable limits, with regard to the proximity of existing buildings.

The piling contractor should satisfy themselves and confirm to the Client that the available site investigation data provides sufficient information upon which to base their design. If the piling contractor requires any further data, any such requirements should be identified and the information should be obtained prior to the pile design being finalised. The piling contractor should monitor the pile installations and satisfy himself that the encountered ground conditions are as good as, or better than, assumed in his design.

In designing and constructing the piles it is recommended that, in addition to other factors, the piling contractor gives consideration to the following issues:

- The density of the Alluvium Deposits generally increase with depth, particularly relevant at the location of borehole BH02 in which the upper levels of the Granular Alluvium deposits were identified as Medium Dense to a depth of 12.5mbgl, at which point the strata was identified as dense to very dense.
- The potential presence of layers of soft cohesive deposits within the Alluvium Deposits, as identified within borehole BH02 between 9.3 and 10.8mbgl should be considered when undertaking any pile

design.

- The piles should be designed to accommodate any effects of lateral loading and negative skin friction in alluvial soils.
- The design should ensure that the piles do not buckle as a result of insufficient lateral support through soft/loose deposits.
- The design should account for the presence of sub-artesian groundwater in the Granular Alluvium Deposits.
- Measures should be taken to prevent the inward squeezing, or necking, of the piles through soft/loose/water bearing deposits.
- Appropriate load tests should be carried out during the early stages of the piling works and on a suitable proportion of the piles to confirm that they are able to support the required working loads and that actual settlements are within specified tolerances.
- The requirement to minimise arisings from construction activities as much as possible, e.g. with all other factors being equal, a displacement piling solution may be preferred to a non-displacement method.
- Due consideration should be given to, and appropriate allowances made for, obstructions within the Made Ground (i.e. concrete), which may obstruct or otherwise interfere with piling operations.

6.6.2 Floor Slabs

The super structure is likely to be set upon a ring beam piled foundation, a degree of ground improvement works will be required to accommodate the ground bearing floor slab. It is recommended that the initial 600mm of the existing ground level be removed with the exposed formation proof rolled prior to placing at least 250mm of clean stone of engineering grade and suitability. The overlying ground bearing floor slab will require to be fully reinforced to act against potential differential settlement movement and accommodate the anticipated loads. Given the variability of the made ground and potential for ongoing differential settlement in the peat deposits, we would recommend a suspended floor slab.

6.6.3 Foundation Concrete Class Designation

The Aggressive Chemical Environment for Concrete (ACEC) classification for the site has been assessed according to the guidelines within BRE Special Digest 1 (2005). For classification purposes, based on the BRE guidance, the groundwater must be classed as 'mobile' unless proven to be 'static' over a 24hr period.

Four soil samples at varying depths were tested to derive concrete class designation parameters. The pH values ranged between 7.3 and 11.0. The levels of water-soluble sulphate (SO_4) content of the tested soil samples varied between 6.5mg/l and 318mg/l. A copy of the test certificates are presented within Appendix VII. Based on the above and in general, the results indicate a Design Sulphate (DS) class for the site is DS-1 with the ACEC classification as AC-1.

6.7 Soakaway Testing

Two in-situ Soakaway Tests were performed in accordance with BRE Digest 365 to determine the shallow soil's permeability, and suitability for the installation of Sustainable Urban Drainage Systems (SUDS) or the more commonly phrased Soakaway Systems. The depth of the soakaway tests undertaken in each pit is outlined in Table 12 with the calculated soil permeability also presented.

Table 12: Determined Soil Infiltration Rates

Trial Pit ID	Test Depth (mbgl)	Strata Type Tested	Calculated Permeability Rate (m/sec)
TP2	0.8 - 2.0	Tidal Flat Deposits (Sand)	2.04×10^{-5}
TP3	1.5 – 3.0	Tidal Flat Deposits (Sand over Peat)	No significant reduction in water level over 120 minute test period.

A full set of Soakaway Test certificates are presented within Appendix III

7.0 GEO-ENVIRONMENTAL CONSIDERATIONS

7.1 General

The following Section assesses the findings of the geo-environmental laboratory test results from samples obtained during the ground investigation. The risks to human health and the environment are both considered herein. This Section sets out the preliminary Conceptual Site Model (CSM) for pollutant linkages and aims to review this CSM following assessment of the test result findings from the intrusive investigation.

7.1.1 *Pre-Intrusive Investigation Conceptual Site Model*

The CSM is a representation of the current understanding of the site and its surrounding environment with regards to geology, groundwater, surface waters, and potential contamination on-site and adjacent off-site and any migration pathways.

The potential risks to the proposed development and adjacent land have been assessed by consideration of the potential pollution linkages. For a risk to exist there must be a source of contamination, a receptor that may be harmed, and a pathway by which the receptor could be exposed to the contaminant. Only when all three factors are present (i.e. source, pathway, and receptor) can a pollution linkage, and consequently an unacceptable risk, exist. The conceptual site model considers all three elements and the potential for pollution linkages that may exist. If no linkage is identified then there is considered to be no or negligible risk.

The Conceptual Site Model has been developed for the proposed end use. Receptors specific for the proposed end use considered in the assessment are as follows:

- Human Health – end users
- Controlled Waters – ground water and surface waters
- Buildings and Services

Due to the current land use (disused doctor's surgery) of the site, there lies the possibility of Made Ground Deposits present on site as well as the contamination of near surface soils by old colliery spoil and workings. There also lies the potential for Made Ground Deposits due to undocumented construction / demolition of buildings and roads. Any Made Ground that may be present could contain Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons and Asbestos.

Details of the pathways associated with each of the components are highlighted in the following set of tables:

Table 13: Potential Pollutant Linkages on-site to on-site

Potential Sources onsite	MADE GROUND - Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, and Asbestos.	
Potential Pathways on-site to on-site	Receptors onsite	
- Dermal contact with contaminated soils – dermatitis. - Ingestion of soil, water or dust through ground maintenance etc. - Inhalation of dust or land gas emissions from Made Ground and organic soils. - Leaching of contaminated soils into groundwater. - Migration of groundwater across site.	Future Site End Users including Workers, Construction Workers and Visitors. Groundwater: – Superficial deposits: ‘Unproductive aquifer’ – Bedrock: ‘Secondary A’ aquifer	
Chemically aggressive contaminants identified at raised concentrations.	Buildings and services.	

Table 14: Potential Pollutant Linkages on-site to off-site

Potential Sources onsite	MADE GROUND - Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, and Asbestos.	
Potential Pathways on-site to off-site	Receptors offsite	
- Inhalation of dust or land gas emissions from possible Made Ground and organic soils. - Leaching of contaminated soils into groundwater. - Migration from groundwater to surface waters. - Migration of contaminants through groundwater off-site leading to potential dermal contact, ingestion of soil, water or dust and inhalation of gas emissions.	Neighbouring site users Groundwater: – Superficial deposits: ‘Unproductive aquifer’ – Bedrock: ‘Secondary A’ aquifer	

Table 15: Potential Pollutant Linkages off-site to on-site

Potential Sources offsite	MADE GROUND - Heavy Metals, Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, and Asbestos.	
Potential Pathways off-site to on-site	Receptors onsite	
- Inhalation of dust or land gas emissions from Made Ground and organic soils. - Migration of contaminants through groundwater on-site leading to potential dermal contact, ingestion of soil, water or dust and inhalation of gas emissions.	Future Site End Users including Workers, Construction Workers and Visitors. Groundwater: – Superficial deposits: ‘Unproductive’ aquifer – Bedrock: ‘Secondary A’ aquifer	

The aforementioned CSM will be reviewed later in the report following assessment of the laboratory test results findings and information gathered from the intrusive investigation.

7.2 Human Health Risk Assessment

7.2.1 Legislative Background

There have been several major changes in Contaminated Land non-statutory guidance over the past decade, in particular relating to Contaminated Land Regime (CLR) documentation and their derivatives i.e. Soil Guideline Values and Toxicological Reports. In 2006, DEFRA commenced work on their 'Way Forward' exercise which aimed to redefine the way contaminated land is assessed with the aid of devising revamped technical guidance and soil guideline values. A working group of various environmental consultancies/ establishments/ stakeholders set about determining how the non-statutory guidance of CLEA 2002 may be amended to be increasingly user friendly for assessors of contaminated land and ultimately to help in defining whether land qualifies as contaminated land under Part IIA Environmental Protection Act 1990. July 2008 saw the findings of this exercise published. Firstly, the document entitled '*Guidance on the Legal Definition of Contaminated Land*' was published followed closely by the publication of the fourteen measures derived to improve contaminated land non-statutory technical guidance i.e. CLR Publications.

In light of these improvements, the toxicology of various contaminants and therefore the generic soil guideline values, has been revised by EA and DEFRA. The revised paper published in August 2008 is entitled '*Human Health Toxicological Assessment of Contaminants in Soil*'. Based on the findings of this paper, EA are developing a new set of Toxicological Reports and subsequently a new, expanded set of SGV'. Upon publishing, these new SGV's may then be used in assessing risks to human health.

In parallel to much of these developments, in 2006/07 it was recognised that due to the limited number of revised SGVs being produced, the Chartered Institute of Environmental Health (CIEH) co-jointly with Land Quality Management (LQM) researched and developed an additional or alternate set of Soil Guideline Values known as Generic Assessment Criteria (GAC) values, producing GACs for 31 contaminants for Residential, Allotment and Commercial End Land Uses. These new values complete with details of how they were derived and including toxicological datasets was published in a single document 'The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment'.

Following publication of the '*Way Forward*' document in late 2006, LQM/CIEH looked to review their GAC and add to them. By 2009 a 2nd Edition of 'The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment' was published using updated methods and culminated in GAC for 82 substances.

In 2013, a cross-government steering group commenced the development of a new set of Generic Assessment Criteria as driven by DEFRA. The newly derived Guideline Values are termed C4SLs – Category 4 Screening Levels and are considered more pragmatic (but still precautionary) by DEFRA and were proposed as more suitable and sensible comparison values.

In November 2014, the LQM/CIEH produced its third set of Generic Assessment Criteria for 89 potential contaminants as knowledge of toxicity and interaction continued to progress, thus replacing the 2nd Edition with the new publication entitled '*The LQM/CIEH S4ULs for Human Health Risk Assessment*'. This most recent set of GACs are referred to as 'S4ULs' – Suitable for Use Levels'

7.2.2 Human Health Risk Assessment Criteria

For the purposes of Quantum Geotechnical Ltd assessments, the most recent and applicable SGVs, GACs, SU4Ls and C4SLs are used based on site end use and development and overall suitability. These are all referenced within the text. SU4Ls take precedence in QGL assessments. Where these are not available or suitable, C4SLs are adopted.

By adopting the CLEA approach to human health risk assessment as defined in CLR11, a human health risk assessment has been undertaken for the proposed development adopting the Residential threshold values as the proposed development is to be a Nursing Home.

The assessment criteria used in this assessment is that presented by LQM/CIEH in their publication *The LQM/CIEH S4ULs for Human Health Risk Assessment (2015)*. The S4ULs (Suitable for Use Levels) used have been derived in accordance with UK legislation, national as well as Environment Agency policy and using a modified version of the Environment Agency CLEA software and available guidance provided to the contaminated land practitioner community for the purpose of deriving Generic Assessment Criteria (GAC).

The LQM/CIEH S4ULs are intended for use in assessing potential risks posed to human health by contaminants in soil and as transparently derived and cautious 'trigger values' above which further assessment or remedial action may be necessary. By using the LQM/CIEH S4AULs, Quantum Geotechnical acknowledges *Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4AUL3409. All Rights Reserved.*

7.2.3 Soil Sample Test Results Comparisons

Heavy Metal and Inorganic Compounds

The results of levels of potential contaminants have been compared to generic assessment criteria as described above, for a Residential end use with Plant Uptake as being considered the most conservative threshold for human health relating to handling of soils. The test certificates are included in Appendix VII. The concentrations of heavy metal and inorganic compounds are summarised in the table below.

Table 16: Summary of Heavy Metals and Inorganic Soil Test Results

Determinant	Results Range (mg/kg)	LQM/CIEH S4ULs (2015) (mg/kg)	Exceedances
	Made Ground	Residential End Use with Plant Uptake ⁽¹⁾	
Arsenic (aqua regia extractable)	5.2-31	37	0
Boron (water soluble)	0.4 – 0.9	290	0
Cadmium (aqua regia extractable)	<0.2 – 0.7	11	0
Chromium (hexavalent)	<4.0	910	0
Chromium (aqua regia extractable)	8.5-16	910	0
Copper (aqua regia extractable)	18-68	2,400	0
Lead (aqua regia extractable)	26-120	200	0
Mercury (aqua regia extractable)	<0.3	40	0
Nickle (aqua regia extractable)	5-25	130	0
Selenium (aqua regia extractable)	<1.0	3,000	0
Zinc (aqua regia extractable)	37-550	3,700	0

Notes:

(1). GAC from LQM/CIEH S4ULs 2015. (2). GAC from LQM/CIEH 2009 & 2015. (3). GAC from DEFRA C4SL. (4). GAC from AtRisk adopting most sensitive end use for acute risk.

Polycyclic Aromatic Hydrocarbons

The results of levels of potential contaminants as have been compared to generic assessment criteria as described, for a Residential end use with Plant Uptake as being considered the most conservative threshold for human health relating to handling of soils and for a Soil Organic Matter (SOM) content of 1% as the minimum recorded is 1.8%. The test certificates are included in Appendix VII. The concentrations of speciated Polycyclic Aromatic Hydrocarbon are summarised and compared in the table below.

Table 17: Summary of Polycyclic Aromatic Hydrocarbon Soil Test Results

Determinant	Site Results Range (mg/kg)	LQM/CIEH S4ULs (2015) (mg/kg) Residential End Use with Plant Uptake ⁽¹⁾	
		Made Ground	Exceedances
Soil Organic Matter	1.8 – 6.6		
Acenaphthene	<0.05	210	0
Acenaphthylene	<0.05 – 0.40	170	0
Anthracene	<0.05 – 1.3	2400	0
Benzo(a)anthracene	<0.93 – 10	7.2	1 TP02 0.3-0.5m
Benzo(a)pyrene	0.96-7.8	2.2	2 TP02 0.3-0.5m TP03 0.3-0.5m
Benzo(b)fluoranthene	1.4 - 15	2.6	3 TP02 0.3-0.5m TP03 0.3-0.5m BH02 0.5m
Benzo(ghi)perylene	0.62 – 4.2	320	0
Benzo(k)fluoranthene	0.58 – 3.4	77	0
Chrysene	0.8 – 9.6	15	0
Dibenz(a,h)anthracene	<0.05 – 1.8	0.24	4 TP01 1.0m TP02 0.3-0.5m TP03 0.3-0.5m BH02 0.5m
Fluoranthene	<0.77 – 11	280	0
Fluorene	<0.05 - 0.26	170	0
Indeno(1,2,3-cd)pyrene	<0.67 – 4.3	27	0
Napthalene	<0.05-0.43	2.3	0
Phenanthrene	0.30-5.7	95	0
Pyrene	0.67- 8.5	620	0

Notes:

(1). GAC from LQM/CIEH S4ULs 2015.

Total Petroleum Hydrocarbons

The results of levels of potential contaminants have been compared to generic assessment criteria as described, for a Residential end use with Plant Uptake as being considered the most conservative threshold for human health relating to handling of soils and for a Soil Organic Matter (SOM) content of 1% as the minimum recorded is 1.8%. The test certificates are included in Appendix VII. The concentrations of speciated Petroleum Hydrocarbon are summarised and compared in the table below.

Table 18: Summary of Petroleum Hydrocarbon Soil Test Results

Determinand	Site Results Range	LQM/CIEH S4ULs (2015) (mg/kg) Residential End Use with Plant Uptake ⁽¹⁾	
		Made Ground	1% SOM
TPH – Aliphatic EC5-6	<0.1	42	0
TPH – Aliphatic >EC6-8	<0.1	100	0
TPH – Aliphatic >EC8-10	<0.1	27	0
TPH – Aliphatic >EC10-12	<1.0	130	0
TPH – Aliphatic >EC12-16	<2.0 – 4.4	1,100	0
TPH – Aliphatic >EC16-21	<8.0 – 8.4	6,500	0
TPH – Aliphatic >EC21-35	19-24	6,500	0
TPH – Aromatic >EC5-7	<0.1	70	0
TPH – Aromatic >EC7-8	<0.1	130	0
TPH – Aromatic >EC8-10	<0.1	34	0
TPH – Aromatic >EC10-12	<1.0	74	0
TPH – Aromatic >EC12-16	<2.0 - 9.3	140	0
TPH – Aromatic >EC16-21	<10 – 43	260	0
TPH – Aromatic >EC21-35	50-100	1,100	0

Notes:

(1). GAC from LQM/CIEH S4ULs 2015. (2). GAC for C16 – C35 only quoted.

BTEX Compounds

Benzene, Toluene, Ethylbenzene and Xylene compounds were all tested within the soil samples. All recorded values of <1.0µg/kg.

Total Phenols

Total Phenols (monohydric) all recorded values of <1.0mg/kg in the soil samples.

Asbestos

An asbestos screen was undertaken on two samples of Made Ground collected from across the site. No Asbestos and Asbestos Containing Material was identified.

7.3 Environmental Risk Assessment

The following section presents the findings of the soil leachate test results and provides assessment in relation to risks to the environment, particularly controlled waters.

7.3.1 Soil Leachate Criteria

The risk to controlled waters, i.e. nearby watercourses and groundwater, is defined by the potential for any contaminants present on site to leach from the soils beneath the site.

1 No. soil samples from both the shallow Made Ground and Natural underlying soils were subjected to leachate testing, although none of the soils tested recorded any raised concentrations. The result ranges are presented together with the threshold levels given by the United Kingdom Drinking Water Standards (UKDWS) as well as the relevant Environmental Quality Standards (EQS) guideline values.

7.3.2 Soil Leachate Test Results Comparisons

Table 19 presents the summarised findings of the soil leachate testing undertaken on both the Made Ground and Natural Soil samples. The test certificates are included in Appendix VII.

Table 19: Summary of Soil Leachate Chemical Analysis

Determinant	Units	Soil Leachate – Site Results Range (µg/l)	Environmental Quality Standards – Freshwater ¹	UK Drinking Water Standards ²	Exceedances
		Made Ground Samples			
Arsenic	µg/l	4.6	50	10	0
Cadmium	µg/l	<0.08	5	5	0
Chromium	µg/l	1.4	10 ³	50	0
Copper	µg/l	14	6 ³	2000	1 TP01 0.3-0.5m
Lead	µg/l	1.3	10 ³	10	0
Mercury	µg/l	<0.5	1	1	0
Nickel	µg/l	3.4	100 ³	20	0
Zinc	µg/l	21	50 ³	5000	0
Napthalene	µg/l	<0.01	10	Not Available	0
Acenaphthylene	µg/l	<0.01	Not Available	Not Available	0
Acenaphthene	µg/l	<0.01	Not Available	Not Available	0
Fluorene	µg/l	<0.01	Not Available	Not Available	0
Phenanthrene	µg/l	<0.01	Not Available	Not Available	0
Anthracene	µg/l	<0.01	Not Available	Not Available	0
Fluoranthene	µg/l	<0.01	0.02	Not Available	0
Pyrene	µg/l	<0.01	Not Available	Not Available	0
Benzo(a)anthracene	µg/l	<0.01	Not Available	Not Available	0
Chrysene	µg/l	<0.01	Not Available	Not Available	0
Benzo(b)fluoranthene	µg/l	<0.01	Not Available	Not Available	0
Benzo(k)fluoranthene	µg/l	<0.01	Not Available	Not Available	0
Benzo(a)pyrene	µg/l	<0.01	0.03	0.001	0
Indeno(1,2,3-cd)pyrene	µg/l	<0.01	Not Available	Not Available	0
Dibenz(a,h)anthracene	µg/l	<0.01	Not Available	Not Available	0
Benzo(ghi)perylene	µg/l	<0.01	Not Available	Not Available	0

¹Figures for Environmental Quality Standards (EQS) are Annual Average Concentrations derived from the Environment Agency

²UK Drinking Water Standards taken from; Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) (as amended), and Water Supply (Water Quality) Regulations 2000 (SI 2000/3184) (as amended).

³Hardness Banding applied, lowest groundwater test result used i.e. **321mgCaCO₃/l** – using Table 2b: EGS for hardness related List 2 dangerous substances, EC Dangerous Substances Directive (76/464/EEC)

NT – Not Tested. I/S – Insufficient Sample, NYS – Not Yet Specified

7.4 Ground Gas Monitoring Results

At time of writing 3 No. post-fieldwork monitoring ground gas visits had been undertaken to allow a preliminary assessment to be undertaken. Appendix V presents the monitoring records with the results discussed below.

The results show CH₄ concentrations between 0 and 0.6%v/v and CO₂ concentrations between 0.1 and 3.6%v/v. Measured flow rates ranged between 0.1 and 0.2l/hr whilst O₂ levels ranged between 19.9 and 20.5%v/v.

The potential risks posed by any recorded presence of potentially harmful gases can be assessed on a semi-quantitative basis by reference to the guidance in documents CIRIA 665 and BS8485. The assessment comprises multiplying the maximum measured steady gas flow rate (expressed as litres per hour) by the maximum steady gas concentration (expressed as percentage-by-volume; divided by 100) to derive a Gas Screening Value (GSV). The GSV can then be used to determine a risk classification and a Characteristic Situation for the site as defined in Table 20.

Table 20: Gas Screening Value and Characteristic Situation Classification

Characteristic Situation	Risk Classification	Gas Screening Value (l/hr) - GSV
1	Very low	<0.07
2	Low	>0.07, <0.7
3	Moderate	>0.7, <3.5
4	Moderate to High	>3.5, <15
5	High	>15, <70
6	Very High	>70

Based on the ground gas monitoring findings to date the site is classified as Characteristic Situation 1, very low to low risk, with no special precautions against ground gases are required. A full set of gas monitoring, with revised classification if necessary, will be issued as an addendum once complete.

In addition to the Ground Gas monitoring, a Photo Ionisation Detector was used to measure Isobutylene within the monitoring standpipes. Isobutylene provides an indication of the volatile organic compounds accumulating within the borehole standpipes. Measurements were taken on the 27th February 2019 and ranged between 43.2 and 55.6ppm.

7.4.1. Radon Assessment

From viewing the UK Radon at risk website, the website indicates that the site is in a Radon Affected Area with 3-5% of properties above the action level. Therefore basic Radon Protection measures are required.

7.5 Recommendations on Contaminated Land

7.5.1 Human Health of Site End Users

The concentrations of Benzo(a)anthracene in Trial Pit TP02, Benzo(a)pyrene Trial Pits TP02 and TP03, Benzo(b)fluoranthene Trial Pits TP02 and TP03 and Borehole BH02 and Dibenzo(a,h)anthracene Trial Pits TP01, TP02, TP03 and Borehole BH02, within the Made Ground, exceeded the relevant assessment criteria for Residential Land Use with plant uptake. Further analysis found many of these potential contaminants also exceed the assessment criteria for Residential Land Use without plant uptake.

Based on the laboratory test results, there is the potential the concentrations of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene within the Made Ground may pose a significant risk to future site users.

Although no statistical analysis has been undertaken, the spread of potentially significantly elevated contaminant concentrations within the Made Ground can be considered to be site wide.

The PID measurements recorded to date indicate volatiles are unlikely to pose a risk to future site users.

In order to remove / reduce the risk to future site users the potential contaminant source (Made Ground) can be removed and disposed of off-site or the potential contaminant pathway can be removed by installing a suitably designed capping layer above the potentially contaminated material to remove the contamination pathway. The potentially contaminated Made Ground may remain in-situ below the proposed building without any additional remedial treatment if the potential contaminants are proven to be immobile through undertaking further monitoring of vapour concentrations prior to construction.

Based on existing site constraints, it is recommended additional exploratory holes are undertaken post demolition / when access is available to the entire site, with additional sampling, testing and analysis undertaken to determine if any identified potential contamination sources and associated risk to receptors are present in areas of the site not previously investigated due to access restrictions.

7.5.2 Human Health Risks of Workers during Construction

The geo-environmental laboratory test results identified potentially significantly raised contaminant concentrations within the Made Ground, which although considered unlikely, may pose a risk to construction operatives.

Operatives working with, or likely to come into contact with the Made Ground with the potential to harness raised concentrations of contaminants, should observe particular precautions concerning personal hygiene. They should be issued with the appropriate personal protective equipment and should be instructed in safe working methods.

Instructions should be issued in the recognition of potentially hazardous materials including oily and odorous soil and water and also any discoloured or fibrous substances for example. Operatives should be warned to avoid contact between hands and mouth before washing. The consumption of food must be confined to designated clean areas with suitable welfare including washing facilities should be provided.

7.5.3 Summary Assessment of Risk to Controlled Waters

The single soil leachate test undertaken identified potentially significantly raised Copper concentration with the soil leachate from the sample of Made Ground from Trial Pit TP01. Although the concentration of Copper measured within the soil leachate from the Made Ground within TP01 only slightly exceeded the relevant EQS value, it may pose a risk to nearby controlled waters.

It is recommended groundwater samples are obtained from the borehole standpipes installed during this ground investigation to determine if potentially mobile contaminants within the Made Ground are potentially entering the groundwater below the site. Due to the potentially contaminative land uses in the surrounding area and the potential for these land uses to have an adverse effect on groundwater quality in the area, it is recommended the findings of this investigation and any subsequent testing / analysis are discussed with the Local Authority Pollution Control Officer and Natural Resources Wales to determine the requirement for remedial measures.

7.6 Review of Conceptual Site Model

The onsite investigation and subsequent laboratory testing has identified that the Made Ground may pose a significant risk to future site users and controlled waters. The Conceptual Site has been revised based on the findings of the ground investigation and is presented in Tables 21 and 22.

Table 21: Potential Pollutant Linkages on-site to on-site

Potential Sources onsite	MADE GROUND - Polycyclic Aromatic Hydrocarbons	
Potential Pathways on-site to on-site		Receptors onsite
- Dermal contact with contaminated soils – dermatitis. - Ingestion of soil, water or dust through ground maintenance etc. - Leaching of contaminated soils into groundwater.		Future Site End Users including Workers, Construction Workers and Visitors. Groundwater: – Superficial deposits: 'Unproductive aquifer' – Bedrock: 'Secondary A' aquifer

Table 14: Potential Pollutant Linkages on-site to off-site

Potential Sources onsite	MADE GROUND - Heavy Metals	
Potential Pathways on-site to off-site		Receptors offsite

• Leaching of contaminated soils into groundwater. • Migration from groundwater to surface waters. • Migration of contaminants through groundwater off-site leading to potential dermal contact, ingestion of soil, water or dust and inhalation of gas emissions.	Neighbouring site users Groundwater:– Bedrock: ‘Secondary A’ aquifer Surface Water
--	---

7.7 Summary or Recommendations

Given this Preliminary Ground Investigation was heavily restricted by access and permissions at the time, i.e. access was unavailable to the grassed area to the western area of the site, the existing building prevented extensive investigation below the central and north eastern area of the site and budgetary requirements dictated only 2 no Cable Percussive Boreholes, and the identification of potentially contaminated Made Ground deposits below the site, it is recommended additional exploratory holes are undertaken across the site.

It is recommended further works include PID monitoring for PAH vapours across the site, additional groundwater sampling and testing along with additional investigation below the existing building footprint.

Subject to the results of the aforementioned additional testing, remediation strategies can be fully revised and adopted which may take the form of capping the proposed soft landscaped areas with inert clean topsoil with separator membrane, and should no hydrocarbon related vapours be realized, the proposed new building area will not require any special groundgas/vapour protection, with the building itself and hardstanding surrounding areas serving to sever the pollutant linkage between the Made Ground (source) and the receptor (site users).

It is recommended the findings of this investigation and any subsequent testing / analysis are discussed with the Local Authority Pollution Control Officer and Natural Resources Wales to determine the requirement for remedial measures.

8.0 REFERENCES

British Geological Survey:

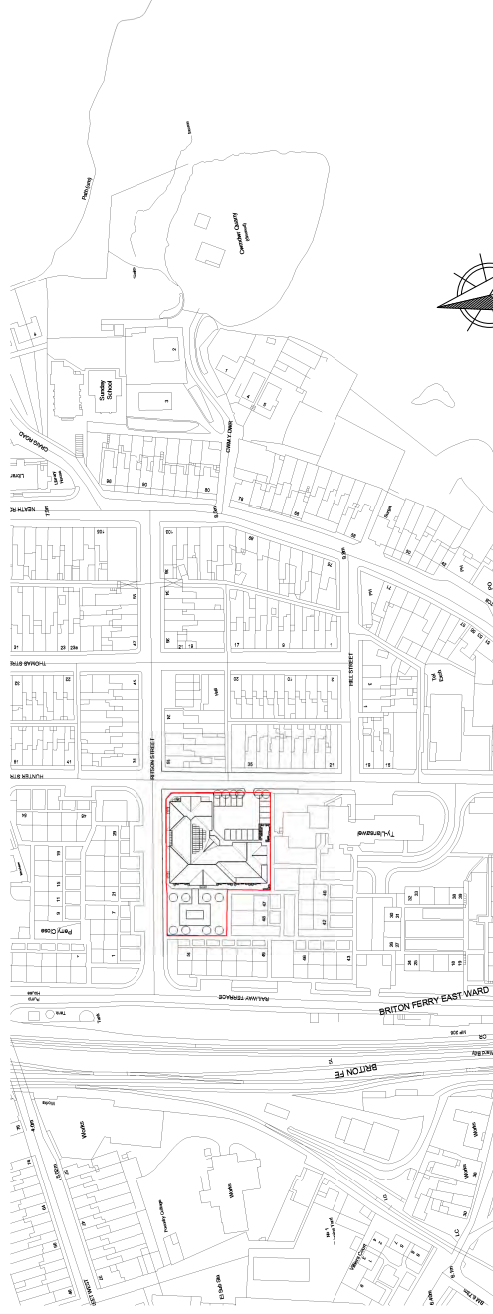
- British Geological Survey (BGS) Sheet 247 'Swansea' Solid and Drift (1:50000 scale) edition.
- BGS Lexicon of Named Rock Units (www.bgs.ac.uk/lexicon)
- BGS Geology of Britain Viewer (www.bgs.ac.uk)

Specialist Publications:-

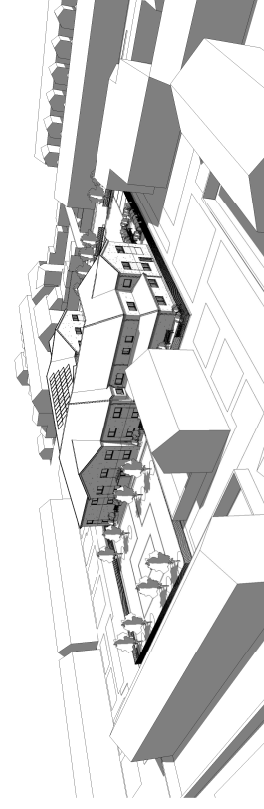
- British Code of Practice BS 5930:2015 '*Code of Practice for Site Investigations*'
- British Code of Practice BS 1377:1990 '*Methods of test for soils for civil engineering purposes*'.
- British Code of Practice BS 10175:2011 '*Code of Practice for Investigation of Potentially Contaminated Sites*'
- British Code of Practice BS EN ISO 14688-1:2002+A2:2013 Geotechnical investigation and testing. Identification and classification of soil. Identification and description
- British Code of Practice BS EN ISO 14688-2:2004+A2:2013 Geotechnical investigation and testing. Identification and classification of soil. Principles for a classification.
- British Code of Practice BS EN ISO 14689-1:2003 Ground Investigation and Testing – Identification and classification of rock
- Health and Safety Executive Guidance Note EH40/90
- *CIRIA Report 143* 'The Standard Penetration Test (SPT): Methods and Use', 1995.
- BRE (2005) Special Digest 1:2005, 3rd Edition, Concrete in aggressive ground. BRE, Garston.
- BS 6031: 2009 Code of Practice for Earthworks.
- Workmanship for excavation shall comply with BS 8000: 1989 Part 1, Sections 3.1, 3.2 and 3.3.
- Specification for Highway Works (MCHW 1), Volume 1, Series 600 & Series 800, 2006 with Amendment 2016
- ICE UK Specification for Ground Investigation Second Edition.
- Design Manual for Roads and Bridges: Volume 7 Pavement Design and Maintenance
- Specification for Highways Works Series 600 Earthworks
- Highways Agency Interim Advice Note 73/06, Rev 1 2009, Clause 7.7

APPENDIX I – SITE PLANS AND FIGURES





LOCATION PLAN
1 : 1250



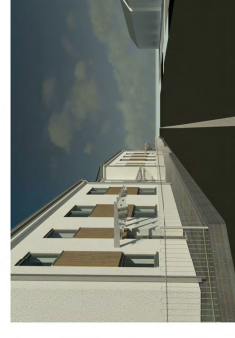
VIEW 1



VIEW 2
1:1



VIEW 4
1:1



VIEW 3
1:1



VIEW 5
1:1

[illegible]

PROJECT

Nursing Home, Briton Ferry

TITLE

IMAGES & LOCATION

CLIENT

DRAWN BY Author	CHECKED BY Checker	DATE 05/29/17
SCALE (@ A1) As indicated		PROJECT NUMBER Project Number
DRAWING NUMBER A1 - A105		REV D

APPENDIX II – CABLE PERCUSSION BOREHOLE LOGS

Contract : Former Health Centre, Hunter Street										Borehole No. BH01																																																																																																																																		
Client : H Singh																																																																																																																																												
Dates : 22/1/18 - 24/1/18					Job Number : G40104			Ground Level :																																																																																																																																				
Location : Within carpark area					Engineer : RB Planning			Coordinates:																																																																																																																																				
m B.G.L.	Samples		Insitu Test Results		Strata				Water	Install/Backfill																																																																																																																																		
	Depth	Type No. Blows	Depth	Test Results	Depth (Thickness)	Description	Legend	Depth (Thickness)																																																																																																																																				
0	0.00 - 0.10	ES1			(0.10)	Black tarmac.		(0.10)																																																																																																																																				
	0.10	B3			0.10	MADE GROUND - Grey slightly sandy Gravel.		0.10																																																																																																																																				
	0.30 - 0.50	ES2			(0.20)	Gravel is fine to coarse angular to sub-angular of limestone.		(0.20)																																																																																																																																				
	0.30 - 0.60	B3A			0.30			0.30																																																																																																																																				
1	1.00 - 1.20	ES4	1.2	SPT (C) 16 (1-2-4-2-5-5)	(1.80)	MADE GROUND - Soft black brown sandy gravelly Clay with medium cobble content. Gravel is fine to coarse angular to sub-angular of brick and limestone with frequent traces of bricks and ash. Cobbles are sub-angular to sub-rounded of sandstone.		(1.80)																																																																																																																																				
	1.20 - 1.70	B5																																																																																																																																										
2	2.00	ES5A	2.2	SPT (C) 1 (1-0-0-0-1-0)	2.10			2.10																																																																																																																																				
	2.20 - 2.70	B6																																																																																																																																										
	2.20	D7																																																																																																																																										
3	3.20 - 3.65	SPT8	3.2	SPT (S) 2 (1-0-0-1-0-1)	(3.20)			(3.20)																																																																																																																																				
	3.20 - 3.70	B9																																																																																																																																										
4	4.20 - 4.65	SPT10	4.2	SPT (S) 4 (1-0-1-1-1-1)																																																																																																																																								
	4.20 - 4.70	B11																																																																																																																																										
5	5.20 - 5.65	SPT12	5.2	SPT (S) 7 (1-0-1-1-2-3)	5.30			5.30																																																																																																																																				
	5.20 - 5.70	B13																																																																																																																																										
	5.30	D14																																																																																																																																										
6	6.50 - 6.95	SPT15	6.5	SPT (S) 17 (1-2-3-4-5-5)	(2.50)	Soft grey green sandy gravelly SILT with low to medium cobble content. Sand is fine, gravel is fine to coarse rounded to sub-rounded of siltstone and sandstone. Cobbles are rounded to sub-rounded of sandstone.		(2.50)																																																																																																																																				
	6.50 - 7.00	B16																																																																																																																																										
7																																																																																																																																												
8	8.00 - 8.40	B17	8	SPT (C) 46 (4-7-10-10-9-17)	7.80	Brown medium dense slightly sandy silty GRAVEL with low to medium cobble content. Gravel is fine to coarse rounded to sub-rounded of siltstone and sandstone. Cobbles are rounded to sub-rounded of sandstone.		7.80																																																																																																																																				
					(0.20)			(0.20)																																																																																																																																				
9			9	SPT (C) 45 (3-6-9-9-12-15)	(2.00)			(2.00)																																																																																																																																				
	9.50 - 10.00	B18																																																																																																																																										
10					10.00	Dense brown grey sandy GRAVEL with medium to high cobble content. Gravel is fine to coarse rounded to sub-rounded of siltstone and sandstone, cobbles are rounded to sub-rounded of sandstone.		10.00																																																																																																																																				
11			11	SPT (C) 53 (8-13-14-18-21-)	(3.30)	Dense brown slightly clayey sandy GRAVEL with medium to high cobble and boulder content. Gravel is fine to coarse rounded to sub-rounded of sandstone and siltstone, cobbles and boulders are rounded to sub-rounded of sandstone.		(3.30)																																																																																																																																				
12																																																																																																																																												
	12.50 - 12.90	B19	12.5	SPT (C) 59 (5-11-10-15-15-19)																																																																																																																																								
13			13.3	SPT (C) 50/20mm (15-10/40mm-50/20mm-)	13.30	BH terminated at 13.30mbgl within dense cobbles and boulders		13.30																																																																																																																																				
14																																																																																																																																												
<table border="1"> <thead> <tr> <th colspan="4">Hole Progress / Water Obs</th> <th colspan="2">Casing</th> <th colspan="3">Groundwater</th> <th colspan="3">Chiselling</th> </tr> <tr> <th>Date / Time</th> <th>H. Depth</th> <th>C. Depth</th> <th>Water</th> <th>Depth</th> <th>Cas. Dia.</th> <th>Struck</th> <th>Rose To</th> <th>Behaviour</th> <th>Sealed</th> <th>From</th> <th>To</th> <th>Hours</th> </tr> </thead> <tbody> <tr> <td>22/01/2018</td> <td>8.00</td> <td>6.00</td> <td>7.00</td> <td>6.00</td> <td>200.00</td> <td>0.80</td> <td>0.80</td> <td>Slow water seepage at 0.80mbgl</td> <td></td> <td>8.40</td> <td>8.70</td> <td>1:00</td> </tr> <tr> <td>17:00</td> <td>8.00</td> <td>6.00</td> <td>1.00</td> <td>13.30</td> <td>150.00</td> <td>7.50</td> <td>7.00</td> <td>Medium water strike at 7.50mbgl</td> <td></td> <td>11.30</td> <td>12.00</td> <td>1:30</td> </tr> <tr> <td>23/01/2018</td> <td>13.30</td> <td>13.00</td> <td>2.30</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>12.90</td> <td>13.30</td> <td>1:30</td> </tr> <tr> <td>08:00</td> <td>13.30</td> <td>13.00</td> <td>2.30</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>23/01/2018</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>17:00</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>24/01/2018</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>08:00</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>												Hole Progress / Water Obs				Casing		Groundwater			Chiselling			Date / Time	H. Depth	C. Depth	Water	Depth	Cas. Dia.	Struck	Rose To	Behaviour	Sealed	From	To	Hours	22/01/2018	8.00	6.00	7.00	6.00	200.00	0.80	0.80	Slow water seepage at 0.80mbgl		8.40	8.70	1:00	17:00	8.00	6.00	1.00	13.30	150.00	7.50	7.00	Medium water strike at 7.50mbgl		11.30	12.00	1:30	23/01/2018	13.30	13.00	2.30							12.90	13.30	1:30	08:00	13.30	13.00	2.30										23/01/2018													17:00													24/01/2018													08:00												
Hole Progress / Water Obs				Casing		Groundwater			Chiselling																																																																																																																																			
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22/01/2018	8.00	6.00	7.00	6.00	200.00	0.80	0.80	Slow water seepage at 0.80mbgl		8.40	8.70	1:00																																																																																																																																
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Remarks: Dando 2000 cable percussion rig																																																																																																																																												
 Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk					Operator: G Williams		Logged By: S Picton		Sheet No. 1 Of 1		m Per Page 15		All measurements in metres unless otherwise stated																																																																																																																															

Contract : Former Health Centre, Hunter Street Client : H Singh										Borehole No. BH02		
Dates : 24/1/18 - 26/1/18 Location : Within rear of carpark area					Job Number : G40104 Engineer : RB Planning			Ground Level : Coordinates:				

m B.G.L.	Samples		Insitu Test Results		Strata			Legend	Depth (Thickness)	Water	Install/ Backfill
	Depth	Type No. Blows	Depth	Test Results	Depth (Thickness)	Description	Depth (Thickness)				
0	0.20	ES1			(0.10)	Black tarmac.	(0.10)				
1	0.20 - 0.40	B2	1.2	SPT (C) 50/43mm (50/43mm---)	0.10	MADE GROUND - Grey slightly sandy Gravel. Gravel is fine to coarse angular to sub-angular of limestone.	0.10		1		
	0.50	ES3			(0.30)		(0.30)				
	0.50 - 1.00	B3A			0.40		0.40				
	1.00	ES4			(0.70)		(0.70)				
	1.20 - 2.00	B5			1.10		1.10				
2	2.00	ES5A	2.2	SPT (C) 4 (1-2-1-0-0-3)	(0.60)	MADE GROUND - Soft black brown sandy gravelly Clay with medium cobble content. Gravel is fine to coarse angular to sub-angular of brick and limestone with frequent traces of bricks and ash. Cobbles are sub-angular to sub-rounded of sandstone.	(0.60)				
	2.20 - 2.70	B6			1.70		1.70				
3	3.10	D6A	3.2	SPT (C) 2 (1-0-0-1-0-1)	(0.30)	MADE GROUND - Brown sandy Cobbles and Boulders. Cobbles and boulders are sub-angular to sub-rounded of sandstone.	(0.30)				
	3.20 - 3.65	SPT7			2.00		2.00				
	3.20 - 3.70	B8			(1.10)		(1.10)				
4	4.20 - 4.65	SPT9	4.2	SPT (C) 2 (1-0-1-0-1-0)		Brown very sandy gravelly COBBLES. Sand is fine. Gravel and cobbles are rounded to sub-rounded of sandstone and siltstone.					
	4.20 - 4.70	B10									
5	5.20 - 5.65	SPT11	5.2	SPT (S) 4 (1-0-1-1-1-1)	(3.70)	Brown slightly sandy PEAT with medium cobble content. Sand is fine. Cobbles are rounded to sub-rounded of sandstone.	(3.70)				
	5.20 - 5.70	B12									
6	6.00	D13	6.5	SPT (S) 9 (1-1-2-2-3)		Very soft to soft brown PEAT.					
	6.50 - 6.95	SPT15									
7	6.50 - 7.00	B16	8.5	SPT (S) 12 (1-2-2-3-4)	6.80	Firm to stiff grey slightly sandy gravelly SILT/CLAY with low to medium cobble content. Sand is fine, gravel is fine to coarse rounded to sub-rounded of siltstone and sandstone with rare traces of peat. Cobbles are rounded to sub-rounded of sandstone.	6.80		1		
	6.90	D17			(0.70)		(0.70)				
	7.00 - 7.45	U18 - 24/100%			7.50		7.50				
8	8.00	D19	8.5	SPT (S) 12 (1-2-2-3-4)	(1.80)	Brown medium dense slightly sandy silty GRAVEL with low to medium cobble content. Gravel is fine to coarse rounded to sub-rounded of siltstone and sandstone. Cobbles are rounded to sub-rounded of sandstone.	(1.80)				
	8.50 - 8.95	SPT20									
9	8.50 - 9.00	B21	9.30	D22		Soft to firm grey sandy SILT/CLAY.					
	9.50										
10	10.00 - 10.45	SPT23	10	SPT (S) 4 (1-0-1-1-1)	(1.50)		(1.50)				
	10.00 - 10.50	B24									
11	11.00 - 11.50	B25	11	SPT (C) 23 (2-4-4-5-7-7)	10.80	Dense brown slightly clayey sandy GRAVEL with high cobble and boulder content. Gravel is fine to coarse rounded to sub-rounded of sandstone and siltstone, cobbles and boulders are rounded to sub-rounded of sandstone.	10.80		1		
	12.50 - 13.00	B26									
12			12.5	SPT (C) 54 (19-7-11-13-13-17)	(3.40)		(3.40)				
13			14	SPT (C) 50/100mm (17-8/20mm-29-21/25mm-)							
14			14.2	SPT (C) 50/0mm (50mm---)	14.20	BH terminated at 14.20mbgl within dense cobbles and boulders	14.20				

Hole Progress / Water Obs				Casing		Groundwater				Chiselling		
Date / Time	H. Depth	C. Depth	Water	Depth	Cas. Dia.	Struck	Rose To	Behaviour	Sealed	From	To	Hours
24/01/2018	7.50	6.00		6.00	200.00	1.00	0.80	Slow water seepage at 1.00mbgl		1.10	1.70	1:30
17:00	7.50	6.00	7.30	14.20	150.00	10.80	7.60	Medium water strike at 10.80mbgl		12.20	12.60	1:00
25/01/2018										12.90	13.10	0:30
08:00										14.00	14.20	1:00

Remarks: Dando 2000 cable percussion rig												
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	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: G Williams	Logged By: S Picton	Sheet No. 1 Of 1	m Per Page 15	All measurements in metres unless otherwise stated	
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APPENDIX III – TRIAL PIT LOGS AND SOAKAWAY TEST RESULTS

Contract : Former Health Centre, Hunter Street Client : H Singh							Trial Pit No. TP01	
Dates : 29/1/18 - 29/1/18 Location : Within rear of carpark area			Job Number : G40104 Engineer : RB Planning			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1	0.30 - 0.50	ES1			0.10	Black tarmac.		(0.10)
					0.10	MADE GROUND - Grey slightly sandy Gravel. Gravel is fine to coarse angular to sub-angular of limestone.		0.10
	0.50 - 1.00	B2			0.30			(0.30)
					0.40	MADE GROUND - Soft black brown sandy clayey Gravel with medium cobble content. Gravel is fine to coarse angular to sub-angular of brick and limestone with frequent traces of bricks and ash. Cobbles are sub-angular to sub-rounded of sandstone.		0.40
					0.50			(0.50)
	1.00 -	ES3			0.90	MADE GROUND - Grey Concrete.		0.90
					0.10			(0.10)
1.00	TP terminated at 1.00mbgl on concrete.		1.00					

PLAN

Groundwater: Slow water seepage at 1.00mbgl

Stability: Stable.

Shoring: N/A

Remarks : TP position marked out on site by QGL in close liason with the project engineer, services checked and area CAT scanned.

Equipment Used: 5 tonne tracked 360 excavator

	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: K Jones	Logged By: S Picton	Sheet No. 1 Of 2	m Per Page 3	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street

Client : H Singh

**Trial Pit No.
TP01**

Dates : 29/1/18 - 29/1/18

Job Number : G40104

Ground Level :

Location : Within rear of carpark area

Engineer : RB Planning

Coordinates:



Contract : Former Health Centre, Hunter Street Client : H Singh							Trial Pit No. TP02	
Dates : 29/1/18 - 29/1/18 Location : Within grassed area			Job Number : G40104 Engineer : RB Planning			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Depth (Thickness)	
1	0.10 -	D1A			0.15	Grass over brown sandy silty TOPSOIL with frequent rootlets.		(0.15)	
	0.30 - 0.50	ES1			0.15	MADE GROUND - Soft black brown sandy silty Gravel with medium cobble content. Gravel is fine to coarse angular to sub-angular of brick and limestone with frequent traces of bricks, slag and ash. Cobbles are sub-angular to sub-rounded of sandstone.		0.15	
	0.50 - 1.00	B3			0.85			(0.85)	
	1.00 - 1.00 - 1.50	ES2 B4			1.00	Grey slightly silty SAND. sand is fine.		1.00	
2	2.00 -	ES5 D6			2.00	TP terminated at 2.00mbgl sides unstable and collapsing.		2.00	

PLAN 		Groundwater: Slow water seepage at 2.00mbgl Stability: Unstable and collapsing below 2.00mbgl Shoring: N/A		Remarks : TP position marked out on site by QGL in close liason with the project engineer, services checked and area CAT scanned. Soakaway test undertaken at base of pit.	
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Equipment Used: 5 tonne tracked 360 excavator

	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: K Jones	Logged By: S Picton	Sheet No. 1 Of 2	m Per Page 3	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street

Client : H Singh

Trial Pit No.

TP02

Dates : 29/1/18 - 29/1/18

Job Number : G40104

Ground Level :

Location : Within grassed area

Engineer : RB Planning

Coordinates:



Ty Berwig, Bynea
Llanelli, Carmarthenshire SA14 9ST
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Fax: 01554 776150
email: enquiries@quantum-geotech.co.uk

Operator:
K Jones

Logged By:
S Picton

Sheet No.
2 Of 2

m Per
Page

All measurements in
metres unless
otherwise stated



Contract : Former Health Centre, Hunter Street Client : H Singh							Trial Pit No. TP03	
Dates : 29/1/18 - 29/1/18 Location : Within grassed area			Job Number : G40104 Engineer : RB Planning			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Depth (Thickness)	
1	0.10 -	D1			0.10	Grass over brown sandy silty TOPSOIL with frequent rootlets.		(0.10)	
					0.10	MADE GROUND - Black tarmac		0.10	
	0.30 - 0.50	ES2			0.05	MADE GROUND - Soft black brown red sandy silty Gravel with medium cobble content. Gravel is fine to coarse angular to sub-angular of brick and limestone with frequent traces of bricks, slag and ash. Cobbles are sub-angular to sub-rounded of sandstone.		0.10	
					0.15			(0.05)	
	0.50 - 1.00	B3			0.85	...At 0.70mbgl layer of red clinker 0.10m in thickness.		(0.85)	
2	1.00 -	ES4			1.00	Grey slightly silty SAND. sand is fine.		1.00	
	1.00 - 2.00	B5			1.00			(1.00)	
2	2.00 -	ES6			2.00	Brown slightly sandy PEAT. Sand is fine. Peat is weakly decomposed.		2.00	
	2.00 - 3.00	B7			1.00			(1.00)	
3	3.00 -	D8			3.00	TP terminated at 3.00mbgl sides unstable and collapsing.		3.00	

PLAN 	Groundwater: Slow water seepage at 2.90mbgl Stability: Unstable and collapsing below 2.50mbgl Shoring: N/A	Remarks : TP position marked out on site by QGL in close liason with the project engineer, services checked and area CAT scanned. Soakaway test undertaken at base of pit.
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Equipment Used: 5 tonne tracked 360 excavator							
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	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: K Jones	Logged By: S Picton	Sheet No. 1 Of 2	m Per Page 4	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street

Client : H Singh

Trial Pit No.

TP03

Dates : 29/1/18 - 29/1/18

Job Number : G40104

Ground Level :

Location : Within grassed area

Engineer : RB Planning

Coordinates:



Ty Berwig, Bynea
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Fax: 01554 776150
email: enquiries@quantum-geotech.co.uk

Operator:
K Jones

Logged By:
S Picton

Sheet No.
2 Of 2

m Per
Page

All measurements in
metres unless
otherwise stated



APPENDIX IV – DYNAMIC PROBE RESULTS

Contract : Former Health Centre, Hunter Street Client : H Singh		Dynamic Probe DP01
Dates : 29/1/18 - 29/1/18 Location : Along raised paving area	Job Number : G40104 Engineer : RB Planning	Ground Level : Coordinates:

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.5	2																
		2															
			2														
				2													
	1				2												
1.0		1															
			2														
				1													
	1				1												
		1															
1.5			1														
				1													
					2												
	2																
		4															
2.0			6														
				10													
					15												
	15																
2.5																	
3.0																	
3.5																	
4.0																	
4.5																	
5.0																	
5.5																	
6.0																	
6.5																	
7.0																	
7.5																	
8.0																	
8.5																	
9.0																	
9.5																	

Equipment: Dando Terrier Rig					Comments: Refused at 2.00mbgl				
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2									
	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 1 Of 1	m Per Page 10	All measurements in metres unless otherwise stated			

Contract : Former Health Centre, Hunter Street

Client : H Singh

Dynamic Probe
DP02

Dates : 29/1/18 - 29/1/18

Job Number : G40104

Ground Level :

Location : Along raised paving area

Engineer : RB Planning

Coordinates:

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
	3																
		3															
			1														
				1													
0.5	2				1												
		2															
			2														
				2													
1.0	1				2												
		2															
			2														
				1													
1.5	1				1												
		2															
			2														
				2													
2.0	2				2												
		4															
			2														
				4													
2.5	8				6												
		3															
			12														
				13													
3.0	3				5												
		2															
			2														
				6													
3.5	8				9												
		3															
			2														
				1													
4.0	1				1												
		2															
			1														
				2													
4.5	6				3												
		10															
			9														
				8													
5.0	6				8												
		8															
			10														
				12													
5.5					25												
6.0																	
6.5																	
7.0																	
7.5																	
8.0																	
8.5																	
9.0																	
9.5																	

Equipment: Dando Terrier Rig

Comments: Refused at 5.40mbgl

Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2



Ty Berwig, Bynae
Llanelli, Carmarthenshire SA14 9ST
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Operator:
D Pulman

Logged By:
S Picton

Sheet No.
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m Per
Page
10

All measurements in
metres unless
otherwise stated



Contract : Former Health Centre, Hunter Street Client : H Singh										Dynamic Probe DP03	
Dates : 29/1/18 - 29/1/18 Location : Along raised paving area					Job Number : G40104 Engineer : RB Planning					Ground Level : Coordinates:	

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.0	2	6															
0.1			9														
0.2				6													
0.3	4				5												
0.4		4															
0.5			4														
0.6				3													
0.7	2				2												
0.8		2															
0.9			3														
1.0				6													
1.1	6				5												
1.2		5															
1.3			4														
1.4				2													
1.5					1												
1.6	1																
1.7		2															
1.8			3														
1.9				3													
2.0	2				2												
2.1		3															
2.2			4														
2.3				1													
2.4	2				1												
2.5		2															
2.6			2														
2.7				3													
2.8	5				6												
2.9		8															
3.0			1														
3.1				0													
3.2	0				0												
3.3		0															
3.4			0														
3.5				1													
3.6					0												
3.7	0																
3.8		0															
3.9			0														
4.0				0													
4.1	1				0												
4.2		0															
4.3			0														
4.4				1													
4.5					0												
4.6	0																
4.7		0															
4.8			0														
4.9				0													
5.0	1				0												
5.1		0															
5.2			0														
5.3				1													
5.4	0				1												
5.5		0															
5.6			1														
5.7				0													
5.8	0				0												
5.9		0															
6.0			1														
6.1				0													
6.2	0				1												
6.3		1															
6.4			0														
6.5				1													
6.6	0																
6.7		1															
6.8			0														
6.9				1													
7.0	0				0												
7.1		1															
7.2			0														
7.3				0													
7.4	0				1												
7.5		1															
7.6			0														
7.7				0													
7.8	1				0												
7.9		1															
8.0			0														
8.1				0													
8.2	0				1												
8.3		0															
8.4			0														
8.5				0													
8.6	0				1												
8.7		1															
8.8			1														
8.9				0													
9.0	1				1												
9.1		1															
9.2			1														
9.3				1													
9.4	1																
9.5		1															
9.6			1														
9.7				1													
9.8					1												
9.9						1											
10.0							1										

Equipment: Dando Terrier Rig Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2					Comments:				
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	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 1 Of 2	m Per Page 10	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street Client : H Singh											Dynamic Probe DP03	
Dates : 29/1/18 - 29/1/18 Location : Along raised paving area					Job Number : G40104 Engineer : RB Planning					Ground Level : Coordinates:		

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
1																	
10.5																	
11.0																	
11.5																	
12.0																	
12.5																	
13.0																	
13.5																	
14.0																	
14.5																	
15.0																	
15.5																	
16.0																	
16.5																	
17.0																	
17.5																	
18.0																	
18.5																	
19.0																	
19.5																	

Equipment: Dando Terrier Rig Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2					Comments:				
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	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 2 Of 2	m Per Page 10	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street Client : H Singh	Dynamic Probe DP04
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Dates : 29/1/18 - 29/1/18 Location : Within grassed area	Job Number : G40104 Engineer : RB Planning	Ground Level : Coordinates:
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Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.0	0																
0.5		0	0														
				18													
	13				15												
		11															
1.0			8														
				4													
					2												
	0																
1.5		0															
			0														
				0													
	1				2												
2.0		0															
			0														
				0													
	0				0												
2.5		0															
			0														
				0													
	0				0												
3.0		0															
			0														
				0													
	0				0												
3.5		0															
			0														
				0													
	0				0												
4.0		0															
			0														
				0													
	0				0												
4.5		1															
			0														
				0													
	1				0												
5.0		0															
			0														
				0													
	1				1												
5.5		0															
			0														
				1													
	0				0												
6.0		0															
			0														
				0													
	0				1												
6.5		1															
			0														
				0													
	1				1												
7.0		0															
			0														
				0													
	0				1												
7.5		1															
			0														
				0													
	1				1												
8.0		0															
			0														
				1													
	0				0												
8.5		1															
			0														
				1													
	1				0												
9.0		0															
			1														
				1													
	1				1												
9.5		1															
			1														
				2													
					1												

Equipment: Dando Terrier Rig	Comments:
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2	

	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 1 Of 2	m Per Page 10	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street Client : H Singh											Dynamic Probe DP04	
Dates : 29/1/18 - 29/1/18 Location : Within grassed area					Job Number : G40104 Engineer : RB Planning					Ground Level : Coordinates:		

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
1																	
10.5																	
11.0																	
11.5																	
12.0																	
12.5																	
13.0																	
13.5																	
14.0																	
14.5																	
15.0																	
15.5																	
16.0																	
16.5																	
17.0																	
17.5																	
18.0																	
18.5																	
19.0																	
19.5																	

Equipment: Dando Terrier Rig					Comments:				
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2									

	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 2 Of 2	m Per Page 10	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street Client : H Singh		Dynamic Probe DP05
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Dates : 29/1/18 - 29/1/18 Location : Within rear of carpark area	Job Number : G40104 Engineer : RB Planning	Ground Level : Coordinates:
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Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
	5																
		5															
			5														
				5													
0.5					5												
	8																
		4															
			4														
				3													
1.0	1				1												
		0															
			0														
				0													
1.5	1				0												
		1															
			1														
				1													
2.0	1				1												
		1															
			1														
				0													
2.5	0				0												
		0															
			0														
				0													
3.0	0				0												
		0															
			0														
				1													
3.5	0				0												
		0															
			0														
				0													
4.0	0				0												
		1															
			0														
				0													
4.5	1				0												
		0															
			0														
				0													
5.0	0				0												
		1															
			0														
				0													
5.5	0				1												
		0															
			0														
				0													
6.0	0				1												
		1															
			0														
				0													
6.5	1				0												
		0															
			1														
				0													
7.0	1				0												
		1															
			0														
				1													
7.5	0				1												
		0															
			0														
				1													
8.0	0				1												
		1															
			0														
				1													
8.5	1				0												
		0															
			0														
				1													
9.0	1				1												
		1															
			1														
				1													
9.5	1				2												
		1															
			1														
				2													
				2													

Equipment: Dando Terrier Rig	Comments:
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2	

	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 1 Of 2	m Per Page 10	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street Client : H Singh											Dynamic Probe DP05	
Dates : 29/1/18 - 29/1/18 Location : Within rear of carpark area					Job Number : G40104 Engineer : RB Planning					Ground Level : Coordinates:		

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
10.5																	
11.0																	
11.5																	
12.0																	
12.5																	
13.0																	
13.5																	
14.0																	
14.5																	
15.0																	
15.5																	
16.0																	
16.5																	
17.0																	
17.5																	
18.0																	
18.5																	
19.0																	
19.5																	

Equipment: Dando Terrier Rig					Comments:				
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2									

	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 2 Of 2	m Per Page 10	All measurements in metres unless otherwise stated	
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Contract : Former Health Centre, Hunter Street Client : H Singh		Dynamic Probe DP06
Dates : 29/1/18 - 29/1/18 Location : Within rear of carpark area	Job Number : G40104 Engineer : RB Planning	Ground Level : Coordinates:

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.5	5																
		5															
			5														
				5													
	10				5												
		4															
			4														
				3													
1.0					1												
	1																
		0															
			0														
				0													
1.5					0												
	1																
		1															
			1														
				1													
2.0																	
	1				1												
		1															
			1														
				1													
2.5																	
				0													
	0				0												
		0															
			0														
3.0																	
	0			0													
		0			0												
			0														
				1													
3.5					0												
	0																
		0															
			0														
				0													
4.0																	
	1																
		0															
			0														
				0													
4.5																	
	1																
		0															
			0														
				0													
5.0																	
	0				0												
		1															
			0														
				0													
5.5																	
	0																
		0															
			0														
				0													
6.0																	
	0																
		1															
			0														
				0													
6.5																	
	1																
		0															
			1														
				0													
7.0																	
	1																
		1															
			0														
				1													
7.5																	
	0																
		0															
			0														
				1													
8.0																	
	0																
		1															
			1														
				0													
8.5																	
	1																
		0															
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				1													
9.0																	
	1																
		1															
			1														
				1													
9.5																	
					2												
	1																
		1															
			1														
				2													
				2													

Equipment: Dando Terrier Rig					Comments:				
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2									
	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 1 Of 2	m Per Page 10	All measurements in metres unless otherwise stated			

Contract : Former Health Centre, Hunter Street Client : H Singh											Dynamic Probe DP06	
Dates : 29/1/18 - 29/1/18 Location : Within rear of carpark area					Job Number : G40104 Engineer : RB Planning					Ground Level : Coordinates:		

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
10.5																	
11.0																	
11.5																	
12.0																	
12.5																	
13.0																	
13.5																	
14.0																	
14.5																	
15.0																	
15.5																	
16.0																	
16.5																	
17.0																	
17.5																	
18.0																	
18.5																	
19.0																	
19.5																	

Equipment: Dando Terrier Rig					Comments:				
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2									

	Ty Berwig, Bynea Llanelli, Carmarthenshire SA14 9ST Tel: 01554 744880 Fax: 01554 776150 email: enquiries@quantum-geotech.co.uk	Operator: D Pulman	Logged By: S Picton	Sheet No. 2 Of 2	m Per Page 10	All measurements in metres unless otherwise stated	
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APPENDIX V – GROUNDWATER & GROUNDGAS MONITORING RESULTS

APPENDIX VI – GEOTECHNICAL LABORATORY TEST RESULTS

Particle Size Distribution & Moisture Content

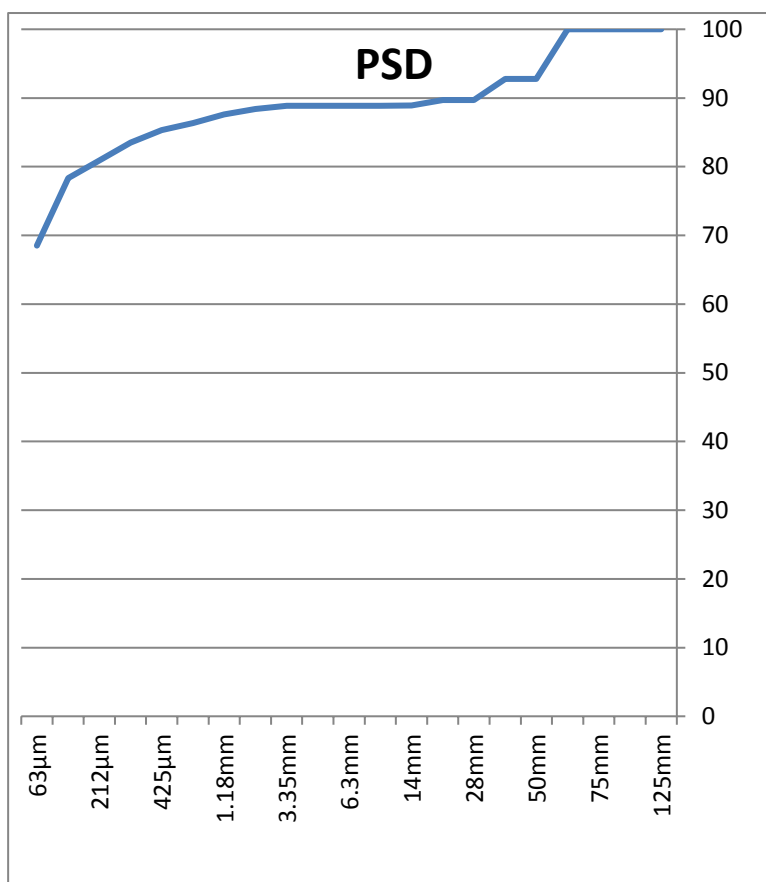
BS1377: Pt2: 1990 Clause 9 & Clause 3

8295

LABORATORY REPORT G40104/18/PSD1
Date: 26 January 2018

Project	G40104 - Former Surgery, Hunter Street, Briton Ferry		
Material	Grey slightly gravelly slightly sandy CLAY		
Location	BH01 - B13	Depth (m)	5.2 - 5.7
Contractor	Quantum	Sample Certificate	Yes
Source	In Situ	Ticket Number	N/A
Date Sampled	22.1.18	Date Received	24.1.18
Date Test Start	24.1.18	Date Tested To	26.1.18
Sampled By	Quantum	Sample Type	Bulk

Sieve size	% passing	Specification
125mm	100	
90mm	100	
75mm	100	
63mm	100	
50mm	93	
37.5mm	93	
28mm	90	
20mm	90	
14mm	89	
10mm	89	
6.3mm	89	
5mm	89	
3.35mm	89	
2mm	88	
1.18mm	88	
600µm	86	
425µm	85	
300µm	84	
212µm	81	
150µm	78	
63µm	69	
Particle Diameter	Percentage Passing	
0.020		
0.006		
0.002		



Moisture Content %	Uniformity Coefficient	Lower Limit
69		

Soil Fraction	Cobbles	Gravel	Sand	Silt/Clay	-
Total Percentage	0	12	20	69	-

Remarks : Opinions and Interpretations expressed herein are outside the scope of UKAS accreditation

Client Name: B & H Singh
135 Hendre Road
Llanelli
SA14 8TH

Signed: *G. Morris*
G. Morris
Laboratory Manager

Particle Size Distribution & Moisture Content

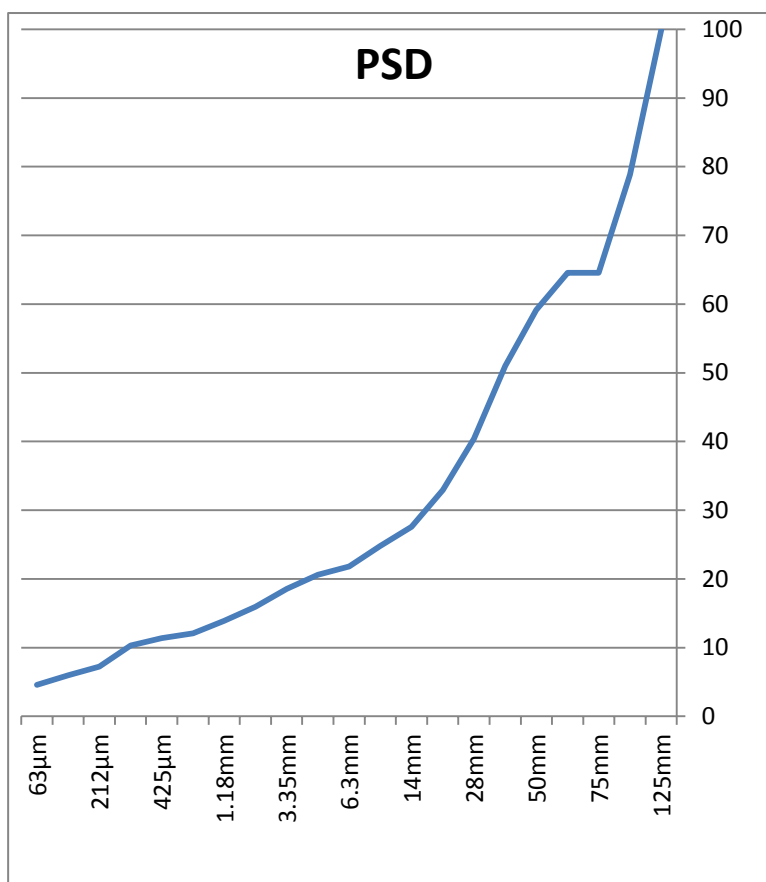
BS1377: Pt2: 1990 Clause 9 & Clause 3

8295

LABORATORY REPORT G40104/18/PSD2
Date: 29 January 2018

Project	G40104 - Former Surgery, Hunter Street, Briton Ferry		
Material	Dark Brown clayey sandy GRAVEL with cobbles.		
Location	BH02 - B5	Depth (m)	1.0 - 2.0
Contractor	Quantum	Sample Certificate	Yes
Source	In Situ	Ticket Number	N/A
Date Sampled	24.1.18	Date Received	25.1.18
Date Test Start	25.1.18	Date Tested To	29.1.18
Sampled By	Quantum	Sample Type	Bulk

Sieve size	% passing	Specification
125mm	100	
90mm	79	
75mm	65	
63mm	65	
50mm	59	
37.5mm	51	
28mm	40	
20mm	33	
14mm	28	
10mm	25	
6.3mm	22	
5mm	21	
3.35mm	19	
2mm	16	
1.18mm	14	
600µm	12	
425µm	11	
300µm	10	
212µm	7	
150µm	6	
63µm	5	
Particle Diameter	Percentage Passing	
0.020		
0.006		
0.002		



Moisture Content %	Uniformity Coefficient	Lower Limit
18		

Soil Fraction	Cobbles	Gravel	Sand	Silt/Clay	-
Total Percentage	35	49	11	5	-

Remarks : Opinions and Interpretations expressed herein are outside the scope of UKAS accreditation

Client Name: B & H Singh
135 Hendre Road
Llanelli
SA14 8TH

Signed: *G. Morris*
G. Morris
Laboratory Manager

Particle Size Distribution & Moisture Content

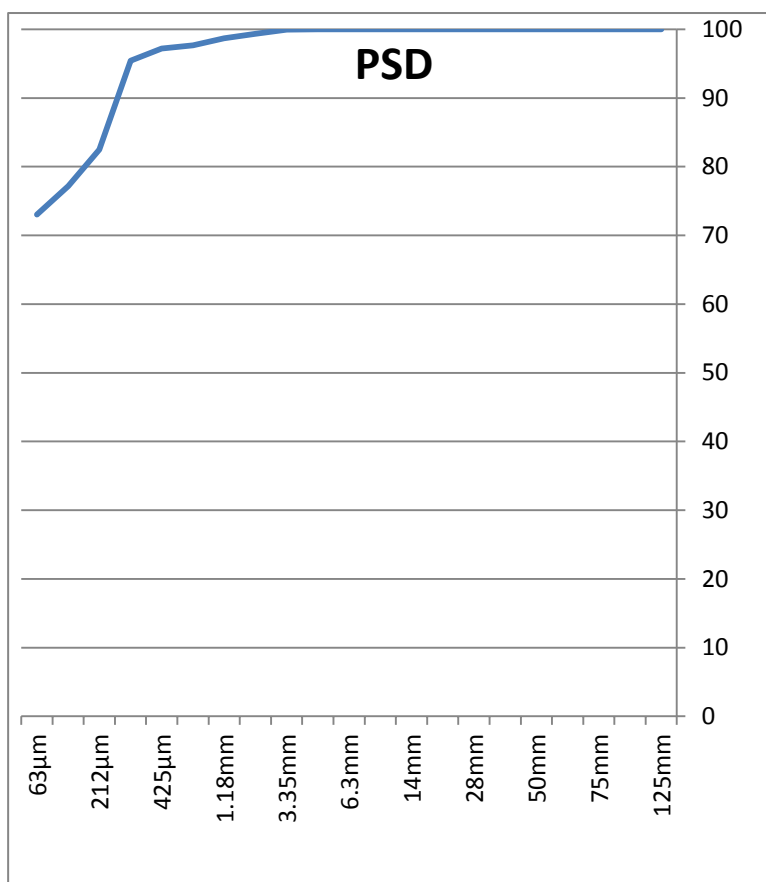
BS1377: Pt2: 1990 Clause 9 & Clause 3

8295

LABORATORY REPORT G40104/18/PSD3
Date: 29 January 2018

Project	G40104 - Former Surgery, Hunter Street, Briton Ferry		
Material	Brown slightly gravelly slightly sandy CLAY		
Location	BH02 - B8	Depth (m)	3.2 - 3.7
Contractor	Quantum	Sample Certificate	Yes
Source	In Situ	Ticket Number	N/A
Date Sampled	24.1.18	Date Received	25.1.18
Date Test Start	25.1.18	Date Tested To	29.1.18
Sampled By	Quantum	Sample Type	Bulk

Sieve size	% passing	Specification
125mm	100	
90mm	100	
75mm	100	
63mm	100	
50mm	100	
37.5mm	100	
28mm	100	
20mm	100	
14mm	100	
10mm	100	
6.3mm	100	
5mm	100	
3.35mm	100	
2mm	99	
1.18mm	99	
600µm	98	
425µm	97	
300µm	95	
212µm	82	
150µm	77	
63µm	73	
Particle Diameter	Percentage Passing	
0.020		
0.006		
0.002		



Moisture Content %	Uniformity Coefficient	Lower Limit
104		

Soil Fraction	Cobbles	Gravel	Sand	Silt/Clay	-
Total Percentage	0	1	26	73	-

Remarks : Opinions and Interpretations expressed herein are outside the scope of UKAS accreditation

Client Name: B & H Singh
135 Hendre Road
Llanelli
SA14 8TH

Signed: *G. Morris*
G. Morris
Laboratory Manager

Particle Size Distribution & Moisture Content

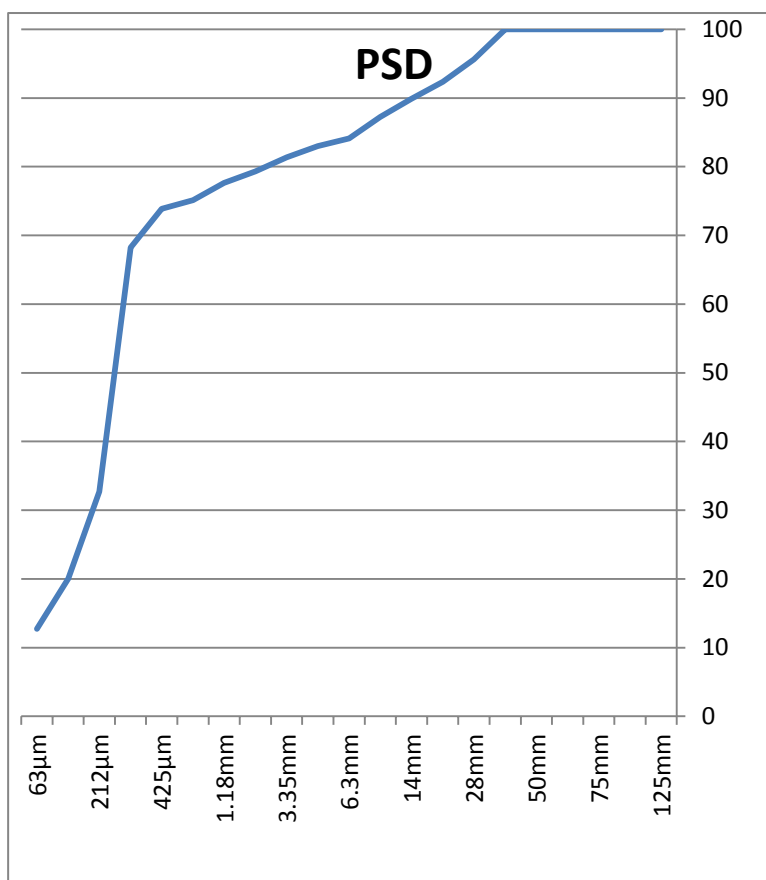
BS1377: Pt2: 1990 Clause 9 & Clause 3

8295

LABORATORY REPORT G40104/18/PSD4
Date: 01 February 2018

Project	G40104 - Former Surgery, Hunter Street, Briton Ferry		
Material	Dark brown clayey very gravelly SAND		
Location	TP02 - B3	Depth (m)	0.5 - 1.0
Contractor	Quantum	Sample Certificate	Yes
Source	In Situ	Ticket Number	N/A
Date Sampled	29.1.18	Date Received	30.1.18
Date Test Start	30.1.18	Date Tested To	1.2.18
Sampled By	Quantum	Sample Type	Bulk

Sieve size	% passing	Specification
125mm	100	
90mm	100	
75mm	100	
63mm	100	
50mm	100	
37.5mm	100	
28mm	96	
20mm	92	
14mm	90	
10mm	87	
6.3mm	84	
5mm	83	
3.35mm	81	
2mm	79	
1.18mm	78	
600µm	75	
425µm	74	
300µm	68	
212µm	33	
150µm	20	
63µm	13	
Particle Diameter	Percentage Passing	
0.020		
0.006		
0.002		



Moisture Content %	Uniformity Coefficient	Lower Limit
25		

Soil Fraction	Cobbles	Gravel	Sand	Silt/Clay	-
Total Percentage	0	21	67	13	-

Remarks : Opinions and Interpretations expressed herein are outside the scope of UKAS accreditation

Client Name: B & H Singh
135 Hendre Road
Llanelli
SA14 8TH

Signed: *T.M. Burke*
T.M. Burke
Senior Technician

APPENDIX VII – ENVIRONMENTAL LABORATORY TEST RESULTS

**Steffan Picton**

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Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 18-73851

Project / Site name: Former Surgery Hunter Street, Briton Ferry

Your job number: G40104

Your order number:

Report Issue Number: 1

Samples Analysed: 3 soil samples

Samples received on: 25/01/2018

Samples instructed on: 25/01/2018

Analysis completed by: 02/02/2018

Report issued on: 02/02/2018

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 18-73851

Project / Site name: Former Surgery Hunter Street, Briton Ferry

Lab Sample Number				895146	895147	895148		
Sample Reference				BH01	BH01	BH01		
Sample Number				2	6	13		
Depth (m)				0.30-0.50	2.20-2.70	5.20-5.70		
Date Sampled				22/01/2018	22/01/2018	22/01/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	5.7	75	34		
Total mass of sample received	kg	0.001	NONE	2.0	0.35	0.40		

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	-		
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.0	7.3	7.4		
Total Cyanide	mg/kg	1	MCERTS	< 1	-	-		
Total Sulphate as SO ₄	mg/kg	50	MCERTS	650	2300	560		
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.0065	0.15		
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	6.5	148		
Sulphide	mg/kg	1	MCERTS	15	-	-		
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	-	750	200		
Elemental Sulphur	mg/kg	5	MCERTS	< 5.0	-	-		
Total Sulphur	mg/kg	50	MCERTS	-	11000	5700		
Ammonium as NH ₄	mg/kg	0.5	MCERTS	-	260	41		
Organic Matter	%	0.1	MCERTS	1.8	-	-		
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	-	< 2.0	2.2		

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-		
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	-		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	-		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	-		
Phenanthrene	mg/kg	0.05	MCERTS	0.30	-	-		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-		
Fluoranthene	mg/kg	0.05	MCERTS	0.77	-	-		
Pyrene	mg/kg	0.05	MCERTS	0.67	-	-		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.76	-	-		
Chrysene	mg/kg	0.05	MCERTS	0.80	-	-		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.4	-	-		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.58	-	-		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.0	-	-		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.48	-	-		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	-		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.62	-	-		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	7.43	-	-		
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	31	-	-		
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	-	-		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	-		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	-		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	9.9	-	-		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	41	-	-		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	60	-	-		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	-		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	-	-		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	-		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	-	-		



Analytical Report Number: 18-73851

Project / Site name: Former Surgery Hunter Street, Briton Ferry

Lab Sample Number				895146	895147	895148		
Sample Reference				BH01	BH01	BH01		
Sample Number				2	6	13		
Depth (m)				0.30-0.50	2.20-2.70	5.20-5.70		
Date Sampled				22/01/2018	22/01/2018	22/01/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0	-	-		
Toluene	ug/kg	1	MCERTS	< 1.0	-	-		
Ethylbenzene	ug/kg	1	MCERTS	< 1.0	-	-		
p & m-xylene	ug/kg	1	MCERTS	< 1.0	-	-		
o-xylene	ug/kg	1	MCERTS	< 1.0	-	-		
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0	-	-		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	-	-		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	-	-		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	-	-		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	4.4	-	-		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	8.4	-	-		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	24	-	-		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	37	-	-		

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	-	-		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	-	-		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	-	-		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	-	-		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	-	-		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	50	-	-		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	60	-	-		



Analytical Report Number : 18-73851

Project / Site name: Former Surgery Hunter Street, Briton Ferry

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
895146	BH01	2	0.30-0.50	Brown clay and gravel.
895147	BH01	6	2.20-2.70	Brown loam and clay with peat and vegetation.
895148	BH01	13	5.20-5.70	Grey clay.

Analytical Report Number : 18-73851

Project / Site name: Former Surgery Hunter Street, Briton Ferry

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests. 2:1 extraction.	L082-PL	D	MCERTS
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS

Iss No 18-73851-1 Former Surgery Hunter Street, Briton Ferry G40104

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The results included within the report are representative of the samples submitted for analysis.

Page 5 of 6



Analytical Report Number : 18-73851

Project / Site name: Former Surgery Hunter Street, Briton Ferry

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Steffan Picton**

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Analytical Report Number : 18-74116

Project / Site name:	Former Surgery Hunter Street, Briton Ferry	Samples received on:	29/01/2018
Your job number:	G40104	Samples instructed on:	29/01/2018
Your order number:		Analysis completed by:	06/02/2018
Report Issue Number:	1	Report issued on:	06/02/2018
Samples Analysed:	1 soil sample		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 18-74116

Project / Site name: Former Surgery Hunter Street, Briton Ferry

Lab Sample Number				896535				
Sample Reference				BH02				
Sample Number				3				
Depth (m)				0.50				
Date Sampled				24/01/2018				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	39				
Moisture Content	%	N/A	NONE	19				
Total mass of sample received	kg	0.001	NONE	2.0				

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected				
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	11.0				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO ₄	mg/kg	50	MCERTS	2600				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.32				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	318				
Sulphide	mg/kg	1	MCERTS	11				
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	63				
Elemental Sulphur	mg/kg	5	MCERTS	< 5.0				
Total Sulphur	mg/kg	50	MCERTS	1400				
Ammonium as NH ₄	mg/kg	0.5	MCERTS	0.8				
Organic Matter	%	0.1	MCERTS	6.6				
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	2.8				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.43				
Acenaphthylene	mg/kg	0.05	MCERTS	0.40				
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05				
Fluorene	mg/kg	0.05	MCERTS	0.32				
Phenanthrene	mg/kg	0.05	MCERTS	5.7				
Anthracene	mg/kg	0.05	MCERTS	0.59				
Fluoranthene	mg/kg	0.05	MCERTS	6.7				
Pyrene	mg/kg	0.05	MCERTS	4.9				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.3				
Chrysene	mg/kg	0.05	MCERTS	2.5				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.9				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.1				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.0				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.2				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.35				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.3				

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	32.7				
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	25				
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	68				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	25				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	550				



Analytical Report Number: 18-74116

Project / Site name: Former Surgery Hunter Street, Briton Ferry

Lab Sample Number				896535				
Sample Reference				BH02				
Sample Number				3				
Depth (m)				0.50				
Date Sampled				24/01/2018				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	ug/kg	1	MCERTS	< 1.0				
Ethylbenzene	ug/kg	1	MCERTS	< 1.0				
p & m-xylene	ug/kg	1	MCERTS	< 1.0				
o-xylene	ug/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	ug/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	19				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	22				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	9.3				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	43				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	100				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	150				



Analytical Report Number : 18-74116

Project / Site name: Former Surgery Hunter Street, Briton Ferry

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
896535	BH02	3	0.50	Brown sandy clay with gravel and stones.

Analytical Report Number : 18-74116

Project / Site name: Former Surgery Hunter Street, Briton Ferry

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests. 2:1 extraction.	L082-PL	D	MCERTS
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 dphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS

Iss No 18-74116-1 Former Surgery Hunter Street, Briton Ferry G40104

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 18-74116

Project / Site name: Former Surgery Hunter Street, Briton Ferry

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Steffan Picton**

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Analytical Report Number : 18-74571

Project / Site name:	Former Surgery Hunter Street, Briton Ferry	Samples received on:	01/02/2018
Your job number:	G40104	Samples instructed on:	01/02/2018
Your order number:		Analysis completed by:	08/02/2018
Report Issue Number:	1	Report issued on:	08/02/2018
Samples Analysed:	1 leachate sample - 3 soil samples		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 18-74571

Project / Site name: Former Surgery Hunter Street, Briton Ferry

Lab Sample Number				899075	899076	899077		
Sample Reference				TP01	TP02	TP03		
Sample Number				3	1	2		
Depth (m)				1.00	0.30-0.50	0.30-0.50		
Date Sampled				29/01/2018	29/01/2018	29/01/2018		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	54	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	13	18	6.5		
Total mass of sample received	kg	0.001	NONE	1.4	0.93	1.8		

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	8.1	8.2		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Total Sulphate as SO ₄	mg/kg	50	MCERTS	550	680	330		
Sulphide	mg/kg	1	MCERTS	18	7.9	< 1.0		
Elemental Sulphur	mg/kg	5	MCERTS	< 5.0	87	< 5.0		
Organic Matter	%	0.1	MCERTS	3.0	4.7	2.8		

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.24	0.36		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.87	0.60		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.25	0.26		
Phenanthrene	mg/kg	0.05	MCERTS	0.42	1.5	0.95		
Anthracene	mg/kg	0.05	MCERTS	0.12	1.3	0.73		
Fluoranthene	mg/kg	0.05	MCERTS	1.1	11	4.7		
Pyrene	mg/kg	0.05	MCERTS	0.82	8.5	4.0		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.93	10	5.2		
Chrysene	mg/kg	0.05	MCERTS	1.1	9.6	6.5		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.0	15	9.1		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.36	3.4	1.8		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.96	7.8	5.0		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.67	4.3	3.1		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.32	1.8	1.2		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.83	4.2	3.2		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	9.57	79.4	46.7		
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.2	20	9.7		
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	0.9	0.4		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	8.5	9.5	16		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	54	26		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	26	39	38		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	5.0	15	24		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	59	37	55		



Analytical Report Number: 18-74571

Project / Site name: Former Surgery Hunter Street, Briton Ferry

Lab Sample Number				899078				
Sample Reference				TP01				
Sample Number				1				
Depth (m)				0.30-0.50				
Date Sampled				29/01/2018				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

Hardness - Total	mgCaCO ₃ /l	1	NONE	52.4				
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Speciated PAHs

Naphthalene	µg/l	0.01	NONE	< 0.01				
Acenaphthylene	µg/l	0.01	NONE	< 0.01				
Acenaphthene	µg/l	0.01	NONE	< 0.01				
Fluorene	µg/l	0.01	NONE	< 0.01				
Phenanthrene	µg/l	0.01	NONE	< 0.01				
Anthracene	µg/l	0.01	NONE	< 0.01				
Fluoranthene	µg/l	0.01	NONE	< 0.01				
Pyrene	µg/l	0.01	NONE	< 0.01				
Benzo(a)anthracene	µg/l	0.01	NONE	< 0.01				
Chrysene	µg/l	0.01	NONE	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	NONE	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	NONE	< 0.01				
Benzo(a)pyrene	µg/l	0.01	NONE	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01				

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2				
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	4.6				
Boron (dissolved)	µg/l	10	ISO 17025	14				
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08				
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.4				
Copper (dissolved)	µg/l	0.7	ISO 17025	14				
Lead (dissolved)	µg/l	1	ISO 17025	1.3				
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5				
Nickel (dissolved)	µg/l	0.3	ISO 17025	3.4				
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0				
Zinc (dissolved)	µg/l	0.4	ISO 17025	21				

Calcium (dissolved)	mg/l	0.012	ISO 17025	19				
Magnesium (dissolved)	mg/l	0.005	ISO 17025	1.3				



Analytical Report Number : 18-74571

Project / Site name: Former Surgery Hunter Street, Briton Ferry

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
899075	TP01	3	1.00	Grey clay and sand with stones and vegetation.
899076	TP02	1	0.30-0.50	Brown loam with gravel.
899077	TP03	2	0.30-0.50	Brown loam and gravel.

Analytical Report Number : 18-74571

Project / Site name: Former Surgery Hunter Street, Briton Ferry

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
NRA Leachate Prep	10:1 extract with de-ionised water shaken for 24 hours then filtered.	In-house method based on National Rivers Authority	L020-PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total Hardness of leachates	Determination of hardness in leachates by calculation from calcium and magnesium.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	NONE

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 18-74571

Project / Site name: Former Surgery Hunter Street, Briton Ferry

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

APPENDIX VIII – COAL AUTHORITY REPORT



The Coal
Authority

Resolving the **impacts** of mining

CON29M Non-Residential Mining Report

BRITON FERRY HEALTH CENTRE
HUNTER STREET
BRITON FERRY
NEATH PORT TALBOT
SA11 2SF

Date of enquiry: 22 January 2018
Date enquiry received: 22 January 2018
Issue date: 22 January 2018

Our reference: 51001774745001
Your reference: Steff Picton



Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	No
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is not within a surface area that could be affected by past underground mining.

2. Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3. Future underground coal mining

The property is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

4. Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

5. Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6. Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7. Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8. Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9. Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10. Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11. Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

12. Withdrawal of support

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

13. Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14. Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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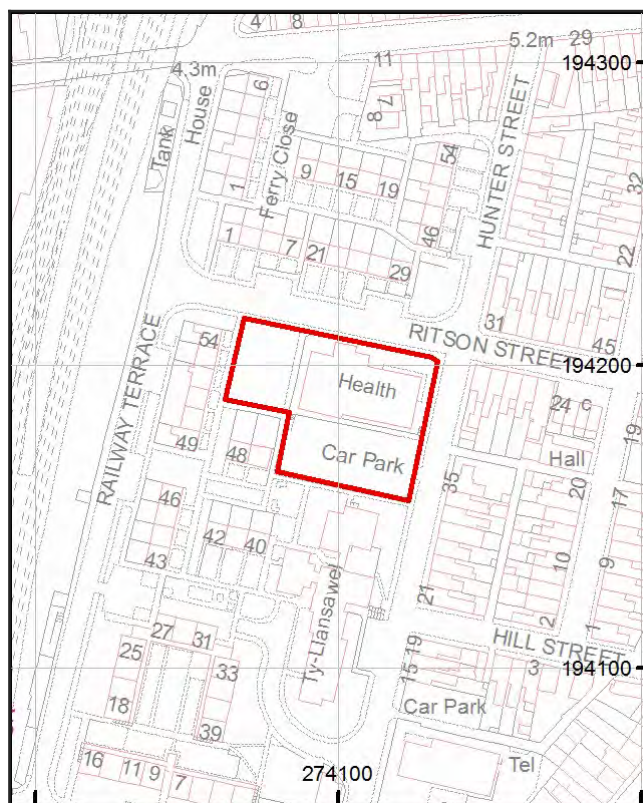
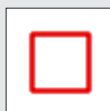
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Enquiry boundary

Key

Approximate position of enquiry boundary shown



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VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	22 January 2018
Issued to	QUANTUM GEOTECHNICAL LTD TY BERWIG HEOL Y BWLCH BYNEA LLANELLI CARMARTHENSHIRE SA14 9ST
Property search for	BRITON FERRY HEALTH CENTRE HUNTER STREET BRITON FERRY NEATH PORT TALBOT SA11 2SF
Reference number	51001774745001
Date of issue	22 January 2018
Cost	£78.30
VAT @ 20%	£15.66
Total received	£93.96
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RISK TO HUMAN HEALTH ASSESSMENT: BACKGROUND AND GUIDANCE NOTES

The Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency published a series of reports in 2002 that provide a scientifically based framework for the assessment of risks to human health from land contamination. By providing a consistent approach to risk assessment, the framework facilitates the rapid identification of sites that pose a significant risk to human health and help avoid blight on other sites. This framework does not consider risks to other receptors such as plants and animals, buildings and controlled waters.

The Soil Guideline Values (SGVs) are a tool that can be used to assess the risks posed to human health from exposure to soil contamination resulting from land use. They represent 'intervention values', which indicate to an assessor that soil concentrations above this level could pose an unacceptable risk to the health of site users and that further investigation and/or remediation is required. Soil Guideline Values combine both authoritative science and policy judgements.

Soil Guideline Values have been derived using the CLEA (Contaminated Land Exposure Assessment) model according to three typical land uses:

- Residential (with and without vegetable growing)
- Allotments
- Commercial / industrial

Where applied appropriately, exceeding a Soil Guideline Value suggests the need for either further investigation and/ or remediation. Soil Guideline Values can be used in connection with the formal requirements of Part IIA of the Environmental Protection Act 1990 ("the contaminated land regime"). However, they will also be relevant to many situations where the effect of land contamination on human health is an issue such as in planning applications when judging the need for action to ensure that a new use of land does not pose unacceptable risks to health.

The CLEA Soil Guideline Values (SGV) provide thresholds to undertake generic risk assessments of sites in respect of risks to human health. The issuing of

SGV's by DEFRA/ EA is an ongoing process, with the suite of analytes for which published results are available being updated at regular intervals. The list of published SGV's is not complete when compared to the list of potential contaminants as detailed in the earlier CLEA publication CLR8, from which the suggested suite of contaminants tested for is derived.

There have been several major changes in Contaminated Land non-statutory guidance in recent years, in particular relating to CLR documentation and their derivatives i.e. Soil Guideline Values and Toxicological Reports. In 2006, DEFRA commenced work on their 'Way Forward' exercise which aimed to redefine the way contaminated land is assessed with the aid of devising revamped technical guidance and soil guideline values. A working group of various environmental consultancies/ establishments/ stakeholders set about determining how the non-statutory guidance of CLEA 2002 may be amended to be increasingly user friendly for assessors of contaminated land and ultimately to help in defining whether land qualifies as contaminated land under Part IIA Environmental Protection Act 1990. July 2008 saw the findings of this exercise published. Firstly the document entitled '*Guidance on the Legal Definition of Contaminated Land*' was published followed closely by the publication of the fourteen measures derived to improve contaminated land non-statutory technical guidance i.e. CLR Publications.

In light of these improvements, the toxicology of various contaminants and therefore the generic soil guideline values, has been revised by EA and DEFRA. The revised paper published in August 2008 is entitled '*Human Health Toxicological Assessment of Contaminants in Soil*'. Based on the findings of this paper, EA are developing a new set of Toxicological Reports and subsequently a new, expanded set of SGV'. Upon publishing, these new SGV's may then be used in assessing risks to human health.

In parallel to much of these developments, in 2006/07 it was recognised that due to the limited number of revised SGVs being produced, the Chartered Institute of Environmental Health (CIEH) co-jointly with Land Quality Management (LQM) researched and developed an additional or alternate set of Soil Guideline Values known as Generic Assessment Criteria (GAC) values, producing GACs for 31 contaminants for Residential, Allotment and Commercial End Land Uses. These new values complete with details of how they were derived and including toxicological datasets was published in a single document 'The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment'. Following publication of the 'Way Forward' document in late 2006, LQM/CIEH looked to review their GAC and add to them. By 2009 a 2nd Edition of 'The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment' was published using updated methods and culminated in GAC for 82 substances.

In November 2014 the LQM/CIEH produced its third set of Generic Assessment Criteria for 89 potential contaminants as knowledge of toxicity and interaction continued to progress, thus replacing the 2nd Edition with the new publication entitled '*The LQM/CIEH S4ULs for Human Health Risk Assessment*'. This most recent set of GACs are referred to as 'S4ULs' – Suitable for Use Levels'

For the purposes of Quantum Geotechnical Ltd assessments, the most recent and applicable SGVs, GACs and SU4Ls are used based on site end use and development and overall suitability. These are all referenced within the text.