Mid & West Wales Fire Service

EARLSWOOD BURN HOUSE, JERSEY MARINE, NEATH

Site Investigation Report

14050/LS/SI/22/RevB

Intégral
Géotechnique

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1.0 INTRODUCTION

1.1 GENERAL

Mid & West Wales Fire Service are proposing a new development within the existing site at Earlswood Burn House in Jersey Marine, Neath for commercial end-use.

Intégral Géotechnique (Wales) Limited have been appointed as the Geotechnical Engineers to undertake an intrusive site investigation to enable a geotechnical and geoenvironmental appraisal of the site and provide a basis for design.

This report presents the findings of the intrusive site investigation and gives recommendations for the design of foundations, floor slabs and other geotechnical and geoenvironmental aspects of the project.

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1.2 PROPOSED DEVELOPMENT

The proposed development will comprise of the construction of a new training facility within the existing structure of the building consisting of a two-storey residential building, materials store and vehicle wash down area. External to the pre-existing building a control room, smoke filter housing and fan will be constructed.

Lawray Architects have provided a drawing for the project entitled ‘Proposed Ground Floor Plan and Roof Plan’ under the project number 19655, dated 22nd February 2022.

1.3 SCOPE OF WORKS

The work instructed included a review of the existing desk study as prepared by Earth Science Partnership and presented in Geotechnical and Geo-Environmental Desk Study Report Reference ESP.8178.3720, followed by site reconnaissance and intrusive investigation based on the recommendations of the desk study. This was followed by laboratory testing, on site monitoring and geotechnical and geo-environmental reporting.

1.3 SCOPE OF WORKS (CONTINUED)

The site investigation included:

- An intrusive investigation carried out on the 18th of July 2022 comprising the drilling of five windowless sample boreholes including the installation of gas monitoring standpipes
- Sampling of made ground and natural soils for laboratory chemical testing and laboratory geotechnical testing
- Monitoring for concentrations of methane, carbon dioxide, oxygen, hydrocarbon vapours and gas flow.
- A supplementary site investigation carried out on the 15th of September 2022 comprising of coring the concrete slab beneath the giraffe building at three locations.

1.4 LIMITATIONS

This document is intended to be a working document for further development in discussion with all concerned including the Local Planning Authority and Natural Resources Wales, as appropriate.

"Contamination" is taken throughout the report to mean the "presence of one or more potentially harmful substances as a result of human activity". The use of the term in this way does not imply that harm is being or might be caused by the contamination. It should be noted that "contamination" can have different meanings under different regulatory regimes, for example, planning, building control and Part IIA of the Environmental Protection Act 1990. Naturally elevated concentrations of potentially harmful substances may also be of concern and the significance of any that have been found is also evaluated in this report.

It is important to recognise that there may be areas of contamination that have not been found, or that contaminants are present at concentrations above those that have been found. It is also important to recognise that contamination may be localised and that no investigation, however comprehensive, is capable of finding such occurrences other than by chance.

It should also be noted that vertical and lateral changes in ground conditions may be present between exploratory hole locations.

Access for the intrusive site investigation was limited at the time due to a large volume of active services on site, areas of hard standing, the large building taking up the majority of the site and the two fire engines which were parked along the western site boundary.

2.0 THE SITE

2.1 SITE LOCATION AND DESCRIPTION

The site is located in Neath, west of Briton Ferry at a National Grid Reference of 273109E, 194177N, see Figure 1.

The site is rectangular in shape and occupies an area of approximately 0.7 hectares. The boundaries of the site are defined by the wider Earlswood Training Centre site to the north and west, A small, wooded area to the east, Earlswood Depot Access Road to the south. A site plan is presented in Figure 2.

The site is situated on relatively flat ground from an approximate elevation of 6.5m AOD.

The site itself comprises largely of a pre-existing building, which currently has no use. Outside the footprint of the building, the site comprises areas of hardstanding of asphalt and concrete.

2.2 SITE OPERATIONS

Currently the site has no active use as the building is vacant. However, the site is part of the wider Earlswood Training Centre.

2.3 SURROUNDING LAND USE

Surrounding the Earlswood Training centre is a wooded area and undeveloped fields, the M4 is present to the south of the site and the A48 is present to the north of the site. The River Neath is adjacent to the site's eastern boundary. Earlswood Golf Course is present to the west of the site's boundary.

2.4 AVAILABLE SITE INVESTIGATION DATA

The following report has been reviewed and utilised in the compiling of this report.

- Proposed Training Facility (Commercial) Development Mid & West Wales Fire Service, Earlswood Depot, Neath Geotechnical & Geo-Environmental Desk Study, referenced ESP.8178.3720 and dated June 2022, produced by Earth Science Partnership

2.4 AVAILABLE SITE INVESTIGATION DATA (CONTINUED)

The full desk study report should be read in conjunction with this report but a summary of the ESP findings are provided below.

Site History - In the 1880s a railway line crossed through the site associated with Earlswood Colliery located to the west, this was dismantled in the late 1890s and the site remained vacant. The site remained vacant until 1965 which a track was constructed across the site and a small building encroached across the southern boundary. The site was completely vacant by the 1980's although the present-day boundary of the Earlswood Training Facility was evident. By 1995 the existing building on site is present, the layout now resembles the present-day layout.

Geology – The site is underlain by marine or estuarine alluvium, overlying bedrock of the Upper Coal Measures. A mantle of made ground is also anticipated across the site.

Mining – The conjectural outcrop of the Wernddu seam is located some 285m to the south of the site. Due to the northerly strata dip this seam would underlie the site at significant depth. The next seam in the sequence is the Graig seam which is located to the north of the site and would therefore not underlie the site. Mining risk is low.

Radon – The risk from radon is considered low and no protective measures will be required for the proposed development.

Hydrogeology – The superficial deposits (Alluvium) are classified as a Secondary Undifferentiated Aquifer. The Upper Coal Measures are classified as a Secondary A aquifer.

Hydrology – The ESP report indiciates the nearest major surface water feature to the site is the small channel noted in the historical mapping, which flows from a well to the west of the site eastward. This extends to a further stream, which flows east to the river Neath.

The river Neath is some 140m to the east of the site.

There are no licensed water abstractions on site or within 250m of the site.

No discharge consents are on site, one is identified 27m east which was revoked in 1994.

Landfill Sites - There are no recorded waste management facilities on-site. There is one recorded historical waste site 15m west of the site boundary. The waste type being a Waste Recovery Energy Plant.

2.4 AVAILABLE SITE INVESTIGATION DATA (CONTINUED)

Other Information - There have not been any pollution incidents to controlled waters on site. It is understood that a septic tank is present on site and off-site oil tanks are present.

Potential Contamination Sources – Former railway line, a small structure within the site therefore made ground is likely to be present. Current use by the fire service as a training facility. The named sources could cause the potential for the following contaminants within the site:

- Heavy metals and semi-metals (arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc)
- Cyanide, sulphate, sulphide
- Polyaromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Phenols
- Asbestos
- Perfluorooctanesulfonic acid (PFOS)

There is also potential for gas generation due to alluvial soils, general made ground, unspecified off-site tank source and the historical waste site located off site.

3.0 PRELIMINARY CONCEPTUAL SITE MODEL

3.1 RISK ASSESSMENT FRAMEWORK

In order to be consistent with current UK government policies and legislation, it is necessary to identify, assess, estimate, evaluate, and take appropriate action to deal with land contamination, in accordance with the procedures specified in the Environment Agency guidance Land Contamination Risk Management (LCRM) published in October 2020. This replaces the now withdrawn 'Model Procedures for the Management of Land Contamination CLR-11' (Environment Agency 2004).

The risk assessment process is designed to provide a reasoned, structured and pragmatic mechanism for the identification of any potential human health and controlled waters risks associated with land contamination and where necessary to develop a robust remediation strategy to ensure protection of the sensitive receptors (human health of future residents, controlled waters, etc).

In accordance with LCRM, the term 'land contamination' is defined as:

- All land affected by contamination – land that might have contamination present which may, or may or may not, meet the statutory definition of contaminated land,
- Land determined as contaminated land under Part 2A of the Environmental Protection Act 1990.

LCRM provides a tiered approach to risk assessment, comprising a preliminary risk assessment (including the development of an initial conceptual site model), a generic quantitative risk assessment and a detailed quantitative risk assessment. For each tier of risk assessment, the following steps must be followed:

1. Identify the hazard - establish contaminant sources,
2. Assess the hazard – use a source-pathway-receptor linkage approach to determine if there is potential for unacceptable risk,
3. Estimate the risk – predict what degree of harm or pollution may result and how likely it is to occur, and
4. Evaluate the risk – decide whether a risk is unacceptable.

LCRM also provides definitions of the following terms:

- Hazard – a property or situation that in particular circumstances could lead to harm or pollution,

3.1 RISK ASSESSMENT FRAMEWORK (CONTINUED)

- Risk – a combination of the probability, or frequency of occurrence of a defined hazard and the magnitude of the consequences of the occurrence,
- Risk assessment – the formal process of identifying, assessing and evaluating the health and environmental risks that may be associated with a hazard,
- Risk management – the formal process to identify, assess and determine the risks, and to select and take action to mitigate them.

The three essential elements to any risk are defined by LCRM as follows:

- A contaminant, or pollutant, that is in, on, or under the land and that has the potential to cause harm, or pollution (Source)
- A route by which a receptor is, or could be affected by a contaminant (Pathway)
- A receptor, i.e. something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part 2A receptors such as buildings, crops or animals (Receptor).

In order for there to be a potential risk, all three of the above elements must be present. If there is a source of contamination and a receptor (for example a resident or site user), then there is only a potential risk if there is a pathway linking the two. Such an active pathway is known as a relevant pollutant linkage. It is possible for the same contaminant to be linked to a receptor via a number of pathways, and hence it is important that all relevant pollutant linkages, to both human health and controlled waters, are separately identified on a site in order that a comprehensive conceptual model can be formed and ultimately a robust remediation strategy designed.

Current practice during Generic Quantitative Risk Assessment of land affected by contamination is to use generic soil screening values based on the appropriate proposed end use. These usually comprise risk based Soil Guideline values (SGVs) or Generic Assessment Criteria (GACs) derived by the Environment Agency's Contaminated Land Exposure Assessment Model (CLEA). The SGVs and the supporting technical guidance were developed in order to assist in the assessment of long term risk to human health from the exposure to contaminated soils.

Revised Statutory Guidance, published in 2012, to support Part 2A of the Environmental Protection Act 1990, introduced a new four category system for classifying land under Part 2A. Category 1 includes land where the level of risk is clearly unacceptable and Category 4 includes land where the level of risk posed is considered to be acceptably low. Under Part 2A, land would be determined as contaminated if it falls within Categories 1 or 2.

3.1 RISK ASSESSMENT FRAMEWORK (CONTINUED)

The revised Part 2A Statutory Guidance was accompanied by an Impact Assessment that identified a role for new 'Category 4 Screening Levels' (C4SLs) that would provide a simple test for determining when land is suitable for use and definitely not contaminated land. A Policy Companion Document including the C4SLs was published in March 2014 (England) and May 2014 (Wales).

The C4SLs have been based on the CLEA methodology and derived using the CLEA model, with modified toxicological and exposure parameters. To date, C4SLs have been released for six substances (arsenic, cadmium, chromium (VI), lead, benzo(a)pyrene and benzene).

The C4SLs have been derived on the assumption that where they exist, they will be used as generic screening criteria within generic quantitative risk assessment.

Following publication of the C4SLs, Land Quality Management (LQM), in conjunction with the Chartered Institute for Environmental Health (CIEH) released Suitable 4 Use Levels (S4ULs) in January 2015.

The S4ULs have been derived in accordance with UK legislation, and using a modified version of the Environment Agency's CLEA software. As such, the S4ULs are based on the concept of minimal or tolerable risk as described in Human Health Toxicological Assessment of Contaminants in Soil (Science Report SR2, Environment Agency 2009a).

S4ULs have been derived for a wider number of substances.

In addition to the existing SGVs, C4SLs and S4ULs, Atkins ATRISK^{soil} also provide a set of Soil Screening Values. These are currently intended to be used in conjunction with SGVs, although they intend to update these values in line with the C4SLs in due course.

We have reviewed all sets of values and intend to use the most appropriate assessment criteria as Tier 1 screening values in the first instance. Where a published S4UL is available, and considered appropriate, this will be used in the first instance.

3.2 CONCEPTUAL MODEL FRAMEWORK

The preliminary stage of the risk assessment process is to develop and define a conceptual site model, based on the desk study and any existing site investigation data. This is used to establish any potential contaminant sources, identify existing and future receptors and assess if there are any potentially active pathways by which a potential risk may be present.

The preliminary conceptual site model will be developed and refined as site specific data is gathered, such as actual ground conditions and chemical data, resulting in a more robust conceptual understanding of the site.

3.3 CRITICAL SENSITIVE RECEPTOR – HUMAN HEALTH

The proposed redevelopment of the site is for a commercial end use. Therefore, the critical sensitive receptor from a human health perspective is an on-site commercial receptor.

In accordance with S4UL/C4SL and CLEA guidance for a standard commercial scenario, the critical sensitive receptor for a commercial end use risk assessment is a female adult, with exposure from 16 to 65 years.

The standard commercial end-use conceptual model defined by S4UL/C4SL and CLEA is assumed to be suitable for the purposes of this assessment.

3.4 CRITICAL SENSITIVE RECEPTOR – CONTROLLED WATERS

Based on the proposed redevelopment of the site for a commercial end use, and the findings of the desk study, the critical sensitive receptor from a controlled water perspective is groundwater within the near surface alluvium and the Secondary A Aquifer of the Upper Coal Measures.

By considering groundwater as the critical sensitive receptor for controlled waters, the groundwater/hydrogeological risk assessment will also be protective of the small channel to the west of the site and the River Neath to the east of the site.

3.5 POTENTIAL CONTAMINANT SOURCES

As identified in the desk study, the historical land uses at the site since the 1880's has resulted in a list of potentially contaminative uses that include, the railway line which ran through the site, the building of the Earlswood Training Facility and the current use by the Fire Service. Significant Made Ground materials are also anticipated.

The potential types of contaminants of concern are listed below:

- Metals, semi-metals, and inorganics within the shallow made ground
- Polyaromatic hydrocarbons (PAH) within the shallow made ground
- Petroleum Hydrocarbons (VPH/EPH) within the shallow made ground
- Asbestos PFOS/PFOA

3.6 POTENTIAL EXPOSURE PATHWAYS

Potential exposure pathways for the critical receptors (both human health and controlled waters) are listed below:

- Dermal contact with soil and/or soil derived dust
- Ingestion of soil
- Inhalation of soil derived dust
- Inhalation of vapours – indoor and outdoor air
- Leaching of contaminants from made ground to groundwater
- Transportation of contaminants within groundwater.

In addition, the following exposure pathways have also been considered:

- Ground gas generation and migration
- Building materials durability.

3.7 SUMMARY OF CONCEPTUAL EXPOSURE MODEL

A preliminary conceptual exposure model has been developed for the site. This is based on the findings of the desk study which was undertaken by ESP and includes all potential sources, pathways and receptors that may be present on site. Those that have been identified as being potentially active require further investigation in the form of sampling and testing of soils and groundwater, followed by appropriate risk assessment.

3.7 SUMMARY OF CONCEPTUAL EXPOSURE MODEL (CONTINUED)

The preliminary conceptual exposure model will be reviewed and refined following the completion of the site works and laboratory testing.

The preliminary conceptual exposure model is presented below in Table 1.

Table 1: Preliminary Conceptual Exposure Model

Source		Receptor	Pathway	Potentially Active Pathway?
Origin	Contaminant			
Made Ground of unknown origin and historical land uses	Metals, semi-metals, non-metals, PAH, petroleum hydrocarbons, asbestos, PFOS/PFOA	Resident – human health	Dermal Contact with made ground/dust	✓
			Ingestion of soil	✓
			Inhalation of dust	✓
			Inhalation of vapours – indoor/outdoor	✓
	Metals, semi-metals, inorganics, PAH, petroleum hydrocarbons and PFOS/PFOA	Groundwater quality	Leaching from made ground	✓
	Metals, semi-metals, inorganics, PAH, petroleum hydrocarbons and PFOS/PFOA	Surface water quality	Transportation within groundwater	✓
Made Ground of unknown origin and natural ground	pH and water soluble sulphate	Building Materials Durability	Direct contact	✓
Ground Gas – organic, gas producing materials	Methane, carbon dioxide	Human health	Accumulation of gases in confined spaces, and/or migration off site, leading to asphyxiation, or risk of explosion	✓

4.0 THE SITE INVESTIGATION

4.1 FIELDWORKS

A site investigation was designed in accordance with BS 5930:2015+A1:2020, the Code of Practice for Site Investigations, BS10175:2011+A2:2017, the Code of Practice for Investigation of Potentially Contaminated Sites, and 'Development of Land Affected by Contamination: A Guide for Developers' prepared by Welsh Local Government Association (WLGA)/Natural Resources Wales (NRW) Land Contamination Working Group, 2017.

The site investigation was also designed to provide information to support and refine the preliminary conceptual site model/conceptual exposure model derived from the ESP desk study information and site walkover.

An investigation comprising the drilling of five windowless sample boreholes (WS1 to WS5), was carried out on the 18th of July 2022. The windowless sample boreholes were located external to the existing building and drilled to a maximum depth of 5.0m below existing ground level. The purpose of the windowless sample boreholes was to prove the shallow ground conditions and allow an assessment of the most appropriate foundation type for the proposed development. In situ strength testing (SPT/CPTs) was carried out in the windowless sample boreholes at 1.0m intervals and at the base of the hole if the sampler refused prematurely.

Shallow ground gas monitoring standpipes were installed WS1 and WS4.

Representative soil samples were taken from the windowless sample boreholes for laboratory chemical and geotechnical testing and placed in the appropriate sample containers deemed suitable for the analysis required. Strict protocols were adopted during this process to limit the cross contamination of samples.

A programme of gas monitoring was commenced as soon as the site works were complete and the conditions within the standpipes had time to stabilise.

A supplementary site investigation was carried out on the 15th of September 2022 comprising the coring of the concrete slab beneath the giraffe building at three locations to determine the concrete slabs thickness and composition.

The fieldworks were supervised by a qualified Geotechnical Engineer from Intégral Géotechnique (Wales) Limited who also logged the windowless sample boreholes and prepared their detailed engineering logs in accordance with the requirements of

4.1 FIELDWORKS (CONTINUED)

BS5930+A2: 2010. The engineering logs provide descriptions of the materials encountered in accordance with BSEN ISO 14688-1 (2002) and 14689-1 (2003) for soils and rocks respectively.

The approximate locations of the windowless sample boreholes are shown on Figure 2, while their logs are presented in Appendix A.

4.2 FIELD OBSERVATIONS

No visual or olfactory evidence of any contamination was observed during the drilling of the windowless sample boreholes.

4.3 LABORATORY CHEMICAL TESTING

Representative soil samples were taken from the windowless sample boreholes, stored at the appropriate temperature and dispatched to the laboratories of i2 Analytical for laboratory chemical testing within 24 hours.

The samples were tested for a range of contaminants that reflects the historical use of the site, the findings of the desk study and the preliminary conceptual site model/conceptual exposure model. A list of the soil testing carried out is given below:

Beryllium	Cadmium
Total Chromium	Hexavalent Chromium (VI)
Copper	Lead
Mercury	Nickel
Vanadium	Zinc
Arsenic	Boron
Selenium	Elemental Sulphur
Total Cyanide	Total Sulphate
Sulphide	Water Soluble Sulphate
pH	Monohydric Phenol
Polyaromatic Hydrocarbons (PAH)	Petroleum Hydrocarbons (VPH/EPH)
Asbestos	PFOS/PFOA

The results of all the soil are presented in Appendix B.

4.4 LABORATORY GEOTECHNICAL TESTING

Representative samples of the natural ground were dispatched to the UKAS accredited laboratories of Apex Testing Solutions and scheduled for analysis of moisture content, Atterberg Limits, water soluble sulphate and pH.

The results of the geotechnical testing are presented in Appendix C.

4.5 IN-SITU GAS MONITORING

Gas monitoring standpipes were installed in two of the windowless sample boreholes (WS1 and WS4) and these are being monitored at fortnightly intervals following completion of the fieldworks.

The gas monitoring programme commenced on 21st July 2022.

The concentration levels of methane, carbon dioxide and oxygen were measured in the standpipes during each visit by using a GA5000 Landfill Gas Analyser. In addition, gas flow rate and the atmospheric pressure at the time of the field measurements were also recorded.

Gas monitoring will be carried out over a range of atmospheric pressures to include at least one reading in low and/or falling pressure, in accordance with the recommendations made in CIRIA Report C665.

The results of the field gas monitoring to date are presented in Appendix D.

5.0 GROUND CONDITIONS

A summary of the ground conditions encountered across the site is presented below in Table 1.

Table 2: Summary of Ground Conditions		
Depth (m) From	To	Stratum
0.0	0.02/0.3	Tarmac or Reinforced Concrete
0.02/0.3	1.3/2.2	MADE GROUND: Variable predominantly interlayered granular soils containing limestone, ash, slag, brick and clinker.
1.3/2.2	5.0	Variable compositions of loose dark grey, beige, brown fine to coarse SAND with subordinate clay bands

The windowless sample borehole WS5 collapsed back to 1.0m. Windowless sample boreholes WS1 to WS4 remained stable in the short term.

5.1 CONCRETE SLAB

The concrete slab which is situated underneath the giraffe building was cored at three locations (Core 1 to Core 3) the locations of the cored samples are shown in Figure 3.

Descriptions of the concrete cores are provided in Figures 4, 5 and 6.

5.2 SURFACE HARDSTANDING

A surface covering of reinforced concrete was observed at three exploratory locations (WS1, WS2 and WS3) typically to 0.3mbgl.

A surface covering of tarmac was observed at two exploratory locations (WS4 and WS5) to a depth of 0.02mbgl.

At WS5, bituminous material overlay concrete.

5.3 MADE GROUND

Made ground was observed at each windowless sample borehole location and was proven to extend to depths of between 1.0m and 2.2m below existing ground level.

The made ground underlying the concrete and tarmac was poorly consolidated, predominately granular but with some cohesive layers and was characterised by the presence of angular and sub angular limestone and occasional anthropogenic materials including brick, ash, clinker and slag.

Uncorrected N values derived from in-situ testing in the windowless sample holes ranged from between 4 and 15 within the made ground. This indicates that with the exception of localised concentrations of cobbles, elevating the N value, the made ground is generally loose or soft.

5.4 SUPERFICIAL SOILS

The made ground deposits were proven to be underlain by natural superficial deposits at depths of between 1.3m and 2.2m below ground level.

Uncorrected N values ranged from between 2 and 9 with values typically around 3. This indicates the superficial deposits are very loose to loose or very soft to soft.

The natural superficial deposits consisted predominantly of loose yellow beige, light brown, orange dark brown, dark grey fine to coarse sand.

The superficial deposit sands within windowless sample bores WS1, WS2 and WS5 had inclusions of fine to coarse subangular and subrounded sandstone gravel.

Locally to WS4 between 3.7m and 4.0mbgl and WS1 between 4.7m and 5.0mbgl described soft dark grey very sandy silty clay.

In WS3 the natural soils were described as medium dense orange, brown clayey gravel. The gravel consisted of fine to coarse sub angular and sub rounded sandstone between the depths of 1.0m and 1.10mbgl.

The laboratory plasticity test results on the recovered natural sand indicated negligible volume change potential of these materials

5.4 GROUNDWATER

The groundwater conditions are based on observations made at the time of the fieldwork. It should be noted that groundwater levels may vary due to seasonal and other effects.

Table 3: Summary of Groundwater Observations	
Exploratory point	**Groundwater Observations**
WS1	Groundwater struck at 1-2m and standing at 0.77m.
WS2	Groundwater struck at 2-3m and standing at 1.27m.
WS3	Groundwater struck at 2-3.0m and standing at 0.88m.
WS4	Groundwater struck at 2-3.0m and standing at 0.8m.

The rise in water level within the windowless sample holes indicates that the groundwater contained in the superficial soils is under sub artesian pressures.

The groundwater conditions are based on observations made at the time of the fieldwork.

It should be noted that groundwater levels may vary due to seasonal and other effects.

6.0 CONTAMINATION

6.1 AVERAGING AREAS

In order to assess the laboratory test results reliably and in context, the data have been grouped into an averaging area. An averaging area (or area of interest) is that area of soil to which a receptor is exposed or which otherwise contributes to the creation of hazardous conditions. This may be an area of historical industrial usage, a soil type, or a specific proposed end use.

In the case of this analysis, the averaging area has been determined according to the proposed commercial end use.

6.2 SOIL CONTAMINATION

The Suitable 4 Use Levels (S4ULs) published by LQM have been adopted as critical concentrations against which soil contaminant concentrations can be compared. In the absence of additional published S4ULs, the Category 4 Screening Levels (C4SLs) derived by DEFRA and Soil Screening Values (SSVs) derived by Atkins ATRISK^{soil} for a commercial end use have been adopted, where considered appropriate.

Since the results of the testing indicate total organic carbon content (TOC) in the range of 0.3% to 5.2%, the results have been compared to the respective guidelines, where applicable, for 1% soil organic matter content.

The soil test results for made ground have been summarised and are shown in Appendix E.

6.2.1 Made Ground

The results of the laboratory testing indicate that most of the analysed chemical elements or compounds are present at concentrations below the appropriate thresholds. However, the initial screening indicates exceedances of arsenic and lead.

Five exceedances of lead have been identified within the made ground in WS1 and WS2 at depths of between 0.3m to 1.9m, the results of which exceeded the adopted screening value of 2330mg/kg (LQM 1%SOM). The elevated concentrations of lead ranged between 4,900mg/kg and 12,000mg/kg.

6.2 SOIL CONTAMINATION (CONTINUED)

Two exceedances of arsenic have been identified within the made ground within WS1 at depths of between 0.3m and 0.6m below existing ground level with the recorded value of 1,200mg/kg exceeding the adopted screening value of 640mg/kg (LQM 1%SOM).

Asbestos has been identified in two out of twelve samples of made ground. Fibres of loose chrysotile asbestos were identified within the made ground at WS1 (0.5-0.6mbgl) and WS2 (1.0-1.5m).

Both samples in which chrysotile fibres were identified in soil were sent for quantification testing at the laboratory and the results are presented in Appendix B and E The results of the quantification tests indicates <0.001% by weight of asbestos in the made ground sample analysed.

The twelve samples of made ground were also tested for perfluorooctane sulfonic acid and perfluorooctanoic acid (PFOS and PFOA). The results of the analysis for PFOS and PFOA have been screened against the Soil Screening Values (SSV) published by the Environment Agency. The adopted screening value is 0.014mg/kg dry weight (DW). There were no exceedances of this adopted screening value within any of the samples.

No further exceedences were detected within the samples of made ground.

6.2.2 In-situ Natural Ground

No visual or olfactory evidence of contamination of the in-situ natural ground was identified during the drilling of the windowless sample boreholes. At the time of writing this report no samples of natural ground had been tested. It is considered likely that concentrations of determinands within the natural ground are likely to be naturally occurring and as such, the natural ground poses no significant threat to human health or the environment.

6.3 GROUND GASES

Ground gas was monitored on a fortnightly basis using a GA 2000 Gas Analyser. The results of the gas monitoring programme to date are included in Appendix D. A summary of the results is given in the following Table 4.

6.3 GROUND GASES (CONTINUED)

Table 4: Summary of Ground Gas Results				
Borehole	Maximum Methane Concentration (%)	Maximum Carbon Dioxide Concentration (%)	Minimum Oxygen Concentration (%)	Gas Flow Rate (l/hr)
WS1	<0.5	<0.5	18.10	<0.3
WS4	0.5	1.2	14.30	<0.3

Note: Results based on six rounds of monitoring completed to date.

The results show a maximum methane concentration of 0.5% and a maximum carbon dioxide concentration of 1.2%. A maximum gas flow rate of <0.3l/hr was measured during the gas monitoring programme to date.

A minimum oxygen concentration of 14.3% has been recorded to date.

7.0 REVISED CONCEPTUAL EXPOSURE MODEL

The preliminary conceptual exposure model has been reviewed and revised to reflect the findings of the site investigation and the results of the laboratory testing of soils, soil leachate, groundwater and gas monitoring. Pathways identified as a relevant pollutant linkage require appropriate risk assessment or mitigation measures (see Section 8).

Table 5: Revised Conceptual Exposure Model

Source		Receptor	Pathway	Preliminary Active Pathway? (see Sect. 5.7)	Relevant Pollutant Linkage	Justification/ Mitigation
Origin	Contaminant					
Made Ground of unknown origin and historical land uses	Metals, semi-metals, PAHs, PFOS/PFOA and asbestos	Resident – human health	Dermal Contact with made ground/dust	✓	✓	Elevated concentrations of arsenic, lead and asbestos identified in the made ground – risk assess.
			Ingestion of soil and/or soil attached to home-grown produce	✓	✓	
			Ingestion of home-grown produce	✓	✓	
			Inhalation of dust	✓	✓	
			Inhalation of vapours – indoor/outdoor	✓	X	No sufficiently volatile contaminants identified.
	Metals, semi-metals, inorganics, PAH, petroleum hydrocarbons and PFOS/PFOA	Groundwater quality	Leaching from made ground	✓	✓	Elevated total determinant concentrations of arsenic and lead identified which have the potential to leach to groundwater

7.0 REVISED CONCEPTUAL EXPOSURE MODEL (CONTINUED)

Table 5: Revised Conceptual Exposure Model (Continued)

Source		Receptor	Pathway	Preliminary Active Pathway? (see Sect. 5.7)	Relevant Pollutant Linkage	Justification/ Mitigation
Origin	Contaminant					
Made Ground of unknown origin and historical land uses	Metals, semi-metals, inorganics, PAH, petroleum hydrocarbons and PFOS/PFOA	Surface water quality	Transportation within groundwater	✓	✓	Elevated total determinant concentrations of arsenic and lead identified which have the potential to leach to groundwater and be transmitted to surface waters
Made Ground of unknown origin and natural ground	Metals, semi-metals, non-metals, PAH, petroleum hydrocarbons,	Building Materials Durability	Direct contact	✓	✓	Building materials will be in contact with made ground – risk assess
Ground Gas – organic, gas producing materials	Methane, carbon dioxide	Human health	Accumulation of gases in confined spaces, and/or migration off site, leading to asphyxiation, or risk of explosion	✓	X	Gas monitoring has not recorded elevated concentrations Risk Assess

8.0 RISK ASSESSMENT

8.1 METHODOLOGY

The risk of pollution, health effects or environmental harm occurring as a result of ground contamination is dependent upon three principal factors:

- The scale of the contamination sources;
- The presence of sensitive "receptors", e.g. Humans: health of the general public, site occupiers, redevelopment workers. Environment: flora, fauna, etc;
- The existence of migration pathways by which contaminants can reach the sensitive receptors.

This section assesses each of these factors in order to evaluate the overall level of risk and potential harm to receptors. The receptor may be human, a water resource, an eco-system or construction materials. Pathways connecting a perceived hazard to a receptor are referred to as exposure pathways.

The sources of contamination and the links connecting the hazards to the sensitive receptors will represent the basis for the risk assessment.

8.2 SOURCE-PATHWAY-RECEPTOR MODEL

The preliminary conceptual site model was based on the findings of the desk study. This was later reviewed and refined according to the findings of the site investigation, allowing for the ground conditions encountered and the results of laboratory testing of soil and groundwater. Any pathways considered to be inactive were removed from the model and all remaining potentially active pathways require risk assessment.

The pathways shown as potentially active in the Revised Conceptual Site Model in Section 7.0 above have been assessed below.

8.3 HUMAN HEALTH RISK ASSESSMENT

8.3.1 Site in its Present Condition

The site does not pose any risks to casual visitors or trespassers as the site is largely covered by a building, tarmac and concrete.

8.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

8.3.2 Future Site Users

The contamination test results and investigation observations show elevated concentration levels in the made ground of arsenic and lead. Two made ground samples were also found to contain chrysotile asbestos fibres.

Given the elevated arsenic, lead and asbestos concentrations within the general made ground encountered across the site, it is considered that a potential risk to human health may exist via the following relevant pollutant linkages when considering the continued commercial usage.

- Dermal contact,
- Ingestion of soil or soil derived dust,
- Inhalation of soil bourn dust.

The inhalation of vapours pathways (indoor and outdoor air) are not considered to be active since the contaminants of concern identified are not sufficiently volatile.

Consideration will need to be given the presence of elevated determinants in the made ground which are elevated compared to commercial guideline values and the effect this will have on continued site usage and the land value of the property.

No soft landscaped areas are proposed.

The site surface is covered by a layer of tarmac/asphalt and/or concrete which provides an effective capping layer, breaking the pathway between the made ground and site users.

The integrity of the hardstanding capping layer should be maintained at all times. Any areas where this surface layer is broken or absent should be repaired and/or extended.

8.3.3 Construction Workers

The presence of elevated concentrations of arsenic, lead, and asbestos fibres indicate a potential risk to construction workers. Appropriate measures are therefore recommended for works involving the made ground materials which are known to be present beneath the site.

During site preparation and construction works, the soils should be dampened down to minimise the potential for soils to dust and subsequent release of any asbestos fibres.

8.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

During exposure of soils, the exposed surface should be inspected by asbestos awareness trained contractors and the surface should be handpicked to remove any residual asbestos containing materials, if they are identified.

These works should be carried out under an appropriate risk assessment and managed in accordance with the Control of Asbestos Regulations 2012 (CAR 2012).

Any handpicked asbestos containing materials should be disposed of off-site at a suitable licensed facility as hazardous waste. All materials should be suitably segregated as to not cross contaminate stockpiles etc. If these works are required, they should be carried out by appropriately licensed contractors.

The following practical measures are required while excavating/re-using made ground:

All works to be carried out in accordance with an appropriate risk assessment and managed in accordance with the requirements of the Control of Asbestos Regulations 2012.

- Excavations will need to be regularly damped down to prevent any dust that may contain asbestos becoming airborne;
- Any excavated materials should be quarantined and regularly dampened down to prevent any dust may contain asbestos becoming airborne;
- Appropriate PPE/RPE to be worn by all workers as required;

Site preparation and operational constraints will be covered in the contractor's method statements. These should include the contractor's proposals for controls and monitoring of dust, noise, vibrations and odour.

Site procedures for managing the remedial works in a manner that will not cause pollution to controlled waters will be covered in the contractor's method statements which will be submitted in discharge of the Conditions of Planning.

All site operatives are to be suitably asbestos awareness trained. Routine visual checks should be made for the presence of any asbestos containing materials (ACM). Any handpicked ACM should be disposed of off-site at a suitable licensed facility as hazardous waste.

8.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

All excavations should be regularly checked for safe atmospheres, including oxygen levels and guidance sought should low oxygen levels be identified in excavations/ confined spaces.

Additionally, a system should be established by which any 'unusual' materials that may be encountered are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material may be identified on site by colour, odour or physical nature.

Daily records and waste transfer notes should be kept in order to document the identification and subsequent removal of any asbestos containing materials (ACM).

These records and waste transfer notes should be made available for review as they will be required for potential remediation verification.

Reference should be made to the Health and Safety Executive document "Protection of Workers and the General Public during the development of contaminated land" for detailed guidance on these matters.

8.4 RISKS TO VEGETATION

No soft landscaped or garden areas are proposed, thus no vegetation will be at risk.

8.5 GROUNDWATER RISK ASSESSMENT

A mantle of made ground characterised by the presence of anthropogenic materials including, ash, clinker, brick and slag has been identified on site. Elevated concentrations of arsenic and lead which exceed commercial soil guideline values were identified in the made ground.

This made ground when considering its material nature and chemistry has the potential to be susceptible to the generation of leachate, which could be transmitted through the made ground to underlying groundwater.

The site in its current use with hard standing and with formal drainage, reduces infiltration into the ground minimising the potential for leachate generation.

8.5 GROUNDWATER RISK ASSESSMENT (CONTINUED)

Therefore, provided that there is no significant ground disturbance, and the site continues to operate in its current form, the potential risk to controlled waters from site operations is considered to be low.

8.6 GROUND GAS RISK ASSESSMENT

The results of the gas monitoring programme indicated a maximum methane concentration of 0.5% and a maximum carbon dioxide concentration of 1.2%. A maximum gas flow rate of <0.3l/hr was measured during the gas monitoring programme.

In accordance with CIRIA Report C665 a Gas Screening Value (GSV) of <0.0036l/hour has been calculated. This GSV corresponds to gas characteristic situation 1 which does not require any special gas protective measures.

Reference should also be made to BS8485:2015 +A1:2019. In accordance with BS8485:2015 +A1:2019 and based on the results of the gas monitoring with the site being classified as characteristic situation 1 (CS1), for development Type C (commercial/public), the minimum gas protection score required is zero, and therefore no specific gas protection measures are required in regards to methane and carbon dioxide.

It should be noted that this classification is based on six rounds of gas monitoring.

8.7 RISKS TO BUILDINGS AND MATERIALS DURABILITY

8.7.1 Concrete Classification

A summary of the laboratory chemical test results for the chemicals monohydric phenol, sulphur, total sulphate, water soluble sulphate, sulphide and pH, which may adversely affect the durability of building materials is presented in Appendix D and E.

Made Ground

Evidence to date does not indicate any specifically aggressive conditions, but it would be reasonable to expect a degree of sulphate and acidic aggressiveness from the made ground.

In accordance with BRE Digest SD1:2005 and adopting the assessment procedure specified therein for brownfield sites, the laboratory chemical test results indicate a characteristic value for water soluble sulphate within the made ground of 560mg/l.

8.7.1 Concrete Classification (CONTINUED)

Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-2.

The groundwater regime of the site has been assessed as 'mobile' and a characteristic pH value within the made ground of 7.2 has been determined. The Design Sulphate Class has been modified to give a site ACEC class of AC-2 for concrete structures constructed within the made ground.

Natural Ground

Evidence to date does not indicate any specifically aggressive conditions, but it would be reasonable to expect a degree of sulphate and acidic aggressiveness from the natural ground.

In accordance with BRE Digest SD1:2005 and adopting the assessment procedure specified therein for brownfield sites, the laboratory chemical test results indicate a characteristic value for water soluble sulphate within the natural ground of 506mg/l.

Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-2.

The groundwater regime of the site has been assessed as 'mobile' and a characteristic pH value within the natural ground of 7.96 has been determined

The Design Sulphate Class has been modified to give a site ACEC class of AC-2 for concrete structures constructed within the natural ground.

8.7.2 Water Services

Based on the chemical analysis and observations undertaken to date, water supply pipes will not require any special protective measures from contaminants at the site, other than clean backfill to all service trenches.

Reference should be made to UKWIR Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, document No. 10/WM/03/21. The final design and selection of the pipe and associated backfill should be agreed with the appropriate Regulator prior to installation.

In order to comply with the UKWIR guidance, specific sampling and testing along the actual line of the proposed water supply route may need to be carried out once this has been established.

8.8 WASTE DISPOSAL

Excavated materials generated by the development may be considered as waste and subject to waste controls. Any re-use of excavated materials on-site should be undertaken in accordance with current waste and environmental legislation and which may require the production of an approved Materials Management Plan (MMP) prepared in accordance with the CL:AIRE Code of Practice.

It is recommended that a sustainable development strategy is adopted which reduces to a practicable minimum the generation of waste materials and the need for disposal to a licensed tip. Emphasis should be on recovery and re-use rather than disposal.

However, any waste or surplus materials that are generated will need to be classified in accordance with current EC regulations and Environment Agency guidance prior to disposal. It is the responsibility of the waste producer to classify the waste.

Based on the data obtained from the site investigation works, any waste materials comprising the existing made ground are likely to be classified as hazardous waste owing to the elevated concentrations of arsenic and lead. The existing natural ground is likely to be classified as hazardous waste.

Any asbestos containing materials (ACMs) will be classified as hazardous waste.

This classification is provisional, and indicative of the likely waste classification based on the data obtained to date (including chemical composition, moisture content, etc.). It also assumes that the materials tested will be representative of future generated waste.

In order to minimise disposal, the materials generated should be segregated and examined, with appropriate testing as necessary, to enable the materials to be sorted or treated into lower classifications, with the resultant benefit of potentially generating re-use rather than disposal.

Once final waste sources and volumes are known, the waste stockpile to be disposed off-site will need to be classified in accordance with Environment Agency/Natural Resources Wales Waste Classification – Guidance on the Classification and Assessment of Waste Technical Guidance WM3 (2015). This is likely to require additional sampling and testing of the generated waste materials to provide an up to date current basis for classification.

Depending on the waste classification, waste acceptance criteria (WAC) testing may be required, in order to determine which class of landfill site the waste can be sent to.

8.8 WASTE DISPOSAL (CONTINUED)

It is recommended that the results of the waste classification and any WAC test results are sent to the intended licensed waste operator prior to disposal in order to confirm their classification and acceptance.

8.9 UNCERTAINTIES

It is important to recognise that there may be areas of contamination within the site that have not been found or that contaminants may be present at concentrations above those that have been found. It is also important to recognise that contamination may be localised and that no investigation, however comprehensive, is capable of finding such occurrences, other than by chance.

The near-surface drainage patterns have not been fully established.

The ground beneath the buildings has not been examined but on present evidence the existing floor slabs are in good condition and there is no evidence of any basements or past spills of potential contaminants. Some degree of made ground material should be expected beneath the existing floor slabs.

9.0 ENGINEERING CONSIDERATIONS AND RECOMMENDATIONS

9.1 DETAILS OF PROPOSED DEVELOPMENT

The proposed development will comprise of the construction of a new training facility within the existing structure of the building consisting of a two-storey residential building, materials store and vehicle wash down area. External to the pre-existing building a control room, smoke filter housing and fan will be constructed.

Lawray Architects have provided a drawing for the project entitled 'Proposed Ground Floor Plan and Roof Plan' under the project number 19655, dated 22nd February 2022.

At this stage, the anticipated loading of the structure has not been supplied.

9.2 SITE PREPARATION

Prior to works commencing on site, any active services within the site area should be identified and either diverted or protected. Any diversionary works should be carried out under the supervision of, and to the specification of, the appropriate statutory authorities. The resulting excavations should be backfilled with suitable acceptable granular fill material.

In areas to be redeveloped all encountered reinforced concrete hardstanding material should be fully broken out and removed, with the resulting debris crushed and screened to a structural specification, typically <125mm maximum particle size.

Areas of existing tarmac should be planed off and the materials set aside for appropriate re-use or alternatively disposal off site at an appropriate facility.

A system should be established by which any 'unusual' materials that may be encountered (including any suspected asbestos containing materials or suspected contamination 'hotspots') are reported rapidly to the site management, so that the appropriate action may be taken, following specialist advice if necessary. An unusual material may be identified on site by colour, odour, or physical nature.

Any reduced levels should be brought up to the required levels with selected well compacted site won or imported granular materials. Department of Transport (DTp) Type 1 subbase or similar approved, could be used, and should be compacted in layers, in accordance with the current DTp Specification for Highway Works.

9.2 SITE PREPARATION (CONTINUED)

Exposed formations should be protected from site traffic and inclement weather in order to preserve their integrity. Any soft spots/areas should be removed and replaced with well compacted site won or imported granular fill material.

9.3 FOUNDATIONS AND FLOOR SLABS

The made ground deposits encountered within the site area are variable in physical nature and in their present state of compaction, these materials are not deemed suitable load bearing materials for the proposed structures.

In addition, the naturally deposited poorly consolidated superficial soils identified in the windowless sample locations immediately below the made ground, are also not considered a suitable load bearing material due to their potential compressibility.

Considering the above, the chosen foundation should fully penetrate these deposits and extend into the natural competent granular soils at depth

It is recommended that piled foundations are adopted, and provided that the piles are taken down into suitably competent in-situ materials (solid strata at depth) then bored piles could be used and taken down to appropriate sets. Bored piles should be adopted owing to the presence and proximity of the existing structure and underground services in the area.

A series of deeper shell and auger boreholes should be drilled on site to provide detailed information for pile design.

The advice of a specialist piling contractor should be sought regarding the specific design and load bearing capacity of the piles. Under the selected intensity of loading, the total settlement of each pile should not exceed 10mm and any differential settlements between adjacent piles should be less than half this value. Any load contribution from the made ground and cohesive alluvium deposits should be ignored in the pile design.

Allowances should be made for negative skin friction within any made ground or soft in-situ soils if ground levels are to be raised.

Allowances should be made by the piling contractor for carrying out suitable pile testing and for potentially for encountering obstructions natural soils.

9.3 FOUNDATIONS AND FLOOR SLABS (CONITNUED)

The piling contractor should also allow for the potential presence of obstructions within the made ground deposits. Such obstructions should be removed by excavation plant, or it may be possible to reposition the piles to avoid the obstructions. This should be minimal after site clearance works.

Suspended ground floor slabs should be adopted at the development.

9.4 EXCAVATIONS AND FORMATIONS

Most excavations should be possible with normal soil excavating machinery. However, allowances should be made for the use of pneumatic breaker attachments, or similar tools, for breaking out the hardstanding and buried obstructions.

Groundwater was encountered at depths generally 1 to 3m below existing ground level during the site investigation works. This groundwater was under sub artesian pressure and rapidly rose within the windowless sample holes. Groundwater in the windowless sample hole standpipes was measured at as shallow as 0.63m below ground level.

It is considered that any groundwater inflows will have to be controlled by extensive pumping techniques, particularly if excavations extend into groundwater and this groundwater is under sub-artesian pressure. Any water ingresses should be adequately controlled at all times to ensure stability and protection of the temporary and permanent works

The ground conditions are based on observations made at the time of the fieldworks. It should be noted that groundwater levels may vary due to seasonal effects.

Some pit side instability within the made ground deposits and poorly consolidated alluvial soils should be anticipated. The stability of trenches is likely to rapidly deteriorate over time, and excavations may require shoring to maintain an open excavation.

The sides of excavations deeper than 1m should be fully supported by trench boxes, or temporarily battered at gradients of typically 30˚.

Any soft spots/areas should be removed and replaced with compacted imported granular materials.

9.5 ACCESS ROADS AND CAR PARKING AREAS

Following site strip there are likely to be variations in the strength of the materials at the formation levels. Subject to confirmatory in-situ testing, we recommend that for design purposes California Bearing Ratio (CBR) values of between 1-2% could be assumed for the in-situ loose sand and made ground.

Formations within the cohesive deposits should be regarded as frost susceptible. It will be necessary to ensure their performance and hence contingencies should be allowed for the removal of any soft spots/areas and their replacement with well compacted granular fill materials. These should be placed in well compacted layers, in accordance with Department of Transport (DTp) Specification for Highway Works.

Allowances should be made for undertaking field CBR tests in order to confirm the above assumptions. Depending on the outcome of such field tests, the above recommendations may be revised, if necessary, amended.

9.6 RECOMMENDED FURTHER WORKS

Shell and auger boreholes will be required to be drilled on site to provide parameters for pile design.

APPENDIX A

WINDOWLESS BOREHOLE LOGS

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mail@integralgeotec.com

Project Name:	Project No.:	Borehole No.:
Earlswood Burn House	**14050**	**WS1** Sheet 1 of 1

Location:	Client:	Coordinates:	Hole Type:
Jersey Marine, Neath	Mid & West Wales Fire Service		WLS

Equipment:	Diameter of Casing:	Level:	Scale
DART 540	101mm		1:25

Diameter of Boring:	Depth of Casing:	Dates	Logged By:
101mm	4.00m	18/07/2022 -	LS

Well	Water Strikes	Samples & In situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Light grey reinforced CONCRETE. Reinforcement is a singular metal bar.
		0.30 - 0.50	ES		0.30			(MADE GROUND) Grey black very sandy slightly clayey GRAVEL. Gravel is fine to coarse angular and sub angular limestone, ash, slag and clinker.
		0.50 - 0.60	ES		0.50			(MADE GROUND) Red GRAVEL and COBBLES of sub angular and angular concrete and brick.
					0.60			(MADE GROUND) Grey black very sandy slightly clayey GRAVEL. Gravel is fine to coarse angular and sub angular limestone, ash, slag and clinker.
	0.77				0.70			(MADE GROUND) Red GRAVEL and COBBLES sub angular and angular concrete and brick.
					0.80			(MADE GROUND) Loose becoming medium dense dark beige medium to coarse SAND. Occasional medium and coarse gravel of sub angular sandstone and occasional sub angular brick.
		1.00	C	N=15 (2,2/3,4,4,4)				
		1.20 - 1.50	D					
		2.00	C	N=6 (1,2/2,1,2,1)				
					2.10			Loose yellow beige slightly gravelly coarse SAND. Occasional fine gravels of sub angular sandstone.
					2.70			Loose dark grey fine to coarse SAND.
		3.00	C	N=7 (1,2/1,2,2,2)	3.00			Loose beige light brown medium to coarse SAND with occasional to frequent cobbles of sub rounded and sub angular sandstone.
		4.00	C	N=9 (1,2/2,3,2,2)	4.00			Loose dark grey slightly gravelly very clayey fine to coarse SAND. Gravel is medium to coarse sub angular and sub rounded sandstone. - Clay content becoming greater with depth.
					4.70			Soft grey sandy silty CLAY.
		5.00	C	N=5 (1,2/1,2,1,1)	5.00			End of Borehole at 5.00 m

Remarks:

1. Borehole terminated at 5.0mgl. 2. Gas monitoring well installed.

Key:

D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
SPT - Standard Penetration Test (split spoon)
CPT - Standard Penetration Test (solid cone)
W - Water sample
U - Undisturbed sample
TCR - Total Core Recovery
SCR - Solid Core Recovery
RQD - Rock Quality Designation

AGS

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Project Name:	Project No.:	Borehole No.:
Earlswood Burn House	**14050**	**WS2** Sheet 1 of 1

Location:	Client:	Coordinates:	Hole Type:
Jersey Marine, Neath	Mid & West Wales Fire Service		WLS

Equipment:	Diameter of Casing:	Level:	Scale
DART 540	101mm		1:25

Diameter of Boring:	Depth of Casing:	Dates	Logged By:
101mm	5.00m	18/07/2022 -	LS

Well	Water Strikes	Samples & In situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description	
								Light grey reinforced CONCRETE. Reinforcement is a singular metal bar.	
		0.20 - 0.30	ES		0.20			(MADE GROUND) Grey clayey slightly sandy GRAVEL. Gravel is fine to coarse angular and sub angular limestone.	
		0.50 - 0.60	ES		0.50			(MADE GROUND) Black clayey sandy GRAVEL. Gravel is fine to coarse angular and sub angular ash, slag, clinker, sandstone and limestone.	
					0.80			(MADE GROUND) Grey gravelly COBBLES. Gravel is fine to coarse angular and sub angular limestone. Cobbles are sub angular limestone.	
		1.00	C	N=9 (2,1/2,2,2,3)	1.00			(MADE GROUND) Dark grey black slightly gravelly medium to coarse SAND with occasional roots and rootlets. Gravel is fine to coarse angular and sub angular limestone.	1
		1.00 - 1.50	ES					- Clay content becoming higher with depth.	
	1.27								
		1.80 - 1.90	ES		1.80			(MADE GROUND) Soft dark grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub angular and sub rounded limestone.	
					1.90			(MADE GROUND) Loose grey COBBLES of subangular limestone.	
		2.00	C	N=4 (2,1/1,1,1,1)					2
					2.10			(MADE GROUND) Very loose dark grey black slightly gravelly medium to coarse SAND. Gravel is fine to coarse angular and sub angular limestone.	
					2.20			Soft dark grey slightly gravelly slightly sandy CLAY. Gravel is fine to coarse sub angular sandstone.	
					2.50			Loose dark beige medium to coarse grained organic rich SAND.	
		3.00	C	N=3 (1,0/1,1,0,1)	3.00			No recovery.	3
					3.50			Very soft grey sandy silty CLAY.	
		4.00	C	N=2 (1,0/0,1,0,1)	4.00			No recovery.	4
		5.00	C	N=3 (1,0/1,0,1,1)	5.00			End of Borehole at 5.00 m	5

Remarks:

1. Borehole terminated at 5.0mbgl.

Key:

D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
SPT - Standard Penetration Test (split spoon)
CPT - Standard Penetration Test (solid cone)
W - Water sample
U - Undisturbed sample
TCR - Total Core Recovery
SCR - Solid Core Recovery
RQD - Rock Quality Designation

AGS

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Project Name:	Project No.:	Borehole No.:
Earlswood Burn House	**14050**	**WS3** Sheet 1 of 1

Location:	Client:	Coordinates:	Hole Type:
Jersey Marine, Neath	Mid & West Wales Fire Service		WLS

Equipment:	Diameter of Casing:	Level:	Scale
DART 540	101mm		1:25

Diameter of Boring:	Depth of Casing:	Dates	Logged By:
101mm	5.00m	18/07/2022 -	LS

Well	Water Strikes	Samples & In situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Light grey reinforced CONCRETE. Reinforcement is a singular metal bar.
		0.20 - 0.30	ES		0.25			(MADE GROUND) Light grey beige slightly clayey sandy GRAVEL. Gravel is fine to coarse angular and sub angular limestone.
		0.50 - 0.60	ES		0.50			(MADE GROUND) Black dark grey sandy GRAVEL. Gravel is fine to coarse angular and sub angular limestone, ash, slag and clinker.
					0.60			(MADE GROUND) Orange brown slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse angular and sub angular sandstone, ash, slag and clinker.
					0.70			
	0.88	0.80 - 0.90	ES		0.90			(MADE GROUND) Black slightly clayey sandy GRAVEL. Gravel is fine to coarse angular and sub angular limestone, ash, slag and clinker.
		1.00	C	N=12 (15,7/5,4,2,1)	1.00			(MADE GROUND) Medium dense red, dark brown clayey slightly gravelly SAND. Gravel is fine to coarse angular and sub angular sandstone, ash, slag and clinker. Cobbles of sub angular and sub rounded limestone.
								Limited Recovery of: (MADE GROUND) Medium dense sandy GRAVEL and COBBLES of sub angular limestone.
					1.40			Loose to very loose orange dark brown beige clayey fine to coarse organic rich SAND.
		1.90 - 2.00	D					
		2.00	C	N=6 (4,2/2,1,1,2)				
		3.00	C	N=3 (1,0/1,1,1,0)				
		4.00	C	N=3 (1,1/0,1,1,1)	4.00			No Recovery.
		5.00	C	N=4 (1,0/0,1,1,2)	5.00			End of Borehole at 5.00 m

Remarks:

1. Borehole terminated at 5.0mbgl.

Key:

D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
SPT - Standard Penetration Test (split spoon)
CPT - Standard Penetration Test (solid cone)
W - Water sample
U - Undisturbed sample
TCR - Total Core Recovery
SCR - Solid Core Recovery
RQD - Rock Quality Designation

AGS

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Project Name: **Earlswood Burn House**		Project No.: **14050**	Borehole No.: **WS4** Sheet 1 of 1
Location: Jersey Marine, Neath	Client: Mid & West Wales Fire Service	Coordinates:	Hole Type: WLS
Equipment: DART 540	Diameter of Casing: 101mm	Level:	Scale 1:25
Diameter of Boring: 101mm	Depth of Casing: 4.00m	Dates 18/07/2022 -	Logged By: LS

Water Strikes	Samples & In situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description	
				0.02		Bituminous Material.	
	0.20 - 0.30	ES				(MADE GROUND) Light beige slightly sandy clayey GRAVEL. Gravel is fine to coarse angular and sub angular limestone.	
				0.30		(MADE GROUND) Grey black brown mottled red slightly clayey sandy GRAVEL. Gravel is fine to coarse angular and sub angular limestone, sandstone, ash, slag and clinker.	
	0.50 - 0.70	ES					
0.80							
	1.00	C	N=6 (2,1/1,1,1,3)	1.00			1
				1.10		(MADE GROUND) Loose light beige slightly sandy clayey GRAVEL. Gravel is fine to coarse angular and sub angular limestone.	
						(MADE GROUND) Soft black gravelly CLAY. Gravel is fine to coarse sub angular sandstone and occasional, ash, slag and clinker.	
				1.30		Loose dark grey fine to coarse SAND.	
	1.50 - 2.00	D					
				1.60		Loose light beige fine to coarse SAND.	
	2.00	C	N=9 (2,2/2,3,2,2)				2
	3.00	C	N=5 (1,2/1,2,1,1)	3.00		Loose dark grey fine to coarse SAND.	3
				3.70		Very soft dark grey very sandy silly CLAY.	
	4.00	C	N=2 (1,0/1,0,1,0)	4.00		Limited recovery of loose dark grey beige fine to coarse SAND.	4
	5.00	C	N=3 (0,0/1,0,1,1)	5.00		End of Borehole at 5.00 m	5

Remarks:

1. Borehole terminated at 5.0mbgl. 2. Gas monitoring well installed.

Key:

D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
SPT - Standard Penetration Test (split spoon)
CPT - Standard Penetration Test (solid cone)
W - Water sample
U - Undisturbed sample
TCR - Total Core Recovery
SCR - Solid Core Recovery
RQD - Rock Quality Designation

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Project Name:	Project No.:	Borehole No.:
Earlswood Burn House	**14050**	**WS5** Sheet 1 of 1

Location:	Client:	Coordinates:	Hole Type:
Jersey Marine, Neath	Mid & West Wales Fire Service		WLS

Equipment:	Diameter of Casing:	Level:	Scale
DART 540	101mm		1:25

Diameter of Boring:	Depth of Casing:	Dates	Logged By:
101mm	3.00m	18/07/2022 -	LS

Well	Water Strikes	Samples & In situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					0.02			Bituminous Material.
					0.10			Light grey CONCRETE with no reinforcement.
		0.30 - 0.40	ES					(MADE GROUND) Grey slightly sandy clayey GRAVEL. Gravel is angular and sub angular limestone.
					0.60			(MADE GROUND) Light grey beige mottled dark grey very slightly clayey slightly sandy GRAVEL. Gravel is fine to coarse angular and sub angular limestone, slag and ash.
		1.00	C	N=13 (3,2/3,3,3,4)	1.00			Medium dense orange brown clayey GRAVEL. Gravel is fine to coarse sub angular and sub rounded sandstone.
					1.10			Loose yellow beige fine to coarse SAND.
		1.20 - 1.50	D					
		2.00	C	N=5 (2,2/1,2,1,1)	2.00			Loose becoming very loose yellow beige gravelly fine to coarse SAND. Gravel is fine to coarse angular and sub angular sandstone.
		3.00	C	N=3 (1,0/1,1,0,1)	3.00			End of Borehole at 3.00 m

Remarks:

1. Borehole terminated at 3.0mbgl as borehole collapsed back to 1.0mbgl.

Key:

D - Small disturbed sample
B - Bulk disturbed sample
ES - Environmental soil sample
SPT - Standard Penetration Test (split spoon)
CPT - Standard Penetration Test (solid cone)
W - Water sample
U - Undisturbed sample
TCR - Total Core Recovery
SCR - Solid Core Recovery
RQD - Rock Quality Designation

AGS

APPENDIX B

LABORATORY CHEMICAL TEST RESULTS

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Analytical Report Number : 22-72453

Replaces Analytical Report Number: 22-72453, issue no. 1
Additional analysis undertaken.

Project / Site name:	Earlswood Burn House, Jersey Marine, Neath	**Samples received on:**	20/07/2022
Your job number:	14050	**Samples instructed on/ Analysis started on:**	20/07/2022
Your order number:		**Analysis completed by:**	08/08/2022
Report Issue Number:	2	**Report issued on:**	08/08/2022
Samples Analysed:	12 soil samples		

Signed:

Adam Fenwick
Technical Reviewer
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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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2356762	2356763	2356764	2356765	2356766
Sample Reference				WS1	WS1	WS2	WS2	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.50	0.50-0.60	0.20-0.30	0.50-0.60	1.00-1.50
Date Sampled				18/07/2022	18/07/2022	18/07/2022	18/07/2022	18/07/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	22	8.6	13	25
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	< 0.001	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	< 0.001	-	-	< 0.001
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA	DSA	DSA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.9	7.8	8.8	9.3	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	12000	19000	2200	2700	3800
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.21	0.1	0.072	0.56	0.35
Sulphide	mg/kg	1	MCERTS	60	23	270	1200	370
Total Sulphur	mg/kg	50	MCERTS	5800	9000	1100	2300	3500
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	3.6	5.2	1.3	3.2	2.3
Loss on Ignition @ 450oC	%	0.2	MCERTS	12.2	20	3.8	9	8.1

Total Phenols

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

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.49	1.1	0.31	0.69	0.55
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.29	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.5	3	0.69	1.4	1.4
Anthracene	mg/kg	0.05	MCERTS	0.23	0.51	< 0.05	0.33	0.24
Fluoranthene	mg/kg	0.05	MCERTS	2.8	4	1	1.8	2
Pyrene	mg/kg	0.05	MCERTS	2.1	2.7	0.71	1.3	1.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2	2.7	0.65	1.4	1.6
Chrysene	mg/kg	0.05	MCERTS	2	3.3	0.66	1.2	1.4
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.9	3.1	0.6	1.9	1.7
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.71	1.6	0.43	0.51	0.47
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.6	2	0.42	1.1	1.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.1	1.3	< 0.05	0.7	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.44	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	1.2	< 0.05	0.8	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	18.5	26.9	5.47	13.3	11.8

Analytical Report Number: 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2356762	2356763	2356764	2356765	2356766
Sample Reference				WS1	WS1	WS2	WS2	WS2
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30-0.50	0.50-0.60	0.20-0.30	0.50-0.60	1.00-1.50
Date Sampled				18/07/2022	18/07/2022	18/07/2022	18/07/2022	18/07/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	1200	1200	120	270	210
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.87	1.7	0.48	0.78	0.63
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.2	0.3	1.4	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	26	21	11	120	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	1000	1600	190	380	590
Lead (aqua regia extractable)	mg/kg	1	MCERTS	10000	12000	1800	4900	5900
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	38	27	4.6	16	28
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	45	68	28	34	51
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	82	100	21	40	160
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	41	57	17	93	28
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	180	260	160	500	280
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	19	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	45	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	81	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH_CU_1D_AL}$	mg/kg	10	MCERTS	< 10	< 10	130	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH_CU_1D_AL}$	mg/kg	8.4	NONE	< 8.4	< 8.4	33	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH_CU+HS_1D_AL}$	mg/kg	10	MCERTS	< 10	< 10	140	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	< 10	< 10	180	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	13	29	19	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	24	51	37	15	18
TPH-CWG - Aromatic >EC35 - EC40 $_{EH_CU_1D_AR}$	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44 $_{EH_CU_1D_AR}$	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) $_{EH_CU+HS_1D_AR}$	mg/kg	10	MCERTS	37	80	55	22	27
TPH-CWG - Aromatic (EC5 - EC44) $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	37	80	55	22	27
TPH Total C5 - C44 $_{EH_CU+HS_1D_TOTAL}$	mg/kg	10	NONE	37	80	230	22	27
Environmental Forensics								
PFOS	µg/kg	0.1	NONE	0.2	0.7	0.2	0.2	0.3
PFOA	µg/kg	0.1	NONE	< 0.1	0.2	0.1	< 0.1	< 0.1

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2356767	2356768	2356769	2356770	2356771
Sample Reference				WS2	WS3	WS3	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.80-1.90	0.20-0.30	0.80-0.90	0.50-0.60	0.50-0.70
Date Sampled				18/07/2022	18/07/2022	18/07/2022	18/07/2022	18/07/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	5.2	19	6.8	11
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	ASE	ASE	ASE	ASE	ASE

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.2	8.5	7.6	7.9	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	1	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	8400	390	1700	160	960
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.38	0.025	0.55	0.028	0.3
Sulphide	mg/kg	1	MCERTS	130	< 1.0	1800	11	1400
Total Sulphur	mg/kg	50	MCERTS	4100	270	2700	230	3100
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.2	0.3	2.3	2.6	1.1
Loss on Ignition @ 450oC	%	0.2	MCERTS	10.4	1.6	7.6	6.2	4

Total Phenols

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

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.52	< 0.05	0.73	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.39	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	2	< 0.05	0.54	< 0.05	0.43
Anthracene	mg/kg	0.05	MCERTS	0.28	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	4	< 0.05	0.38	< 0.05	0.64
Pyrene	mg/kg	0.05	MCERTS	2.7	< 0.05	0.32	< 0.05	0.52
Benzo(a)anthracene	mg/kg	0.05	MCERTS	2.9	< 0.05	0.25	< 0.05	0.61
Chrysene	mg/kg	0.05	MCERTS	2.5	< 0.05	0.41	< 0.05	0.56
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.2	< 0.05	0.22	< 0.05	0.37
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.1	< 0.05	0.2	< 0.05	0.34
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	< 0.05	0.2	< 0.05	0.37
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.75	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.28	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.96	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	21.5	< 0.80	3.64	< 0.80	3.84

Analytical Report Number: 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2356767	2356768	2356769	2356770	2356771
Sample Reference				WS2	WS3	WS3	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.80-1.90	0.20-0.30	0.80-0.90	0.50-0.60	0.50-0.70
Date Sampled				18/07/2022	18/07/2022	18/07/2022	18/07/2022	18/07/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	290	28	120	22	200
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.4	0.75	1	1.4	0.94
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	0.2	0.8	0.2	2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	U/S	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	10	19	16	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	620	62	720	81	1400
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11000	250	1500	47	610
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	26	1	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	35	12	39	38	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	720	8.3	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	35	11	34	25	30
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	120	1500	130	2500
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0	46	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	72	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0	< 8.0	71	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH_CU_1D_AL}$	mg/kg	10	MCERTS	< 10	< 10	140	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH_CU_1D_AL}$	mg/kg	8.4	NONE	< 8.4	< 8.4	26	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH_CU+HS_1D_AL}$	mg/kg	10	MCERTS	< 10	< 10	190	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	< 10	< 10	210	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0	24	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	11	< 10	40	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	22	< 10	21	< 10	< 10
TPH-CWG - Aromatic >EC35 - EC40 $_{EH_CU_1D_AR}$	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44 $_{EH_CU_1D_AR}$	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) $_{EH_CU+HS_1D_AR}$	mg/kg	10	MCERTS	33	< 10	84	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44) $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	33	< 10	84	< 10	< 10
TPH Total C5 - C44 $_{EH_CU+HS_1D_TOTAL}$	mg/kg	10	NONE	33	< 10	300	< 10	< 10
Environmental Forensics								
PFOS	µg/kg	0.1	NONE	0.3	< 0.1	0.3	0.7	< 0.1
PFOA	µg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2356772	2356773
Sample Reference				WS4	WS5
Sample Number				None Supplied	None Supplied
Depth (m)				0.20-0.30	0.30-0.40
Date Sampled				18/07/2022	18/07/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	54
Moisture Content	%	0.01	NONE	5.6	4.2
Total mass of sample received	kg	0.001	NONE	1.2	1.2

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-
Asbestos Analyst ID	N/A	N/A	N/A	ASE	SPU

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	8.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	360	230
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.1	0.026
Sulphide	mg/kg	1	MCERTS	190	500
Total Sulphur	mg/kg	50	MCERTS	310	340
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.4	0.5
Loss on Ignition @ 450oC	%	0.2	MCERTS	2.2	1.3

Total Phenols

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

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80

Analytical Report Number: 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Lab Sample Number				2356772	2356773
Sample Reference				WS4	WS5
Sample Number				None Supplied	None Supplied
Depth (m)				0.20-0.30	0.30-0.40
Date Sampled				18/07/2022	18/07/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	25	7.2
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.76	0.29
Boron (water soluble)	mg/kg	0.2	MCERTS	0.2	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.1	0.6
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	11	6.9
Copper (aqua regia extractable)	mg/kg	1	MCERTS	69	14
Lead (aqua regia extractable)	mg/kg	1	MCERTS	180	27
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	8.6
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	13	8.3
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	31
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS_1D_AL}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH_CU_1D_AL}$	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH_CU_1D_AL}$	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0	8.2
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH_CU_1D_AL}$	mg/kg	8	MCERTS	< 8.0	62
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH_CU_1D_AL}$	mg/kg	10	MCERTS	< 10	70
TPH-CWG - Aliphatic > EC35 - EC44 $_{EH_CU_1D_AL}$	mg/kg	8.4	NONE	< 8.4	33
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH_CU+HS_1D_AL}$	mg/kg	10	MCERTS	< 10	71
TPH-CWG - Aliphatic (EC5 - EC44) $_{EH_CU+HS_1D_AL}$	mg/kg	10	NONE	< 10	100
TPH-CWG - Aromatic >EC5 - EC7 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 $_{HS_1D_AR}$	mg/kg	0.001	MCERTS	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 $_{EH_CU_1D_AR}$	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 $_{EH_CU_1D_AR}$	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 $_{EH_CU_1D_AR}$	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic >EC35 - EC40 $_{EH_CU_1D_AR}$	mg/kg	10	NONE	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44 $_{EH_CU_1D_AR}$	mg/kg	8.4	NONE	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) $_{EH_CU+HS_1D_AR}$	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC44) $_{EH_CU+HS_1D_AR}$	mg/kg	10	NONE	< 10	< 10
TPH Total C5 - C44 $_{EH_CU+HS_1D_TOTAL}$	mg/kg	10	NONE	< 10	100
Environmental Forensics					
PFOS	µg/kg	0.1	NONE	0.2	< 0.1
PFOA	µg/kg	0.1	NONE	< 0.1	< 0.1

U/S = Unsuitable Sample I/S = Insufficient Sample

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

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

Analytical Report Number: 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
2356763	WS1	0.50-0.60	123	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**
2356766	WS2	1.00-1.50	110	Loose Fibres	**Chrysotile**	< 0.001	**< 0.001**

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

Analytical Report Number : 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

* 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 *
2356762	WS1	None Supplied	0.30-0.50	Grey clay and sand wth gravel and clinker
2356763	WS1	None Supplied	0.50-0.60	Greyclay and sand with loam and gravel
2356764	WS2	None Supplied	0.20-0.30	Light grey clay and gravel.
2356765	WS2	None Supplied	0.50-0.60	Grey clay and sand with gravel and vegetation.
2356766	WS2	None Supplied	1.00-1.50	Greyclay and sand with loam and gravel
2356767	WS2	None Supplied	1.80-1.90	Grey clay and sand with rubble and clinker
2356768	WS3	None Supplied	0.20-0.30	Brown clay and sand with gravel.
2356769	WS3	None Supplied	0.80-0.90	Grey clay and sand with gravel and vegetation.
2356770	WS3	None Supplied	0.50-0.60	Brown clay and sand with rubble.
2356771	WS4	None Supplied	0.50-0.70	Grey clay and sand wth gravel and clinker
2356772	WS4	None Supplied	0.20-0.30	Light brown clay and sand with gravel.
2356773	WS5	None Supplied	0.30-0.40	Black loam and clay with gravel and stones.

Analytical Report Number : 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
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.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion 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
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	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
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
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-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 sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-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
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.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

Analytical Report Number : 22-72453
Project / Site name: Earlswood Burn House, Jersey Marine, Neath

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
TO - PFOS in soil	Analysed by LC-MS in SIM with ISTD correction	In-house method		W	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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

APPENDIX C

LABORATORY GEOTECHNICAL TEST RESULTS

Results Summary

Apex Testing Solutions Limited
Sturmi Way
Village Farm Industrial Estate
Pyle
Bridgend
CF33 6BZ

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Reporting Details		**Key Information**	
Company Name:	Integral Geotechnique	**Site Name:**	Earlswood Burn House
Address:	7 Beddau Way	**Job Number:**	D22345
	Castlegate Business Park	**Date Received:**	21/07/2022
	Caerphilly	**Job Coordinator:**	A. Grogan
	CF83 2AX		
Contact Name:	**Lauren**		
Contact Number:			

Item No.	Tests Undertaken	Number of Tests
1	pH & sulphate (pH/SO4)*	4
2	Atterburg Limits (4 point) - BS1377-2: 1990	4
3	Moisture Content - BS1377 -2: 1990	4
4	Courier Charge (IG)	

Results Issued: **02/08/2022**

Comments

Results herein relate only to samples received in the laboratory and where not sampled by Apex Testing Solutions personnel relate to the samples as received.
Where tests are UKAS accredited any Opinion and/or Interpretation expressed herein are outside the scope of the UKAS Accreditation. The reports shall not be reproduced in full without the written approval of the laboratory.

Please contact the job coordinator should any further information be required.

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Apex Testing Solutions Limited
Sturmi Way
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Attention: Andrew Grogan

CERTIFICATE OF ANALYSIS

Date of report Generation:	02 August 2022
Customer:	Apex Testing Solutions Limited
Sample Delivery Group (SDG):	220727-67
Your Reference:	ATS 1684
Location:	Earlswood Burn House
Report No:	656381
Order Number:	D22345

We received 4 samples on Wednesday July 27, 2022 and 4 of these samples were scheduled for analysis which was completed on Tuesday August 02, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26641659	WS1		1.20 - 1.50	21/07/2022
26641661	WS3		1.90 - 2.00	21/07/2022
26641663	WS4		1.50 - 2.00	21/07/2022
26641665	WS5		1.20 - 1.50	21/07/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 220727-67 **Report Number:** 656381 **Superseded Report:**
Client Ref.: ATS 1684 **Location:** Earlswood Burn House

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

	Lab Sample No(s)		26641659	26641661	26641663	26641665
	Customer Sample Reference		WS1	WS3	WS4	WS5
	AGS Reference					
	Depth (m)		1.20 - 1.50	1.90 - 2.00	1.50 - 2.00	1.20 - 1.50
	Container		250g Amber Jar (ALE210)	250g Amber Jar (ALE210)	250g Amber Jar (ALE210)	250g Amber Jar (ALE210)
	Sample Type		S	S	S	S
Anions by Kone (soil)	All	NDPs: 0 Tests: 4	X	X	X	X
pH	All	NDPs: 0 Tests: 4	X	X	X	X
Sample description	All	NDPs: 0 Tests: 4	X	X	X	X

14:54:58 02/08/2022

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
26641659	WS1	1.20 - 1.50	Light Brown	Sand	None	None
26641661	WS3	1.90 - 2.00	Dark Brown	Sand	None	None
26641663	WS4	1.50 - 2.00	Light Brown	Sand	None	None
26641665	WS5	1.20 - 1.50	Light Brown	Sand	None	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG: 220727-67 **Report Number:** 656381 **Superseded Report:**
Client Ref.: ATS 1684 **Location:** Earlswood Burn House

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Customer Sample Ref.			WS1	WS3	WS4	WS5		
Depth (m)			1.20 - 1.50	1.90 - 2.00	1.50 - 2.00	1.20 - 1.50		
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)		
Date Sampled			21/07/2022	21/07/2022	21/07/2022	21/07/2022		
Sample Time			-	-	-	-		
Date Received			27/07/2022	27/07/2022	27/07/2022	27/07/2022		
SDG Ref			220727-67	220727-67	220727-67	220727-67		
Lab Sample No.(s)			26641659	26641661	26641663	26641665		
AGS Reference								
Component	**LOD/Units**	**Method**						
Moisture Content Ratio (% of as received sample)	%	PM024	18	22	18	17		
pH	1 pH Units	TM133	8.74 M	7.96 M	8.63 M	8.89 M		
Water Soluble Sulphate as SO4 2:1 Extract	<0.004 g/l	TM243	0.0183 M	0.506 M	0.0271 M	0.0108 M		

14:54:58 02/08/2022

Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM243		Mixed Anions In Soils By Kone

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 220727-67 **Report Number:** 656381 **Superseded Report:**
Client Ref.: ATS 1684 **Location:** Earlswood Burn House

Test Completion Dates

Lab Sample No(s)	26641659	26641661	26641663	26641665
Customer Sample Ref.	WS1	WS3	WS4	WS5
AGS Ref.				
Depth	1.20 - 1.50	1.90 - 2.00	1.50 - 2.00	1.20 - 1.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)	02-Aug-2022	02-Aug-2022	02-Aug-2022	02-Aug-2022
pH	29-Jul-2022	29-Jul-2022	29-Jul-2022	29-Jul-2022
Sample description	28-Jul-2022	28-Jul-2022	28-Jul-2022	28-Jul-2022

Appendix

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22345	**Client:**	Integral Geotechnique
Project Name:	14050 - Earlswood Burn House	**Address:**	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	28725		

Site Ref / Hole ID:	WS01	**Depth (m):**	1.20 - 1.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Light Brown slightly clayey SAND
Location in Works:	N/A	**Material Source:**	Site Gen
Date Sampled:	20 July 2022	**Material Supplier:**	Site Gen
Sampled By:	Client	**Specification:**	BS1377
Date Received:	21 July 2022	**Date Tested:**	25 July 2022

Test Results

Moisture Content (%)	20.2

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver G Llewellyn	Date 25/07/2022	Fig **MC**
EN ISO 17892-1:2014 E			G Llewellyn, Senior Technician		

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

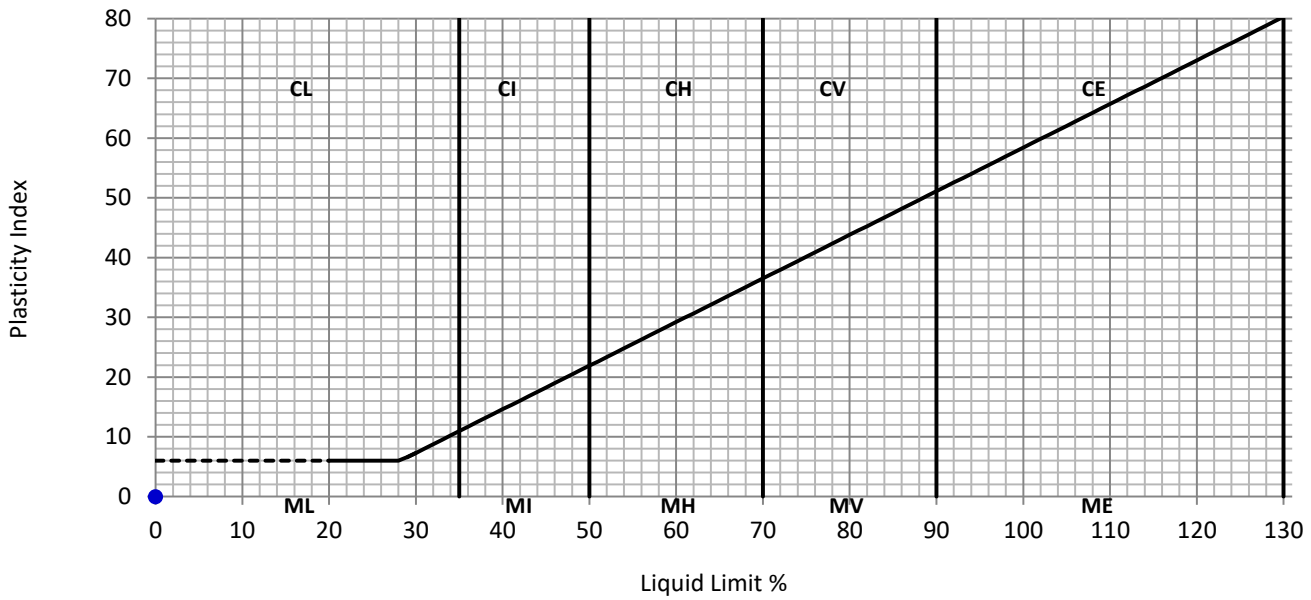
Project No:	D22345	**Client:**	Integral Geotechnique
Project Name:	14050 - Earlswood Burn	**Address:**	7 Beddau Way
ATS Sample No:	28725		Castlegate Business Park
			Caerphilly
			CF83 2AX

Site Ref / Hole ID:	WS01	**Depth (m):**	1.20 - 1.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Light Brown slightly clayey SAND
Location in Works:	N/A	**Material Source:**	Site Gen
Date Sampled:	20 July 2022	**Material Supplier:**	Site Gen
Sampled By:	Client	**Specification:**	BS1377
Date Received:	21 July 2022	**Date Tested:**	25 July 2022

Test Results

Liquid Limit	0	%
Plastic Limit	0	%
Plasticity Index	0	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref.					
BS1377 - 2 Rev. 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver G Llewellyn	Date 25/07/2022	Fig. **ATT**
			G Llewellyn, Senior Technician		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22345	**Client:**	Integral Geotechnique
Project Name:	14050 - Earlswood Burn House	**Address:**	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	28726		

Site Ref / Hole ID:	WS03	**Depth (m):**	1.90 - 2.00
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Grey slightly clayey SAND
Location in Works:	N/A	**Material Source:**	Site Gen
Date Sampled:	20 July 2022	**Material Supplier:**	Site Gen
Sampled By:	Client	**Specification:**	BS1377
Date Received:	21 July 2022	**Date Tested:**	25 July 2022

Test Results

Moisture Content (%)	27.4

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver G Llewellyn	Date 25/07/2022	Fig
EN ISO 17892-1:2014 E			G Llewellyn, Senior Technician		**MC**

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

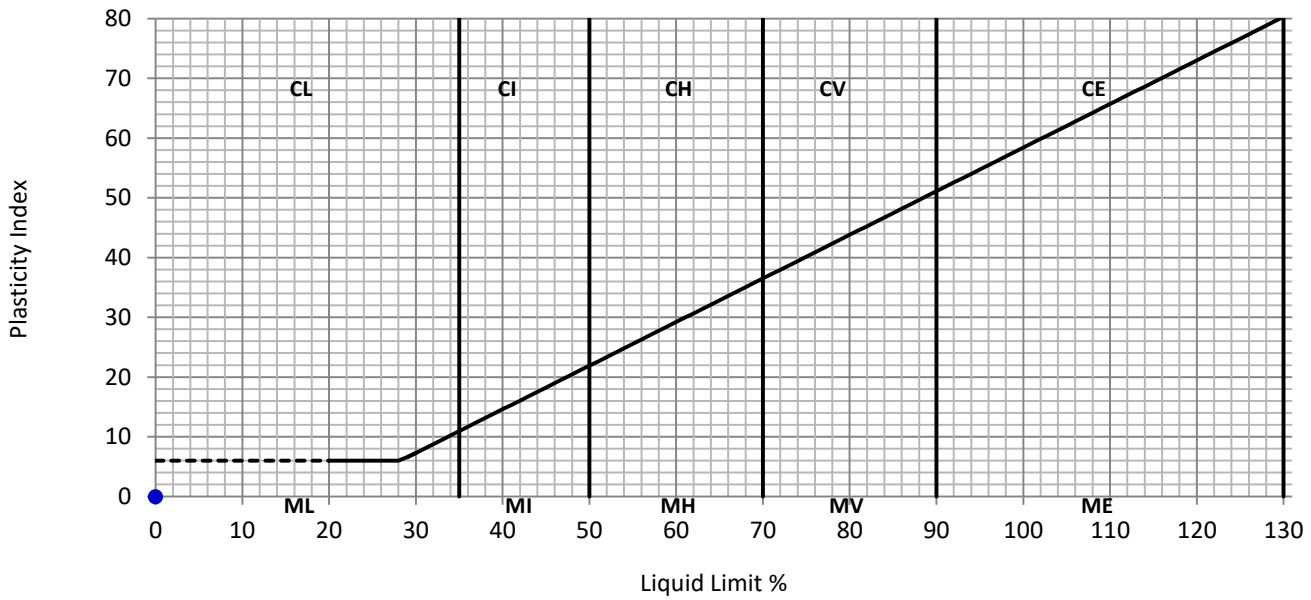
Project No:	D22345	**Client:**	Integral Geotechnique
Project Name:	14050 - Earlswood Burn	**Address:**	7 Beddau Way
ATS Sample No:	28726		Castlegate Business Park
			Caerphilly
			CF83 2AX

Site Ref / Hole ID:	WS03	**Depth (m):**	1.90 - 2.00
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Grey slightly clayey SAND
Location in Works:	N/A	**Material Source:**	Site Gen
Date Sampled:	20 July 2022	**Material Supplier:**	Site Gen
Sampled By:	Client	**Specification:**	BS1377
Date Received:	21 July 2022	**Date Tested:**	25 July 2022

Test Results

Liquid Limit	0	%
Plastic Limit	0	%
Plasticity Index	0	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	2	%



Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig.
BS1377 - 2 Rev. 3.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	G Llewellyn	25/07/2022	**ATT**
	UKAS TESTING 7771	G Llewellyn, Senior Technician		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22345	**Client:**	Integral Geotechnique
Project Name:	14050 - Earlswood Burn House	**Address:**	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	28727		

Site Ref / Hole ID:	WS4	**Depth (m):**	1.50 - 2.00
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown slightly clayey SAND
Location in Works:	N/A	**Material Source:**	Site Gen
Date Sampled:	20 July 2022	**Material Supplier:**	Site Gen
Sampled By:	Client	**Specification:**	BS1377
Date Received:	21 July 2022	**Date Tested:**	25 July 2022

Test Results

Moisture Content (%)	22.9

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver G Llewellyn	Date 25/07/2022	Fig
EN ISO 17892-1:2014 E			G Llewellyn, Senior Technician		**MC**

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

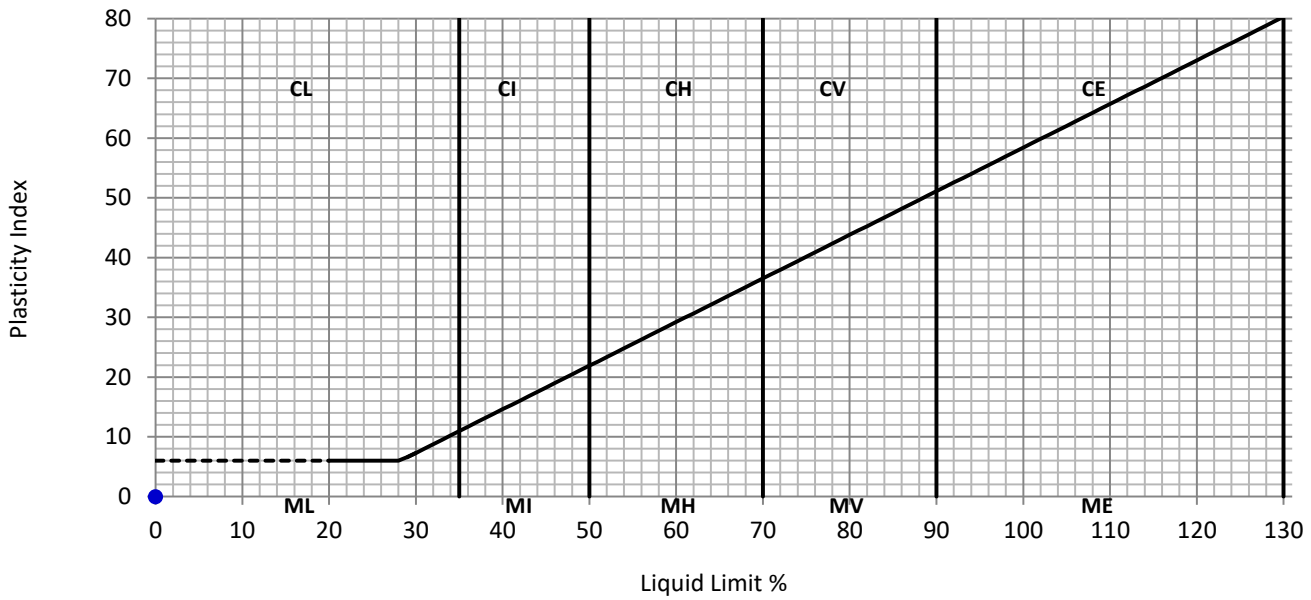
Project No:	D22345	**Client:**	Integral Geotechnique
Project Name:	14050 - Earlswood Burn	**Address:**	7 Beddau Way
ATS Sample No:	28727		Castlegate Business Park
			Caerphilly
			CF83 2AX

Site Ref / Hole ID:	WS4	**Depth (m):**	1.50 - 2.00
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown slightly clayey SAND
Location in Works:	N/A	**Material Source:**	Site Gen
Date Sampled:	20 July 2022	**Material Supplier:**	Site Gen
Sampled By:	Client	**Specification:**	BS1377
Date Received:	21 July 2022	**Date Tested:**	25 July 2022

Test Results

Liquid Limit	0	%
Plastic Limit	0	%
Plasticity Index	0	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	0	%



Remarks:

QA Ref.					
BS1377 - 2 Rev. 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver: G Llewellyn	Date: 25/07/2022	Fig. ATT
			G Llewellyn, Senior Technician		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014

Project No:	D22345	**Client:**	Integral Geotechnique
Project Name:	14050 - Earlswood Burn House	**Address:**	7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX
ATS Sample No:	28728		

Site Ref / Hole ID:	WS5	**Depth (m):**	1.20 - 1.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Light Brown slighlty gravelly slightly clayey SAND
Location in Works:	N/A	**Material Source:**	Site Gen
Date Sampled:	20 July 2022	**Material Supplier:**	Site Gen
Sampled By:	Client	**Specification:**	BS1377
Date Received:	21 July 2022	**Date Tested:**	25 July 2022

Test Results

Moisture Content (%)	22.5

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver G Llewellyn	Date 25/07/2022	Fig
EN ISO 17892-1:2014 E	7771	G Llewellyn, Senior Technician		**MC**

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

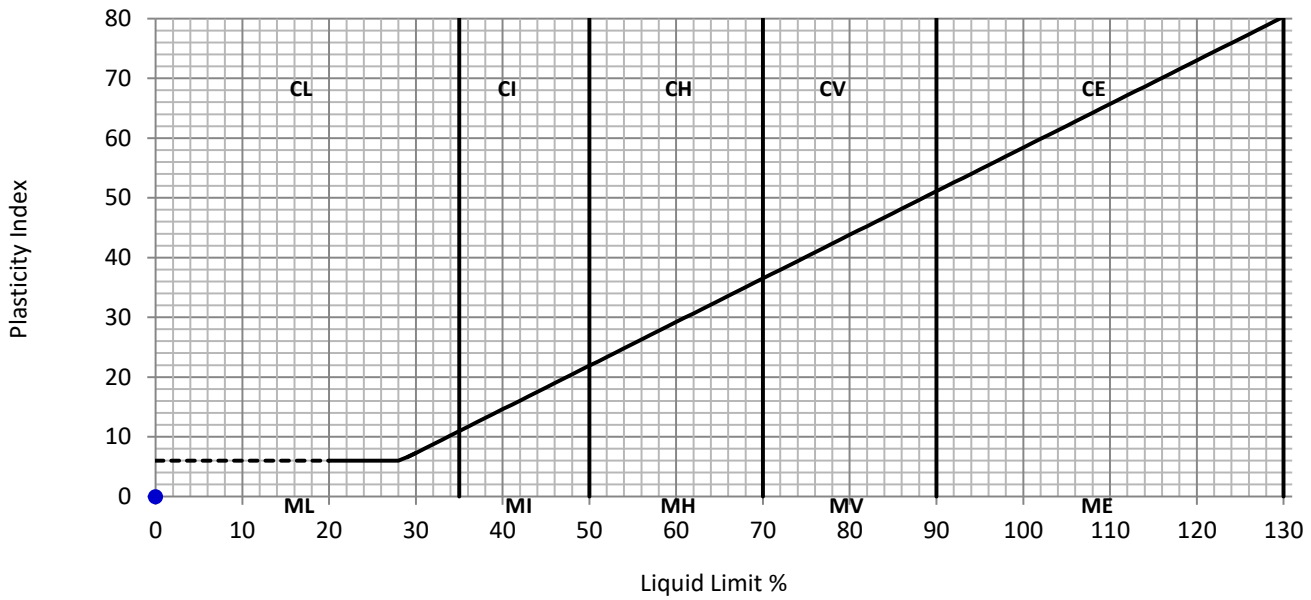
Project No:	D22345	**Client:**	Integral Geotechnique
Project Name:	14050 - Earlswood Burn	**Address:**	7 Beddau Way
ATS Sample No:	28728		Castlegate Business Park
			Caerphilly
			CF83 2AX

Site Ref / Hole ID:	WS5	**Depth (m):**	1.20 - 1.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Light Brown slighlty gravelly slightly clayey SAND
Location in Works:	N/A	**Material Source:**	Site Gen
Date Sampled:	20 July 2022	**Material Supplier:**	Site Gen
Sampled By:	Client	**Specification:**	BS1377
Date Received:	21 July 2022	**Date Tested:**	25 July 2022

Test Results

Liquid Limit	0	%
Plastic Limit	0	%
Plasticity Index	0	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	5	%



Remarks:

QA Ref.					
BS1377 - 2 Rev. 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver: G Llewellyn	Date: 25/07/2022	Fig. ATT
			G Llewellyn, Senior Technician		

APPENDIX D

IN-SITU GAS MONITORING RESULTS

FIELD GAS MONITORING RESULTS

Job No.:	14050
Site:	Earlswood Burn House
Monitoring Date:	21.07.22
Monitoring Round:	1

Monitoring Conditions			**Barometric Pressure (mb)**	
Weather:	Sunny		**On Arrival:**	1022
Ambient Temp:	21	°C	**During Monitoring:**	1022
Instrument:	GA5000		**End of Monitoring:**	1022

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
WS 1	2.51	0.82	<0.5	<0.5			18.50	18.50	<0.5	<0.5	1.00	<1	<0.3	0.20
WS 4	2.41	0.63	0.40	0.40	8.00	8.00	14.30	14.30	0.90	0.90	2.00	<1	<0.3	<0.3

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.:	14050
Site:	Earlswood Burn House
Monitoring Date:	01.08.22
Monitoring Round:	2

Monitoring Conditions			**Barometric Pressure (mb)**	
Weather:	Sunny		**On Arrival:**	1012
Ambient Temp:	22	°C	**During Monitoring:**	1012
Instrument:	GA5000		**End of Monitoring:**	1012

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
WS 1	2.51	0.91	<0.5	<0.5			18.10	18.40	<0.5	<0.5	1.00	<1	<0.3	0.30
WS 4	2.41	0.65	0.50	0.50	10.00	10.00	15.20	15.20	0.80	0.80	3.00	<1	<0.3	<0.3

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

0.5

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.:	14050
Site:	Earlswood Burn House
Monitoring Date:	09.08.22
Monitoring Round:	3

Monitoring Conditions			**Barometric Pressure (mb)**	
Weather:	Sunny		**On Arrival:**	1011
Ambient Temp:	24	°C	**During Monitoring:**	1011
Instrument:	GA5000		**End of Monitoring:**	1011

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
WS 1	2.51	0.90	<0.5	<0.5			18.60	18.70	<0.5	<0.5	2.00	<1	<0.3	0.40
WS 4	2.41	0.68	0.30	0.30	6.00	6.00	15.10	15.10	0.90	0.90	2.00	<1	<0.3	<0.3

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.:	14050
Site:	Earlswood Burn House
Monitoring Date:	30.08.22
Monitoring Round:	4

Monitoring Conditions			**Barometric Pressure (mb)**	
Weather:	Sunny		**On Arrival:**	1012
Ambient Temp:	20	°C	**During Monitoring:**	1012
Instrument:	GA5000		**End of Monitoring:**	1012

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
WS 1	2.51	0.92	<0.5	<0.5			19.20	19.20	<0.5	<0.5	1.00	<1	<0.3	0.40
WS 4	2.41	0.69	0.40	0.20	8.00	4.00	17.20	17.50	1.10	1.10	1.00	<1	<0.3	<0.3

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.:	14050
Site:	Earlswood Burn House
Monitoring Date:	14.09.22
Monitoring Round:	5

Monitoring Conditions		
Weather:	Sunny	
Ambient Temp:	21	°C
Instrument:	GA5000	

Barometric Pressure (mb)	
On Arrival:	998
During Monitoring:	998
End of Monitoring:	998

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
WS 1	2.51	0.93	<0.5	<0.5			19.60	19.80	<0.5	<0.5	1.00	<1	<0.3	0.50
WS 4	2.41	0.73	0.30	0.30	6.00	6.00	18.10	18.10	1.20	1.20	<1	<1	<0.3	0.10

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

FIELD GAS MONITORING RESULTS

Job No.:	14050
Site:	Earlswood Burn House
Monitoring Date:	27.09.22
Monitoring Round:	6

Monitoring Conditions			**Barometric Pressure (mb)**	
Weather:	Cloudy		**On Arrival:**	997
Ambient Temp:	16	°C	**During Monitoring:**	997
Instrument:	GA5000		**End of Monitoring:**	997

Location	Well Base Level (mbgl)	Water Level (mbgl)	Methane (CH4) %v/v		Methane % LEL		Oxygen (O2) %v/v		Carbon Dioxide (CO2) %v/v		Carbon Monoxide (CO) (ppm)	Hydrogen Sulphide (H2S) (ppm)	Peak Gas Flow (l/hr)	VOC Vapours (ppm>background)
			Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady				
WS 1	2.51	0.93	<0.5	<0.5			18.40	18.50	<0.5	<0.5	0.70	<1	<0.3	0.40
WS 4	2.41	0.68	0.30	0.20	6.00	4.00	16.20	16.80	0.60	0.60	1.00	<1	<0.3	<0.3

Typical Instrument Accuracy:

$\%CH_4$	0-70% +/- 0.5%	CO	0-500ppm +/- 2% FS
$\%CO_2$	0-60% +/- 0.5%	H_2S	0-5000ppm +/- 2.0% FS
$\%O_2$	0-25% +/- 1.0%	Flow from borehole	+/- 0.3l/h

LEL = Lower Explosive Limit
N/R = No Reading Taken
FS = Full Scale

Notes:

Intégral Géotechnique

APPENDIX E

SUMMARY OF CHEMICAL RESULTS – MADE GROUND

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 14050

Site: Earlswood Burn House, Jersey Marine, Neath

Soil Type: Made Ground

Soil Organic Matter: 1%

METALS AND SEMI-METALS

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
1	WS1	0.30-0.50	1200	0.4	0.87	< 0.2	26	< 1.8	1000	10000	38	45	82	41	180
2	WS1	0.50-0.60	1200	0.2	1.7	< 0.2	21	< 1.8	1600	12000	27	68	100	57	260
3	WS2	0.20-0.30	120	0.3	0.48	< 0.2	11	< 1.8	190	1800	4.6	28	21	17	160
4	WS2	0.50-0.60	270	1.4	0.78	< 0.2	120	< 1.8	380	4900	16	34	40	93	500
5	WS2	1.00-1.50	210	0.5	0.63	< 0.2	12	< 1.8	590	5900	28	51	160	28	280
6	WS2	1.80-1.90	290	0.5	1.4	< 0.2	13	U/S	620	11000	26	35	720	35	110
7	WS3	0.20-0.30	28	0.2	0.75	< 0.2	10	< 1.8	62	250	1	12	8.3	11	120
8	WS3	0.80-0.90	120	0.8	1	< 0.2	19	< 1.8	720	1500	< 0.3	39	< 1.0	34	1500
9	WS3	0.50-0.60	22	0.2	1.4	< 0.2	16	< 1.8	81	47	< 0.3	38	< 1.0	25	130
10	WS4	0.50-0.70	200	2	0.94	< 0.2	17	< 1.8	1400	610	< 0.3	31	< 1.0	30	2500
11	WS4	0.20-0.30	25	0.2	0.76	1.1	11	< 1.8	69	180	0.9	14	< 1.0	13	100
12	WS5	0.30-0.40	7.2	0.3	0.29	0.6	6.9	< 1.8	14	27	< 0.3	8.6	< 1.0	8.3	31
		Screening Criteria Value	640.0	240000.0	12.0	190.0	-	33.0	68000.0	2330.0	58.0	980.0	12000.0	9000.0	730000.0
		Source of Screening Criteria Value	S4UL	S4UL	S4UL	S4UL	-	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL

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SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 14050

Site: Earlswood Burn House, Jersey Marine, Neath

Soil Type: Made Ground

Soil Organic Matter: 1%

INORGANIC CHEMICALS & OTHERS

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
1	WS1	0.30-0.50	< 1.0	12.20	16.00	< 1.0	7.90	0.21	12000.00	60.00	5800.00	3.60	6.19	Not-detected	-
2	WS1	0.50-0.60	< 1.0	20.00	22.00	< 1.0	7.80	0.10	19000.00	23.00	9000.00	5.20	8.94	Detected	< 0.001
3	WS2	0.20-0.30	< 1.0	3.80	8.60	< 1.0	8.80	0.07	2200.00	270.00	1100.00	1.30	2.24	Not-detected	-
4	WS2	0.50-0.60	< 1.0	9.00	13.00	< 1.0	9.30	0.56	2700.00	1200.00	2300.00	3.20	5.50	Not-detected	-
5	WS2	1.00-1.50	< 1.0	8.10	25.00	< 1.0	7.50	0.35	3800.00	370.00	3500.00	2.30	3.96	Detected	< 0.001
6	WS2	1.80-1.90	< 1.0	10.40	20.00	< 1.0	7.20	0.38	8400.00	130.00	4100.00	2.20	3.78	Not-detected	-
7	WS3	0.20-0.30	< 1.0	1.60	5.20	< 1.0	8.50	0.03	390.00	< 1.0	270.00	0.30	0.52	Not-detected	-
8	WS3	0.80-0.90	1.00	7.60	19.00	< 1.0	7.60	0.55	1700.00	1800.00	2700.00	2.30	3.96	Not-detected	-
9	WS3	0.50-0.60	< 1.0	6.20	6.80	< 1.0	7.90	0.03	160.00	11.00	230.00	2.60	4.47	Not-detected	-
10	WS4	0.50-0.70	< 1.0	4.00	11.00	< 1.0	8.50	0.30	960.00	1400.00	3100.00	1.10	1.89	Not-detected	-
11	WS4	0.20-0.30	< 1.0	2.20	5.60	< 1.0	8.60	0.10	360.00	190.00	310.00	0.40	0.69	Not-detected	-
12	WS5	0.30-0.40	< 1.0	1.30	4.20	< 1.0	8.40	0.03	230.00	500.00	340.00	0.50	0.86	Not-detected	-
Screening Criteria Value			34.0	-	-	440.0	-	-	-	-	-	-	-	-	0.001
Source of Screening Criteria Value			ATRISK	-	-	S4UL	-	-	-	-	-	-	-	-	IOM

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Intégral Géotechnique

SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 14050

POLYAROMATIC HYDROCARBONS (PAH)

Site: Earlswood Burn House, Jersey Marine, Neath

Soil Type: Made Ground

Soil Organic Matter: 1%

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
1	WS1	0.30-0.50	< 0.05	< 0.05	0.23	2	1.6	2.9	1.1	0.71	2	< 0.05	2.8	< 0.05	1.1	0.49	1.5	2.1
2	WS1	0.50-0.60	< 0.05	< 0.05	0.51	2.7	2	3.1	1.2	1.6	3.3	0.44	4	< 0.05	1.3	1.1	3	2.7
3	WS2	0.20-0.30	< 0.05	< 0.05	< 0.05	0.65	0.42	0.6	< 0.05	0.43	0.66	< 0.05	1	< 0.05	< 0.05	0.31	0.69	0.71
4	WS2	0.50-0.60	< 0.05	< 0.05	0.33	1.4	1.1	1.9	0.8	0.51	1.2	< 0.05	1.8	0.29	0.7	0.69	1.4	1.3
5	WS2	1.00-1.50	< 0.05	< 0.05	0.24	1.6	1.1	1.7	< 0.05	0.47	1.4	< 0.05	2	< 0.05	< 0.05	0.55	1.4	1.4
6	WS2	1.80-1.90	< 0.05	< 0.05	0.28	2.9	1.4	2.2	0.96	1.1	2.5	0.28	4	< 0.05	0.75	0.52	2	2.7
7	WS3	0.20-0.30	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
8	WS3	0.80-0.90	< 0.05	< 0.05	< 0.05	0.25	0.2	0.22	< 0.05	0.2	0.41	< 0.05	0.38	0.39	< 0.05	0.73	0.54	0.32
9	WS3	0.50-0.60	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
10	WS4	0.50-0.70	< 0.05	< 0.05	< 0.05	0.61	0.37	0.37	< 0.05	0.34	0.56	< 0.05	0.64	< 0.05	< 0.05	< 0.05	0.43	0.52
11	WS4	0.20-0.30	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
12	WS5	0.30-0.40	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Screening Criteria Value			84000.0	83000.0	520000.0	170.0	35.0	44.0	3900.0	1200.0	350.0	3.50	23000.0	63000.0	500.0	190.0	22000.0	54000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

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SUMMARY OF LABORATORY SOIL TEST RESULTS

Job No.: 14050

Site: Earlswood Burn House, Jersey Marine, Neath

Soil Type: Made Ground

Soil Organic Matter: 1%

PETROLEUM HYDROCARBONS

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10-C12 EPH (mg/kg)	Aliphatic C12-C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35-C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10-C12 EPH (mg/kg)	Aromatic C12-C16 EPH (mg/kg)	Aromatic C16-C21 EPH (mg/kg)	Aromatic C21-C35 EPH (mg/kg)	Aromatic C35-C40 EPH (mg/kg)
1	WS1	0.30-0.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	13	24	< 10
2	WS1	0.50-0.60	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	29	51	< 10
3	WS2	0.20-0.30	< 0.001	< 0.001	< 0.001	< 1.0	19	130	33	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	19	37	< 10
4	WS2	0.50-0.60	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	15	< 10
5	WS2	1.00-1.50	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	18	< 10
6	WS2	1.80-1.90	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	11	22	< 10
7	WS3	0.20-0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 10
8	WS3	0.80-0.90	< 0.001	< 0.001	< 0.001	< 1.0	46	140	26	< 0.001	< 0.001	< 0.001	< 1.0	24	40	21	< 10
9	WS3	0.50-0.60	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 10
10	WS4	0.50-0.70	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 10
11	WS4	0.20-0.30	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 10
12	WS5	0.30-0.40	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	70	33	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 10
Screening Criteria Value			3200.0	7800.0	2000.0	9700.0	59000.0	1600000.0	1600000.0	27.0	56000.0	3500.0	16000.0	36000.0	28000.0	28000.0	28000.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

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FIGURES

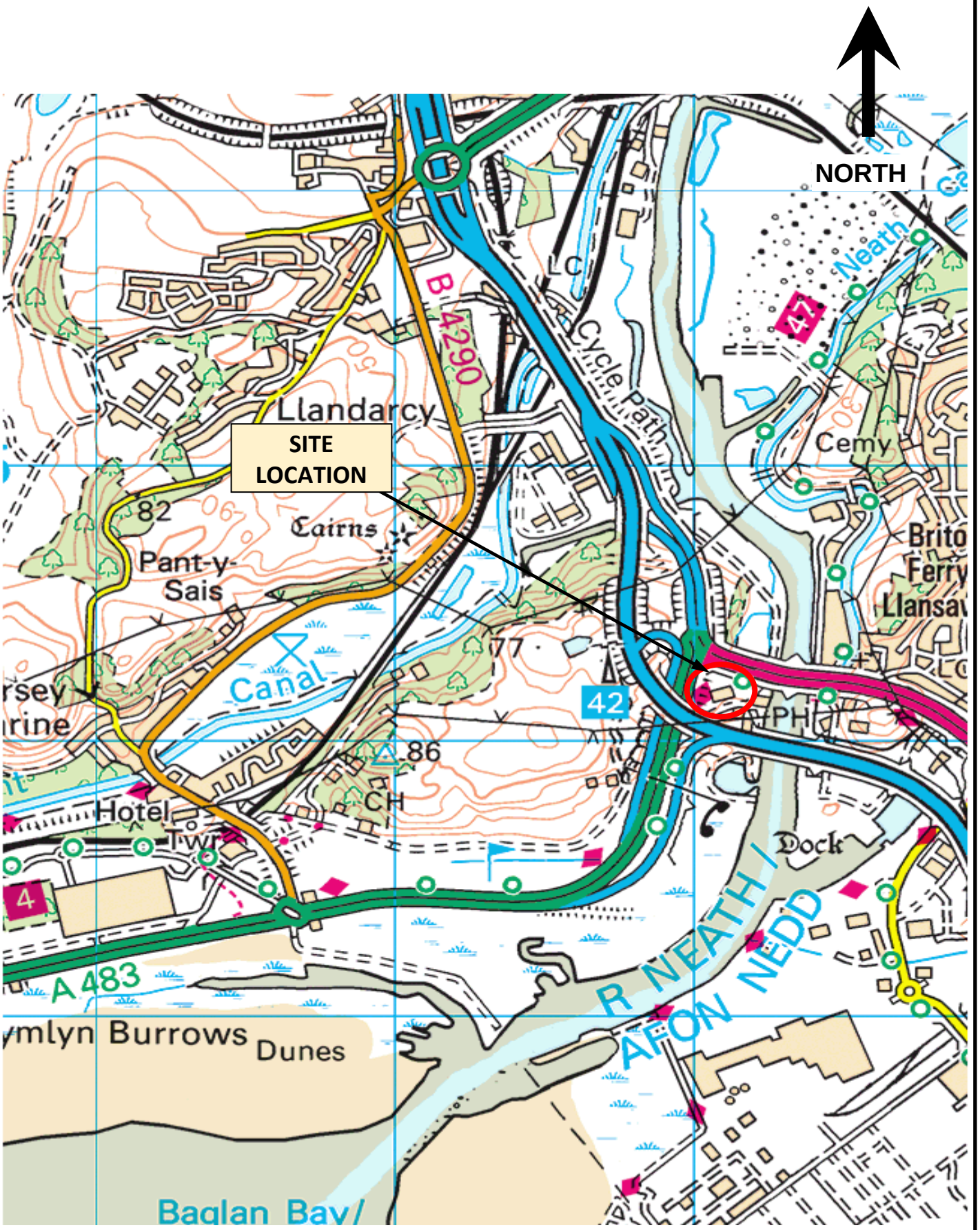


FIGURE 1: SITE LOCATION

Earlswood Burn House, Jersey Marine, Neath

Intégral Géotechnique
Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176

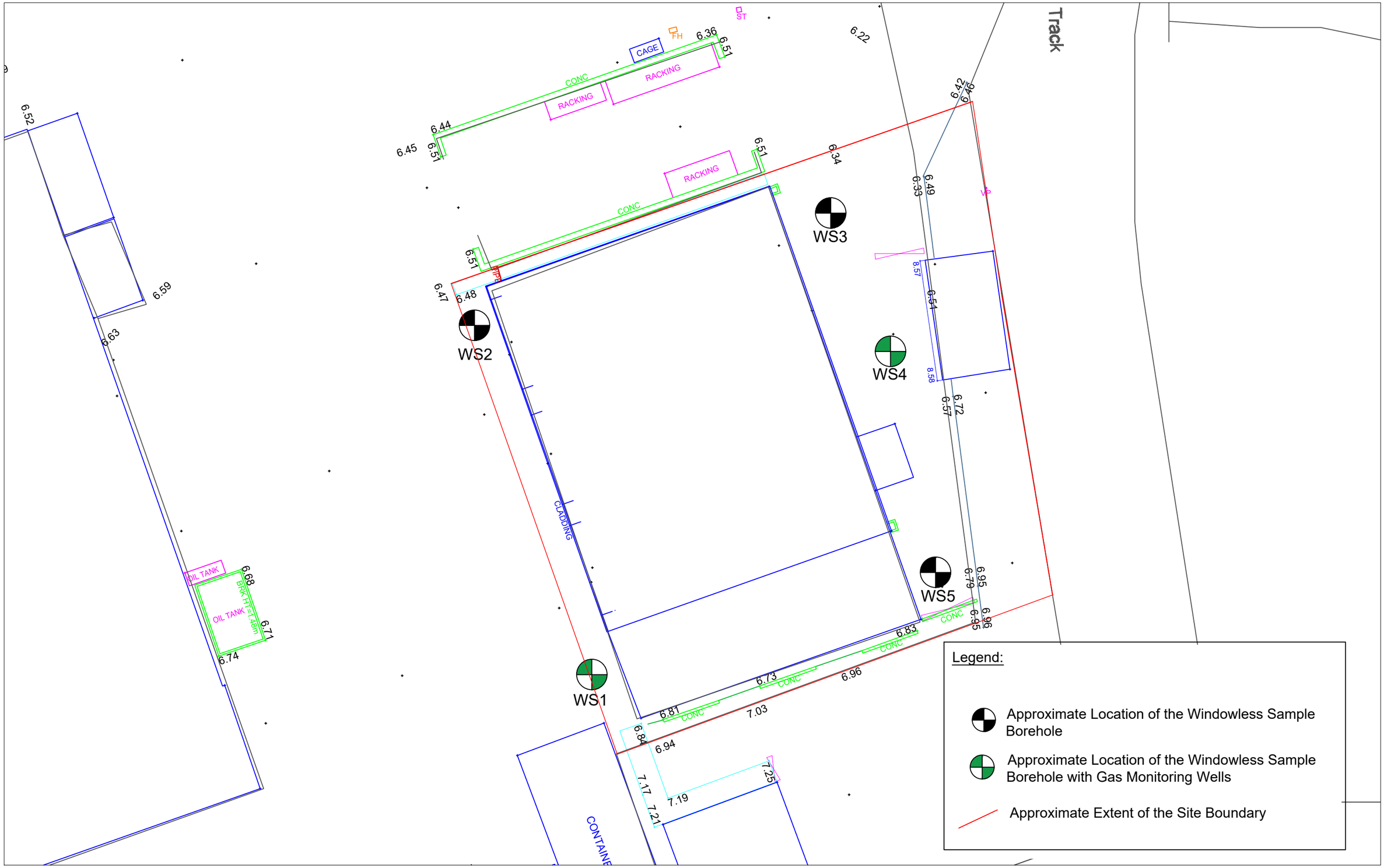
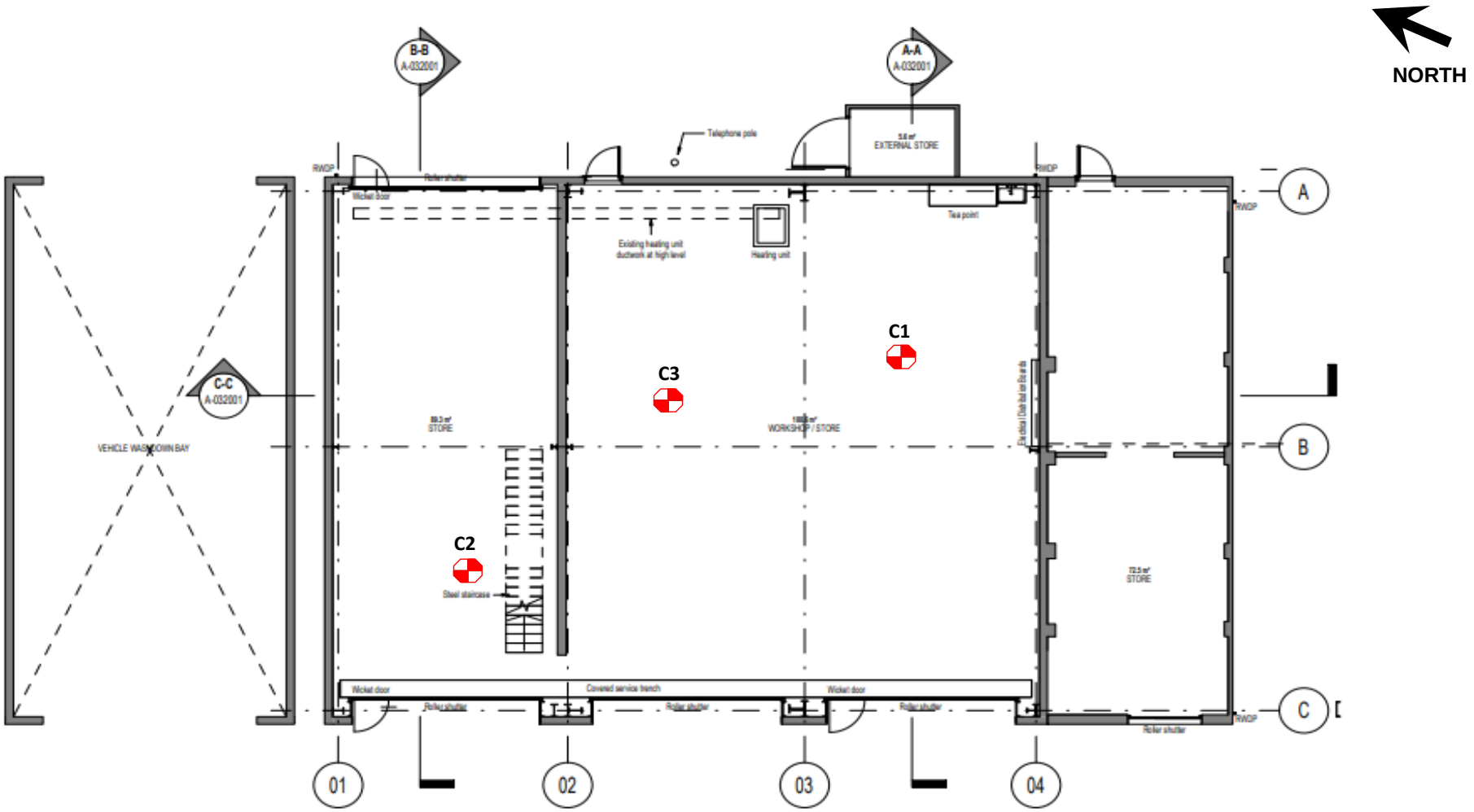


Figure 2: Site Plan

Project: Earlswood Burn House, Jersey Marine, Neath	Job No.: 14050	Intégral Géotechnique
Client: Mid & West Wales Fire Service	Scale: 1/25xp at A3	

Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
CF83 2AX.
Tel: 029 2080 7291



Existing Ground Floor Plan
1 : 100

07/2022 12:15:41

FIGURE 3: SITE PLAN of Cored Concrete Slab

Earlswood Burn House, Jersey Marine, Neath

Intégral Géotechnique

Intégral House
7 Beddau Way
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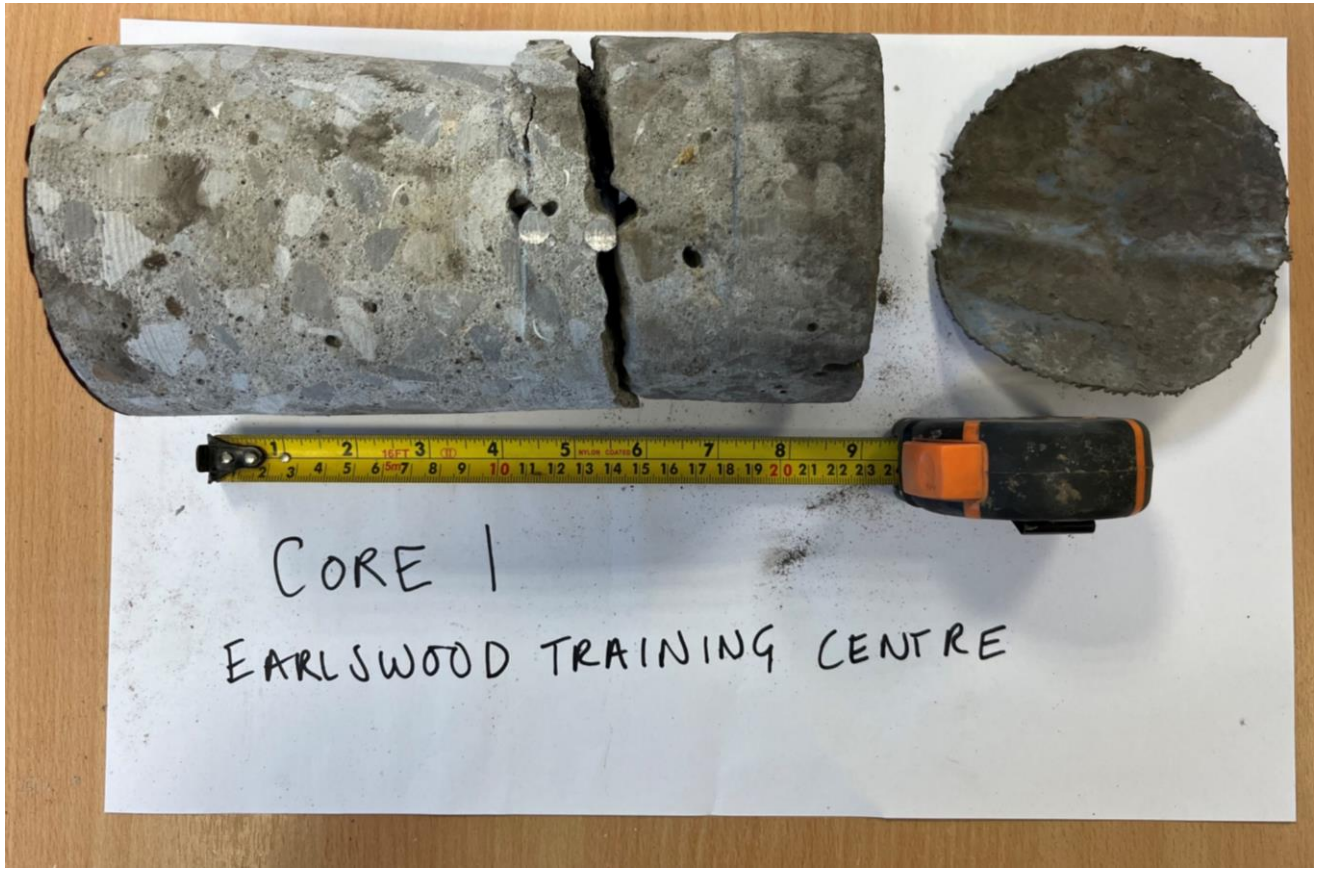
Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176



Core Description: Reinforced Concrete
Core Length: 245mm
Core Diameter: 115mm
Reinforcement: 10mm, 8mm and 6mm steel
Distance to 8mm (from the top of the slab): 125mm
Distance to 8mm (from the top of the slab): 145mm
Distance to 8mm (from the top of the slab): 160mm
Distance to 6mm (from the top of the slab): 190mm

Suspected two layers of reinforcement.

Matrix supported aggregate.
Aggregate size: 2mm to 30mm
Aggregate description: Elongate, sub rounded to sub angular, siltstone, sandstone.
Matrix cement with fine to coarse grained sand.
Approximate air void content: 5%
Voids noted: 1mm up to 10mm.

Notes:

Concrete cast on plastic membrane.
Top of floor slab painted.
No screed present.

Figure 4: Core 1

Earlswood Burn House, Jersey Marine, Neath

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Core Description: Reinforced Concrete

Core Length: 460mm of solid core.
Retrieved as two cores:
1st core length: 290mm
2nd core length: 170mm
10mm of core which was unable to be retrieved as solid core.
Core Diameter: 1st core - 112mm
2nd core - 115mm

Reinforcement (within the 2nd core): 8mm steel
Distance to 8mm (from the second core): 150mm

Aggregate size: 2mm to 40mm
Aggregate description: Elongate, sub rounded to sub angular, siltstone, sandstone.
Matrix cement with fine to coarse grained sand.
Approximate air void content: 5%
Voids noted: 1mm up to 5mm.

Notes:
Top of floor slab painted.
No screed present.

Figure 5: Core 2

Earlswood Burn House, Jersey Marine, Neath

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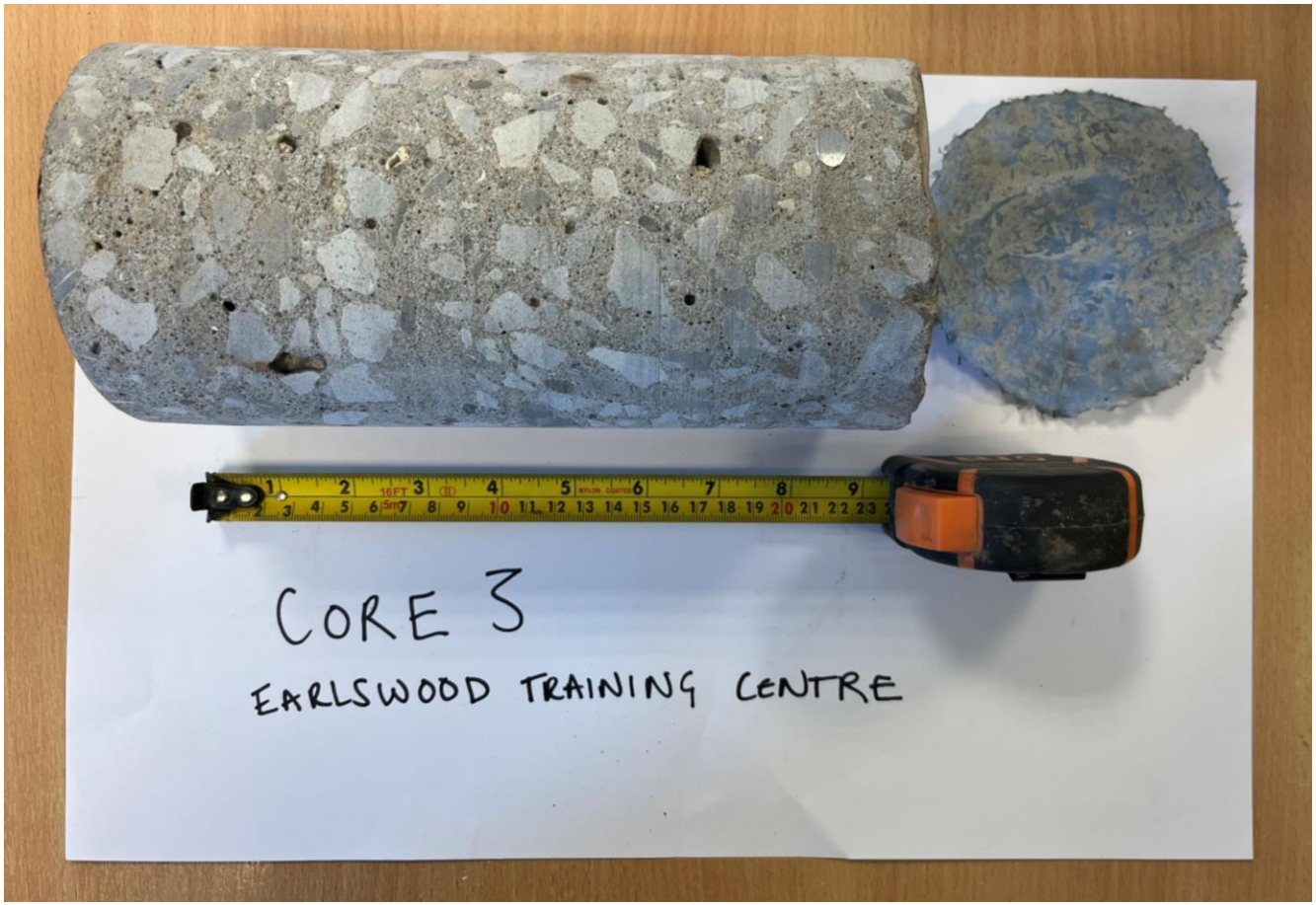

Core Description: Reinforced Concrete

Core Length: 235mm
Core Diameter: 115mm
Reinforcement: 10mm and 8mm steel
Distance to 10mm (from the top of the slab): 175mm
Distance to 8mm (from the top of the slab): 195mm

Suspected mesh reinforcement.

Matrix supported aggregate.
Aggregate size: 2mm to 30mm
Aggregate description: Elongate, sub rounded to sub angular, siltstone, sandstone.
Matrix cement with fine to coarse grained sand.
Approximate air void content: 5-10%
Voids noted: 1mm up to 15mm diameter.

Notes:

Concrete cast on plastic membrane.
Top of floor slab painted.
No screed present.

Figure 6: Core 3

Earlswood Burn House, Jersey Marine, Neath

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