

Bluefield Land Limited

LAND AT CWMGORS, NEATH PORT TALBOT

Site Investigation Report

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1.0 INTRODUCTION

1.1 GENERAL

Bluefield Land Limited are proposing to redevelop land in Cwmgors, Neath Port Talbot for residential end-use. The site location is shown on Figure 1 and a site plan is presented in Figure 2.

Intégral Géotechnique (Wales) Limited have been appointed as the Geotechnical Engineers to undertake a 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 site investigation and gives recommendations for the design of foundations, floor slabs and other geotechnical and geoenvironmental aspects of the project.

A Desk Study has been previously undertaken for the site by Intégral Géotechnique (Wales) Limited and reference should be made to Desk Study Report Ref. 14301/LP/24/DS dated March 2024. This report should be read in conjunction with the Desk Study Report in order to gain a full understanding of the site.

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1.2 PROPOSED DEVELOPMENT

The proposed development will comprise the construction of a number of residential properties and associated infrastructure such as a new access road, areas of car parking and private driveways. Areas of soft landscaping and private gardens will also be provided as part of the development.

The proposed development plan is shown in Figure 3.

1.3 SCOPE OF WORKS

The desk study information was used to make an initial assessment of the site and to design an investigation to be carried out by Intégral Géotechnique. The 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 included:

- An intrusive investigation carried out on the 4th and 5th September 2024 comprising the excavation of seventeen trial pits.
- Soil infiltration testing within five trial pits
- Sampling of soils for laboratory chemical testing.
- Sampling of in-situ soils for geotechnical testing.

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, Natural Resources Wales, and the building control authority 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.

1.4 LIMITATIONS (CONTINUED)

Access for the intrusive site investigation was limited at the time due to existing vacant buildings, areas of hardstanding and services. The densely vegetated areas of the site were not investigated as part of this site investigation.

Further investigation of the areas within the footprint of the existing buildings and beneath building floor slabs is recommended as part of the subsequent post demolition supplemental investigation works.

2.0 THE SITE

2.1 SITE LOCATION AND DESCRIPTION

The site is located on the western edge of Cwmgors approximately 6km northwest of Pontardawe at a National Grid Reference of 270340, 210610, see Figure 1.

The site is irregular in shape and occupies an area of approximately 1.8 hectares. The boundaries of the site are defined by the dismantled railway line and undeveloped land to the west, the continuation of the dismantled railway and residential development to the north, residential development, Heol-Y-Gors and undeveloped land to the east and undeveloped land to the south. A site plan is presented in Figure 2.

The site is situated on a relatively level development plateau created as part of the factory construction at levels of between 163m AOD and 165m AOD. An embankment forms the eastern boundary of the site with the site levels rising up to approximately 168m AOD.

Access to the site is from Heol-Y-Gors via the northeast corner of the site. The access road crosses the site towards the main former works building which is located approximately within the centre of the site. There are areas of hardstanding around the building and the remaining floor slab from a former building which has been demolished to the south of the main building.

The area of the site to the north and south of the existing factory building is heavily vegetated and the whole site densely wooded and/or vegetated around the boundaries.

A culvert is located crossing the site to the north of the existing factory building.

2.2 SITE OPERATIONS

There are no current site operations, but the main building remains on site and is vacant.

2.3 SURROUNDING LAND USE

The surrounding areas are typically developed for residential use with undeveloped land to the west.

2.4 AVAILABLE SITE INVESTIGATION DATA

A ground investigation has been undertaken previously within the site by GEM Geoenvironmental Management on behalf of Bluefield Land. The findings were presented in Geo-Environmental Report Ref: GEM/1231/07 dated 16th January 2008.

The site investigation comprised the excavation of nine machine excavated trial pits and included sampling and both geo-environmental and geotechnical testing.

The ground conditions comprised granular made ground overlying superficial deposits comprising clay, silt, sand and gravel. The made ground extended to 1.7m below ground level within the northern area of the site and was found to extend to depths of between typically 0.6m and 1.0m across the remaining site area.

The laboratory chemical testing identified elevations of heavy metals (arsenic, chromium and lead) within the northern area of the 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.

3.2 CONCEPTUAL MODEL FRAMEWORK (CONTINUED)

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 residential end use. Therefore, the critical sensitive receptor from a human health perspective is an on-site residential receptor.

In accordance with S4UL/C4SL and CLEA guidance for a standard residential with homegrown produce scenario, the critical sensitive receptor for a residential end use risk assessment is a female child, with exposure from 0 to 6 years.

The standard residential with homegrown produce 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 residential end use, and the findings of the desk study, the critical sensitive receptor from a controlled water perspective is groundwater within the Secondary 'A' Aquifer of the South Wales Upper and Middle Coal Measures Formation.

By considering groundwater as the critical sensitive receptor for controlled waters, the groundwater/hydrogeological risk assessment will also be protective of the feature which crosses the site which flows into Garnant to the west.

3.5 POTENTIAL CONTAMINANT SOURCES

As identified in the desk study, the site was undeveloped until 1918 when there was evidence of some reprofiling of the topography to create a development plateau and associated with the construction of the railway line. The main factory building was constructed within the site during the 1960's and there was evidence of further reprofiling.

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,

3.5 POTENTIAL CONTAMINANT SOURCES (CONTINUED)

- Polychlorinated Biphenyls (PCBs) within the shallow made ground in the vicinity of electrical substations/transformers (if present on site or within the building),
- Asbestos within the shallow made ground and the building fabric.

Potential for generation of ground gases such as methane and carbon dioxide depending upon the nature and thickness of the made ground. Potential risk of mine gas from shallow unrecorded workings.

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 and/or soil attached to home-grown produce,
- Ingestion of home-grown produce,
- 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, historical review and site walk over 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.

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.

3.7 SUMMARY OF CONCEPTUAL EXPOSURE MODEL (CONTINUED)

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	Resident – human health	Dermal Contact with made ground/dust	✓
			Ingestion of soil and/or soil attached to home-grown produce	✓
			Ingestion of home-grown produce	✓
			Inhalation of dust	✓
			Inhalation of vapours – indoor/outdoor	✓
	Metals, semi-metals, inorganics, PAH, petroleum hydrocarbons	Groundwater quality	Leaching from made ground	✓
	Metals, semi-metals, inorganics, PAH, petroleum hydrocarbons	Surface water quality	Transportation within groundwater	✓
Asbestos containing material (ACM) within the building fabric	Asbestos containing material (ACM)	Human health	Inhalation of dust/fibres	✓
Electrical substation or transformer (if present within the building or on site)	Polychlorinated Biphenyls (PCBs)	Resident – human health	Dermal Contact with made ground/dust	✓
			Ingestion of soil and/or soil attached to home-grown produce	✓
			Ingestion of home-grown produce	✓
			Inhalation of dust	✓
			Inhalation of vapours – indoor/outdoor	✓
	Polychlorinated Biphenyls (PCBs)	Groundwater quality	Localised spillage	✓
	Polychlorinated Biphenyls (PCBs)	Surface water quality	Transportation within groundwater	✓
Made Ground of unknown origin and natural ground	pH and water soluble sulphate	Building Materials Durability	Direct contact	✓

3.7 SUMMARY OF CONCEPTUAL EXPOSURE MODEL (CONTINUED)

Table 1: Preliminary Conceptual Exposure Model (Continued)				
Source		Receptor	Pathway	Potentially Active Pathway?
Origin	Contaminant			
Ground and Mine 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.

An intrusive investigation comprising the excavation of seventeen trial pits, was carried out on the 4th and 5th September 2024. The trial pits were located across the site and excavated to a maximum depth of 3.0m below existing ground level. The purpose of the trial pits was to prove the shallow ground conditions and allow an assessment of the most appropriate foundation type for the proposed development.

Soil infiltration tests were carried out in five trial pits in order to assess/monitor the likely permeability of the natural ground.

Representative soil samples were taken from the trial pits 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.

The fieldworks were supervised by a qualified Geotechnical Engineer from Intégral Géotechnique (Wales) Limited who also logged the trial pits and prepared their detailed engineering logs in accordance with the requirements of BS5930:2015+A1:2020. 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 trial pits are shown on Figure 2, while their logs are presented in Appendix A. The results of the soil infiltration tests are presented in Appendix B.

4.2 FIELD OBSERVATIONS

During the intrusive investigation, variable made ground was encountered at each trial pit location.

4.3 LABORATORY CHEMICAL TESTING

Representative soil samples were taken from the trial pits across the site, 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
Polycyclic Aromatic Hydrocarbons (PAH)	Petroleum Hydrocarbons (VPH/EPH)

Soil samples were also screened for asbestos.

The results of the laboratory chemical testing are presented in Appendix C.

4.4 LABORATORY GEOTECHNICAL TESTING

Representative samples of the in-situ natural ground were dispatched to the UKAS accredited laboratories of GSTL and scheduled for analysis of moisture content and Atterberg Limit Testing.

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

5.0 GROUND CONDITIONS

The ground conditions typically comprised of variable made ground over generally cohesive, locally granular superficial deposits.

Much of the factory infrastructure remains including buildings, foundations, floor slabs and access roads.

The trial pits were generally stable with localised minor to major instability noted associated with cobble and boulder removal, and groundwater inflow.

5.1 HARDSTANDING

Hardstanding was encountered at six trial pit locations (TP04 to TP07 inclusive, SA02 and SA03) within the central area of the site around the existing factory building. The hardstanding comprised either bituminous materials or reinforced concrete hardstanding.

Hardstanding consisting of bituminous material was encountered at the northern end of the factory building at typical thicknesses of 0.07m/0.1m. Reinforced concrete hardstanding was encountered at the southern end of the factory building at a typical thickness 0.2m.

5.2 MADE GROUND

Made ground was encountered at each trial pit location, either underlying the hardstanding or alternatively from ground level.

The made ground encountered beneath the site was variable in nature.

Within areas of existing vegetation, the made ground initially comprised of soft dark brown, brown and/or red gravelly clay and encountered to depths of between 0.15m and 0.3m bgl.

The gravel typically comprised of brick, sandstone, slag and fine ash.

The veneer of initial cohesive made ground and/or the hardstanding was further underlain by made ground consisting of loose, loose to medium dense black, dark grey, grey, brown and/or red slightly clayey, slightly sandy to sandy gravels with a varying cobble and boulder content and encountered to depths of between 0.6m and 1.6m bgl.

Gravels included sandstone, brick, concrete, slag, and fine ash in varying quantities.

5.2 MADE GROUND (CONTINUED)

Locally to TP01 and TP02, the base of the made ground was not proven, with the trial pits terminating at depths of 2.7m and 3.0m bgl respectively. The made ground within these trial pits consisted of loose to medium dense light brown or dark brown clayey locally slightly sandy gravel with a moderate cobble and low to moderate boulder content of angular to sub-angular platy sandstone, siltstone and mudstone. Gravels were fine to coarse of angular to sub-angular platy sandstone, siltstone and mudstone, with rare coal within TP01.

Locally to TP07, potential reworked natural ground was encountered consisting of brown very clayey gravel with a moderate cobble and boulder content of sub-rounded to rounded sandstone. Gravels included fine to coarse sandstones with rare siltstone and mudstone. This potential reworked natural ground was encountered at a depth of between 0.6m and 1.5m bgl.

5.3 SUPERFICIAL DEPOSITS

The made ground was underlain by superficial deposits and typically encountered from depths of between 0.4m and 1.4m bgl (except at the locations of TP01 and TP02 in the northern part of the site where the base of the made ground was not proved).

The superficial deposits were generally cohesive in nature, comprising firm, firm to stiff, locally stiff generally bluish grey, locally grey, light grey, brown, light brown or yellowish brown locally sandy gravelly clay with a low to moderate cobble and boulder content or sub-rounded to rounded sandstone, with rare angular to sub-angular siltstone and mudstone.

The results of the Atterberg Limit testing on six representative samples of the cohesive superficial soils indicate that the deposits have plasticity indices of between 15% and 38% and modified plasticity indices of between 11.3% and 34.6%. Therefore, in accordance with NHBC standards, the modified plasticity indices indicates that the cohesive superficial soils are of low to medium volume change potential.

Locally to SA05, TP03, TP08 and TP09, the superficial deposits further graded into granular deposits at depths of between 1.7. to 2.7m bgl. The granular deposits generally comprised of medium dense or locally loose to medium dense brown, dark brown or bluish grey clayey locally sandy gravel with a varying cobble and boulder content of locally sub-angular, largely sub-rounded to rounded sandstone with localised angular to sub-angular siltstone and mudstone.

5.4 GROUNDWATER

During the excavation of the trial pits, groundwater was encountered within the following locations, as summarised in Table 2, below.

Table 2: Summary of Groundwater Levels during the Intrusive Site Investigation Works		
Trial Pit Location	Depth to Groundwater (mbgl)	Comment/Strata
SA01	2.9	1. Groundwater rising from the base of pit at 2.9m bgl and standing at 2.85m bgl.
SA02	1.1	1. Minor seepage at 1.1m bgl. Groundwater filling trial pit, standing at 2.55m bgl.
SA04	0.65	1. Major inflow at 0.65m bgl.
SA05	2.8	1. Groundwater rising from the base of pit at 2.8m bgl and standing at 2.5m bgl.
TP04	0.8	1. Major inflow at 0.8m. 2. Groundwater filled the pit to 0.8m.
TP05	2.9	1. Groundwater rising from the base of pit at 2.9m bgl and standing at 2.85m bgl.
TP07	1.3	1. Moderate seepage below 1.3m. 2. Strata saturated below 1.3m.
TP08	1.3	1. Strata saturated between 1.3m and 2.0m bgl. 2. Moderate inflow from 1.8m bgl.
TP09	1.4	1. Moderate inflow below 1.4m. 2. Groundwater standing at 2.1m bgl after 20 mins.
TP10	2.5	1. Minor seepage at 2.5m bgl.
TP11	0.5	1. Minor seepage at 0.5m bgl.
TP12	1.3	1. Minor seepage at 1.3m bgl.

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

5.5 SOIL INFILTRATION TESTS

Soil infiltration testing was undertaken within five trial pits (SA01 to SA05).

The trial pits were rapidly filled with clean water from a tractor towed agricultural bowser and the water levels monitored for a period of time.

5.5 SOIL INFILTRATION TESTS (CONTINUED)

The soil infiltration test sheets are presented in Appendix B.

Within all soil infiltration test locations, no/negligible infiltration was observed and therefore infiltrations rates could not be calculated.

The water levels within SA04 rose by 0.46m over 145 mins due to strong groundwater inflow.

These results are specific to the locations and depths tested.

It should be noted that this initial testing should only be regarded as indicative. If it should be proposed to use soakaways for this site, then more extensive follow up locations and depth specific tests will be required and should fully comply with BRE 365, in order to confirm the suitability of the site and to satisfy the locally authority.

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 residential 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 residential with home grown produce end use have been adopted, where considered appropriate.

Since the results of the testing indicate total organic carbon content (TOC) in the range of 2.0% 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 and superficial soils 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, beryllium, lead, vanadium, zinc and several speciated PAH compounds.

Arsenic was detected at elevated concentrations within four out of the nine samples, at concentrations of between 48mg/kg and 220mg/kg, exceeding the adopted screening value of 37mg/kg.

6.2 SOIL CONTAMINATION (CONTINUED)

Beryllium was detected at elevated concentrations within three out of the nine samples of made ground at concentrations of between 1.8mg/kg and 3.2mg/kg, exceeding the adopted screening value of 1.7mg/kg.

Lead was detected at elevated concentrations within three out of the nine samples of made ground, at concentrations between 290mg/kg and 1100mg/kg, exceeding the adopted screening value of 200mg/kg.

Vanadium was detected at elevated concentrations within three out of the nine samples of made ground, at concentrations between 480mg/kg and 510mg/kg, exceeding the adopted screening value of 410mg/kg.

Zinc was detected at an elevated concentration within one sample of made ground (TP03) at a concentration of 3800mg/kg, exceeding the adopted screening value of 3700mg/kg.

The PAH compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene and dibenzo(ah)anthracene were detected at elevated concentrations within the made ground.

Benzo(a)anthracene was detected at elevated concentrations within two out of the nine samples of made ground at a concentration of 11mg/kg and 40mg/kg, exceeding the adopted screening value of 7.2mg/kg.

Benzo(a)pyrene was detected at elevated concentrations within four out of the nine samples of made ground, at concentrations of between 2.3mg/kg and 37mg/kg, exceeding the adopted screening value of 2.2mg/kg.

Benzo(b)fluoranthene was detected at elevated concentrations within four out of the nine samples of made ground, at concentration of between 3.3mg/kg and 47mg/kg, exceeding the adopted screening value of 2.6mg/kg.

Chrysene was detected at an elevated concentration within one of made ground samples (SA02) at a concentration of 39mg/kg, exceeding the adopted screening value of 15mg/kg.

Dibenzo(ah)anthracene was detected at elevated concentrations within samples of made ground ranging from 0.4mg/kg to 5.6mg/kg with three out of ten samples exceeding the adopted screening value of 0.28mg/kg.

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

6.2 SOIL CONTAMINATION (CONTINUED)

Asbestos was not detected within any samples of made ground.

6.2.2 *In-situ Natural Ground/Superficial Deposits*

No visual or olfactory evidence of contamination of the in-situ natural ground was identified during the excavation of the trial pits. At the time of writing this report one samples of natural ground had been tested. The results of the laboratory testing indicate that all analysed chemical elements or compounds are present at concentrations below the appropriate threshold for residential with homegrown produce end use.

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. Pathways identified as a relevant pollutant linkage require appropriate risk assessment or mitigation measures (see Section 8).

Table 3: 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, non-metals, PAH, petroleum hydrocarbons, asbestos	Resident – human health	Dermal Contact with made ground/dust	✓	✓	Elevated concentrations of arsenic, beryllium, lead, vanadium, zinc and PAH compounds identified within 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	VOC and SVOC sampling, testing and risk assessment recommended following demolition and site clearance
	Metals, semi-metals, inorganics, PAH, petroleum hydrocarbons	Groundwater quality	Leaching from made ground	✓	✓	Elevated concentrations of metals, non-metals and PAH compounds identified within the made ground – risk assess.
	Metals, semi-metals, inorganics, PAH, petroleum hydrocarbons,	Surface water quality	Transportation within groundwater	✓	✓	

7.0 REVISED CONCEPTUAL EXPOSURE MODEL (CONTINUED)

Source		Receptor	Pathway	Preliminary Active Pathway?	Relevant Pollutant Linkage	Justification/ Mitigation
Origin	Contaminant					
Asbestos containing material (ACM) within the building fabric	Asbestos containing material (ACM)	Human health	Inhalation of dust/fibres	✓	✓/X	Following demolition and site clearance, it is recommended that further sampling and testing for asbestos is undertaken.
Electrical substation or transformer (if present within the building or on site)	Polychlorinated Biphenyls (PCBs)	Resident – human health	Dermal Contact with made ground/dust	✓	✓/X	No electrical substation or transformers identified on-site at this stage.
			Ingestion of soil and/or soil attached to home-grown produce	✓	✓/X	
			Ingestion of home-grown produce	✓	✓/X	
			Inhalation of dust	✓	✓/X	
			Inhalation of vapours – indoor/outdoor	✓	✓/X	
	Polychlorinated Biphenyls (PCBs)	Groundwater quality	Localised spillage	✓	✓/X	
	Polychlorinated Biphenyls (PCBs)	Surface water quality	Transportation within groundwater	✓	✓/X	

7.0 REVISED CONCEPTUAL EXPOSURE MODEL (CONTINUED)

Source		Receptor	Pathway	Preliminary Active Pathway?	Relevant Pollutant Linkage	Justification/ Mitigation
Origin	Contaminant					
Made Ground of unknown origin and natural ground	pH and water-soluble sulphate	Building Materials Durability	Direct contact	✓	✓	Building materials will be in contact with made ground and natural 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	✓	✓	Potential gas producing materials present. Gas monitoring programme recommended – 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”, eg 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. The site is largely covered by tarmacadam or concrete and is fenced off.

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 (at shallow depth) of arsenic, beryllium, lead, vanadium, zinc and several PAH compounds.

Given the elevated 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:

- Dermal contact,
- Ingestion of soil or soil derived dust,
- Ingestion of soil attached to homegrown produce,
- Ingestion of homegrown produce,
- 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.

It is therefore considered necessary to protect end users from the elevated concentrations of arsenic, beryllium, lead, vanadium, zinc and PAH compounds in the shallow made ground. It is considered necessary to break the above listed relevant pollutant linkages in order to remove the potential risk.

It is recommended that a capping layer, of a minimum thickness of 600mm, of clean imported subsoil and topsoil is placed over a high visibility geotextile/alert membrane in all private gardens and areas of soft landscaping. This would break all the above listed relevant pollutant linkages and removing the potential risk to future end users.

Following demolition of the existing buildings and site clearance, additional samples should be taken from across the site and tested for a range of contaminants, including asbestos and additional contaminants such as semi volatile and volatile organic compounds (SVOC/VOC).

The above risk assessment should be reviewed to include the findings of the recommended further sampling following demolition of existing buildings and site clearance.

8.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

Although no asbestos was detected within the screened made ground samples, given the age of the existing buildings (i.e. constructed during a time where the use of asbestos in the construction industry was widespread), the presence of residual asbestos containing materials associated with the existing buildings, buried services, drainage runs and any other buried structures could be reasonably anticipated at this stage.

It is therefore recommended that once the existing buildings, floor slabs and areas of hardstanding are fully demolished/broken out and removed, the underlying ground is visually inspected and handpicked of any identified asbestos containing materials.

Similarly, all redundant foundations, service runs/ducts, pits, basements (if present) etc should be inspected and handpicked for any identified asbestos containing materials.

These works should be carried out by a suitable contractor in accordance with an appropriate risk assessment and managed in accordance with the requirements of the Control of Asbestos Regulations (2012). Any handpicked asbestos containing materials should be disposed of off-site at a suitable licenced facility as hazardous waste.

8.3.3 Construction Workers

With future site development works involving the excavation and removal of the made ground, there would be a risk to workers from contaminants in the soils. Appropriate measures are therefore recommended for works involving the made ground materials which are known to be present beneath the site.

All excavations should be regularly checked for safe atmospheres.

Normal good hygiene practices should be adequate to protect the health and safety of redevelopment workers, and should include:

- Minimum handling of materials;
- Washing of hands prior to all meal breaks, which should be taken in a designated clean area;
- The use of standard protective clothing such as boots and overalls and gloves, where considered relevant.

In dry weather, inhalation of dust and gases should be avoided preferably by the use of dust suppression techniques to minimise fugitive emissions and minimisation of exposed materials at any particular time.

8.3 HUMAN HEALTH RISK ASSESSMENT (CONTINUED)

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.

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

The concentrations of copper and zinc in the shallow made ground materials, indicate the potential for adverse effects to vegetation. Similarly, the physical nature of the existing made ground does not provide a suitable growing medium for vegetation.

To ensure viable landscape areas by preventing upward migration of contaminants into the overlying soils, and in order to promote plant growth, any landscaped areas will require the provision of a minimum 600mm thick capping layer of clean, inert subsoil and topsoil materials placed over a high visibility geotextile/alert membrane.

8.5 CONTROLLED WATERS RISK ASSESSMENT

The results of the soil contamination testing has identified elevated concentrations of arsenic, beryllium, lead, vanadium, zinc and several PAH compounds within the made ground beneath the site. It should be noted that no visual evidence of gross contamination was observed.

In order to assess the potential risks to controlled waters at the site, it is recommended that additional soil leachate samples are obtained from across the site and a risk assessment undertaken, as part of the recommended post demolition works, to gain an understanding of the leachability potential of the elevated contaminants within the made ground.

8.6 GROUND AND MINE GAS RISK ASSESSMENT

Given the variability and thickness of the made ground encountered beneath the site, along with the presence of an infilled colliery within 250m of the site (as identified within the Desk Study Report, Ref,14301/LP/24/DS dated March 2024), it is recommended that ground gas monitoring wells are installed on site and a programme of ground gas monitoring is undertaken to gain an understanding of the gas regime at the site. Following completion of the ground gas monitoring programme a risk assessment should be undertaken to determine the requirements or otherwise of any ground gas protection measures within the proposed buildings.

The site is located within a low probability area for radon therefore no radon protective measures would be necessary in the construction of new buildings within the site.

The Coal Authority states that with regards to mine gas there has been none recorded within 500m of the site boundary.

Gas evolution from coal seams and accumulated sources such as abandoned tunnels and workings cannot be discounted and will require further assessment conducted in accordance with CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021.

The area of the site in the vicinity of the coal outcrops is indicated to be located within a high-risk development area and therefore a mine gas risk assessment should be undertaken. The initial desk-based assessment of the site will be utilised in order to develop the level of mine gas risk within the site.

There are many sources of gas in mine workings including desorption of gas from coal and rocks, oxidation of coal, decomposition of old wood (such as pit props) and acidic mine drainage reacting with carbonate in the rocks around the seam or shaft. These gases, if produced within the old workings, would need a viable pathway to the surface such as a shaft or fractured rock above the workings.

The desk study shows that a high-risk development area crosses through the site associated with the coal outcrop as indicated by the Coal Authority. This high-risk zone is associated with the potential for shallow unrecorded workings within this seam.

There are two mine entries recorded within 50m of the site boundary but no pathway features such as shafts or adits are located within the site.

8.6 GROUND AND MINE GAS RISK ASSESSMENT (CONTINUED)

There is one fault indicated to cross the northeast corner of the site. There would be viable pathway via fractured rock or fault zones if this fault reached the surface. It should be noted that superficial deposits of unknown thickness are known to overlie the site and no development has been proposed in the vicinity of the fault.

Based on the desk-based research, the potential risk from coal mine gas emissions at the development site is considered below:

Figure 13.1 Decision Support Tool for Mine Gas Risk Assessment, included within CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021 includes a flow chart to aid the risk assessment process and decision making.

Stage 1 of the flow chart asks if the site is within a Coal Authority defined Coal Mining Reporting Area. Since the site is located within a Coal Authority defined Coal Mining Reporting Area the flow chart then asks if all of the following statements are true:

- Mine entries >50m from site boundary,
- Workings >150m depth,
- No faults or other potential pathways connecting surface to deeper unflooded workings,
- Outside area of past or probable shallow workings on Coal Authority viewer

Based on the information gained from the desk-based research, it is considered that the Stage 1 statements are not true due to the recorded workings as shallow as 37m and the potential for additional shallower unrecorded workings. The off-site shafts are within 50m of the site boundary and there is a fault within the site.

Intrusive works would be required in order to complete the mine gas risk assessment using site specific data including the confirmation of the presence of any shallower workings and also to determine the thickness and permeability characteristics of superficial deposits. It may become a requirement to undertake a programme of gas monitoring to aid with the risk assessment if superficial deposits are thin or if additional workings are found.

8.7 RISKS TO BUILDINGS AND MATERIALS DURABILITY

8.7.1 Concrete Classification

A summary of the laboratory chemical test results for the chemicals water soluble sulphate and pH, which may adversely affect the durability of building materials is presented in Appendix C.

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.

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 (taking the highest of the test results) for water soluble sulphate within the made ground of 124mg/l.

Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-1.

The groundwater regime of the site has been assessed as 'mobile' and a characteristic pH value within the made ground of 7.4 has been determined (adopting the lowest of the test results). The Design Sulphate Class has been modified to give a site ACEC class of AC-1 for concrete structures constructed within the made ground.

Superficial Soils

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 (taking the highest of the test results) for water soluble sulphate within the superficial soils of 58mg/l.

Using Table C2 of BRE Digest SD1:2005, this characteristic value corresponds to Design Sulphate Class DS-1.

The groundwater regime of the site has been assessed as 'mobile' and a characteristic pH value within the superficial soils of 6.2 has been determined (adopting the lowest of the test results). The Design Sulphate Class has been modified to give a site ACEC class of AC-2z for concrete structures constructed within the superficial soils.

8.7 RISKS TO BUILDINGS AND MATERIALS DURABILITY (CONTINUED)

8.7.2 Water Services

Water supply pipes will need to be protected from any contamination present within the ground. In particular, the presence of organic contaminants (such as PAH) should be addressed when selecting pipe materials. Measures to protect the pipes will include clean backfill to trenches and possibly alternative material selection. 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 non-hazardous/hazardous waste. The existing natural ground are likely to be classified as non-hazardous.

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

Any bituminous/tarmac materials that contain coal tar will also be classified as hazardous waste.

8.8 WASTE DISPOSAL (CONTINUED)

Additional testing should be carried out to determine the presence or otherwise, of coal tar within the bituminous materials in order to confirm the waste classification of these materials.

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.

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.

9.0 ENGINEERING CONSIDERATIONS AND RECOMMENDATIONS

9.1 DETAILS OF PROPOSED DEVELOPMENT

The proposed development will comprise the construction of a number of residential properties and associated infrastructure such as a new access road, areas of car parking and private driveways. Areas of soft landscaping and private gardens will also be provided as part of the development.

The proposed development plan is presented in Figure 3.

It should be noted that the following considerations and recommendations are preliminary and subject to the completion of the recommended further works outlined below (see Section 10.7).

These recommendations should be reviewed once the final development proposals and engineering levels are confirmed.

9.2 SITE PREPARATION

Prior to works commencing on site, any existing services within the site should be identified and either relocated or protected.

Any diversion works should be carried out under the supervision of, and to the specification of appropriate Statutory Authorities. The resulting excavations should be backfilled with suitable granular fill material laid and compacted to Department of Transport (DTp) Specification for Earthworks.

In addition, any surface drains that cross the site should be protected from any detrimental effect (including pollution and ground settlements during construction works).

Vegetation is present across much of the site. Japanese knotweed was observed in the northern area of the site at the time of the site investigation works. It is recommended that a full invasive/pest plant species survey is undertaken across the entire site area. A scheme for the eradication and removal of any identified invasive plant species will be required.

All protection orders relating to existing vegetation/ecology should be adhered to during the development of the site.

9.2 SITE PREPARATION (CONTINUED)

There are a number of semi-mature and mature trees located either within the site or along the site boundary. Allowances should be made for the removal of any associated roots that may become exposed in any proposed nearby earthwork and foundation excavations. Any such works should be conducted in accordance with the code of practice recommended by the National House Building Control (NHBC).

Prior to demolition of the existing buildings, it is recommended that a building materials inventory and structural appraisal is carried out to identify hazardous materials or potentially unsafe conditions so that appropriate demolition strategies and waste management control can be both costed and implemented. All asbestos containing materials should be removed by an approved contractor from within the existing structures.

Following the demolition of the existing buildings, all redundant foundations, basements (if present), floor slabs, service ducts, manholes, drainage runs and any other buried structures associated with the former buildings should be fully broken out and removed.

Any deep service chambers etc, if present, should also be excavated and obstructions removed.

The demolition materials should be screened and processed and any unacceptable materials, such as timber, metal etc, removed. The acceptable materials should be crushed and screened to a structural specification, typically <125mm maximum particle size.

Following demolition and site clearance, the exposed formations within the footprint of the former buildings should be inspected, sampled, tested, to include testing for asbestos, VOC/SCOCs and PCBs as deemed necessary, and the risk assessments updated.

Visual checks should be made for potential asbestos containing materials (ACM). Any encountered ACM should be handpicked by a specialist contractor and disposed off-site to a suitably licensed facility as hazardous waste.

A system should be established for identification and dealing with any unforeseen contamination encountered during the site works (including identification of any potential asbestos containing materials). Any contamination, or suspected contamination, should be reported to the site manager, so that appropriate action may be taken, following specialist advice if necessary.

9.2 SITE PREPARATION (CONTINUED)

All materials to be disposed of off-site should be sent to a suitably licensed facility. Licenced tips may require additional testing of materials to ensure compliance with their current licence agreements.

The resultant voids should be backfilled with well compacted suitable site won materials or imported granular fill materials, laid and compacted in layers.

The backfilling of any voids should be undertaken in a controlled manner and the reduced formations should be brought up to the required levels with well compacted suitable site won or imported granular materials adequately benched into the surrounding ground. Department of Transport (DTp) Type 1 sub-base or similar approved, could be used and should be compacted in layers, in accordance with DTp Specification for Highway Works.

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.

Topsoil was not encountered during the intrusive investigation. If any topsoil is encountered during site clearance, the topsoil should be stripped and stockpiled on site for further testing and risk assessment to determine the appropriate re-use or appropriate disposal off-site at a suitably facility.

No compressible materials should be left in situ below the proposed foundations or structures as there may be future residual settlement issues associated with these materials.

Given the cohesive nature of the near surface soils, the exposed surface of the site will deteriorate in poor weather and due to trafficking of plant. We therefore recommend that to minimise surface water management risks and minimise the generation of silt, softened materials and unsuitable arisings, strategic earthworks materials management is required. Areas of stripping should be minimal at all times. The exposed areas should be protected from damage in wet weather. Designated access routes should be maintained and suitably designed and maintained working platforms for construction plant provided.

Allowances should be made for encountering localised pockets of perched/shallow groundwater during excavations, particularly within the made ground deposits. Some surface water and groundwater management may be required to ensure the protection of the earthworks and materials.

9.2 SITE PREPARATION (CONTINUED)

During site clearance and subsequent operations airborne nuisance caused by dust from the site must be controlled on account of the health and safety of site operatives and the general public who are occupying properties adjacent to the site.

9.3 FOUNDATIONS AND FLOOR SLABS

Note that the foundation recommendations made below are provisional and will require review following the recommended mining investigation drilling works and post demolition supplementary investigations. These recommendations should also be reviewed once the final development layout and levels have been confirmed.

The ground conditions beneath the site typically comprise of a variable thickness of made ground over superficial soils generally consisting of firm locally stiff gravelly clays with a low to moderate cobble and boulder content.

It should be noted that the base of the made ground was not proven in trial pits TP01 and TP02 located within the northern part of the site with the made ground proven to a depth of >2.7m and >3.0m bgl respectively. It is recommended that further site investigation should be undertaken within this area to prove the base of the made ground and the nature of the underlying superficial deposits.

On the basis of the findings of the intrusive site investigation to date, the site can be divided into two separate areas in regard to foundation recommendations. The locations of the foundation zones are indicated on Figure 4.

9.3.1 Preliminary Foundation Zone 1 –Central and Southern Areas

Based on the site investigation works to date and subject to the findings of the coal mining risk assessment and recommended drilling works, the areas of the proposed development throughout central and southern areas of the site could be founded upon traditional strip/trench fill foundations, founded within the firm locally stiff gravelly clays, encountered from typically 0.4m/1.5m below existing ground level.

An allowable bearing pressure of 100kN/m² could be used for design purposes for foundations constructed within the firm locally stiff gravelly clays, typically encountered at depths of between approximately 0.4m and 1.5m bgl within the trial pits.

Foundations should penetrate the founding strata by a minimum of 200mm and be at a minimum depth of 900mm below development level in order to protect against the effects of frost heave and/or thermal shrinkage.

9.3 FOUNDATIONS AND FLOOR SLABS (CONTINUED)

All strip/trench fill foundation should be constructed within uniform strata in order to minimise the potential for differential settlement. There should be no spanning of foundations between different soils of differential strengths. If there are significant changes in the beneath strata beneath the foundations, then footings should include suitably designed mesh reinforcement, both top and bottom, to mitigate the risks of relatively deflection.

It should be noted that foundation excavations may be subject to rapid deepening where they cross backfilled excavations generated during demolition and site clearance works. This deepening will be hard to predict during construction.

Deeper foundation depths may be required where the founding horizons may need to be taken down below any root systems.

Foundations should be deepened to fully penetrate any made ground, reworked natural soils, buried topsoil and any encountered soft/loose deposits. Allowances should be made for deepening of foundations that cross the footprints of backfilled demolition trenches.

Laboratory Atterberg Limits have been determined for samples of the natural superficial soils underlying the site. The results show that the superficial soils underling the site have a low to medium volume change potential. Therefore, footings should be deepened in accordance with NHBC guidance for foundations constructed within medium volume change potential soils in influencing distance of mature trees and hedges.

Allowances should be made for the over break in the sides of the excavations, particularly within the made ground and for the possible backfilling either with granular materials or mass concrete.

Given the thickness of made ground, suspended floor slabs are recommended.

It is recommended that a careful inspection is made of the foundations and floor slab formations. Any encountered soft materials should be excavated and removed and replaced with suitable well compacted materials.

It should be noted that the use of strip/trench fill foundation is subject to the control of groundwater inflow during foundation excavations.

9.3 FOUNDATIONS AND FLOOR SLABS (CONTINUED)

If the depth to a founding stratum is prohibitively deep or if groundwater cannot be controlled, consideration should be given to the use of raft type foundations constructed on suitable engineered fill, as described below.

It should be noted that the above preliminary foundation recommendations are subject to the findings of the recommended post demolition supplementary site investigation works beneath the former buildings and the findings of the recommended mining related boreholes.

Allowances may need to be allowed for the inclusion of reinforcement to foundations and/or alternative foundation design.

9.3.2 Preliminary Foundation Zone 2 – Northern Area

Due to the nature and thickness of the made ground, including lateral and vertical variations and instability of trial pit walls encountered in the northern area of the site, shallow traditional strips/trench fill foundations are not deemed suitable.

In the northern part of the site, the following foundation types may be deemed suitable:

1. Raft Foundations on re-engineered fill,
2. Piled Foundations

As previously state the below is subject to the recommended Coal Mining Risk Assessment. It is also recommended that additional site investigation is undertaken in the northern area of the site to confirm the thickness of the made ground and the nature of the underlying ground conditions.

Raft Foundations

Raft foundations may be deemed suitable for the proposed development in the northern part of the site, constructed on well compacted re-engineered materials.

9.3 FOUNDATIONS AND FLOOR SLABS (CONTINUED)

Following site strip, the existing made ground should be excavated to a depth of typically 2.0m below underside of the proposed raft foundation or to the interface with competent undisturbed/in situ natural strata if this is shallower. The resulting reduced formation should be proof rolled, soft spots removed and replaced with structural fill. The excavated soils should be sorted and processed and any deleterious and oversized materials removed. The acceptable excavated soils should be conditioned / processed for optimum compaction and replaced in well compacted layers in accordance Department of Transport Specification for Highways Works. Laboratory compaction testing should be used to inform the compaction process. Upon completion of the earthworks, plate load testing should be undertaken in order to confirm the allowable bearing pressure for raft foundation.

Directly under the raft foundation Department of Transport Type 1 Sub-base, or similar approved, could be used and should be compacted in layers in accordance with current DTp Specification for Highway Works. This layer would be used to prevent weathering of the underlying structural fill.

Subject to the results of confirmatory plate load testing on prepared formations, the proposed raft foundations should be designed to an allowable maximum bearing pressure of 50kN/m² with an average pressure of less than 30kN/m². At this intensity of loading the total settlements should not exceed 30mm and any angular distortions caused by differential movements should be less than 1:750. Rafts should be designed to span a 1.0m soft spot and 1.0m cantilever at build corners.

All formations should be proof rolled with any soft spots and/or obstructions that could form hard spots removed.

Piled Foundations

Piled foundations are also deemed suitable for the proposed development in the northern part of the site.

It will be necessary to drill additional deeper boreholes in this area of the site in order to confirm the thickness of the made ground and to determine the depth to an appropriate founding strata for piled foundations.

Driven pre-cast concrete piles may be suitable subject to confirmation of the underlying ground conditions and subject to noise and vibration. Alternatively, if there are concerns with the use of driven pre-cast concrete piles due to vibrations issues, bored piles such as Continuous Flight Auger (CFA) piles or drilled piles could be considered.

9.3 FOUNDATIONS AND FLOOR SLABS (CONTINUED)

It is recommended that the advice of a specialised piling contractor is sought in order to confirm the most appropriate piling technique and for detailed pile design should the piling option be explored further.

Allowances should be made for a suitable period of pile testing and for construction and testing of piling mats.

Depending on the piling method adopted for the development, allowances should be made for generating soil arisings from augured methods.

It is therefore recommended that any soil generated is retained on site beneath areas of hardstanding in order to minimise the volume to be disposed off-site. Made ground arisings should be retained on site where possible and the natural material disposed off-site, if necessary, in order to minimise disposal costs.

It is recommended that all arisings from either the piling operations or excavations are segregated into made ground and natural soils and stockpiled separately. Stockpiles should be placed on a suitable impermeable surface/membrane, sealed from the weather and bunded to prevent surface run-off.

A piling risk assessment is likely to be required prior to commencement of piling operations.

Due to the variable nature and thickness of the made ground, suspended floor slabs with sub floor voids are recommended.

In all instances no radon protection measures are required in the construction of new buildings.

A programme of ground gas monitoring should be carried out to confirm if ground gas protective measures are required.

9.4 EXCAVATIONS AND FORMATIONS

Most excavations should be possible with normal soil excavating machinery. Allowances should be made for using more powerful machinery and/or pneumatic breaker attachments, or similar attachments, for areas of hardstanding, floor slabs or should any buried obstructions or boulders be encountered.

9.4 EXCAVATIONS AND FORMATIONS (CONTINUED)

From the site investigation findings, the excavations are likely to encounter significant groundwater inflows. Any groundwater inflows/seepages could be considerable and these together with any rainfall infiltrations should be dealt with by conventional pumping techniques.

Any water ingress should be adequately controlled at all times to ensure stability and protection of temporary and permanent works.

The sides of excavations deeper than 1.0m should be supported by trench boxes, or temporarily battered at gradients of typically 30 degrees.

Allowances should be made for potential overbreak within the sides of the excavations, when excavating through the made ground especially if excavations are to remain open for prolonged periods.

The exposed formations within the in-situ materials will be susceptible to damage, loosening and deterioration by wet weather and site traffic. They should therefore be protected by a 200mm thick layer of compacted hardcore or, alternatively, by a thin layer of blinding concrete immediately after exposure.

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

9.5 ACCESS ROADS AND CAR PARKING AREAS

Based on the findings of the site investigation, following site strip there are likely to be variations in the strength of the materials at the formation levels.

For design purposes, an indicative California Bearing Ratio (CBR) value of between 1% to 2% could be assumed for the existing made ground, subject to confirmatory in-situ testing.

After proof rolling the formations, all the 'soft spots/areas' should be removed and replaced with well compacted imported granular materials. Department of Transport (DTp) Type 1 sub-base, or similar approved, could be used and should be compacted in layers in accordance with the current DTp specification for Highway Works.

It should be noted that the Local Highway Authority may insist that CBR tests should be carried out in order to confirm the above recommendations. Depending on the outcome of such field tests, the above recommendations may need to be revised.

9.5 ACCESS ROADS AND CAR PARKING AREAS (CONTINUED)

Allowances should therefore be made for carrying out such tests and further works which the Local Authority may require as a results of these tests.

Formations within cohesive deposits should be regarded as frost susceptible.

9.6 DRAINAGE

Soil infiltration was undertaken within trial pits SA01, SA02, SA03, SA04 and SA05.

The results of the soil infiltration tests are present in Appendix B.

The soil infiltration tests undertaken within all trial pits were terminated due to negligible infiltration rates.

Note that the results are specific to the locations and depths of the tests undertaken.

Due to the cohesive and impermeable nature of the superficial soils, the use of sustainable drainage systems may not be deemed suitable at the site.

9.7 RECOMMENDED FURTHER WORKS

The following supplementary site investigation works are recommended for the site:

- The drilling of rotary boreholes to confirm the possible presence of shallow coal seams/mine workings or otherwise to enable a Coal Mining Risk Assessment to be completed.
- Installation of ground gas monitoring wells and a programme of monitoring to confirm the ground gas regime at the site.
- Following demolition of the existing buildings and site clearance, additional samples should be taken from within the footprint of the former buildings and tested for a range of contaminants, including asbestos and additional contaminants such as PCBs, and semi volatile and volatile organic compounds (SVOC/VOC).
- Samples should also be obtained for leachability testing to gain an understanding of the risk to controlled waters.
- Additional site investigation to confirm the depth of the made ground in the northern area of the site and additional boreholes are recommended if the use of piled foundations is to be considered.

APPENDIX A

TRIAL PIT LOGS

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Cwmgors			Project No.: 14301		Trial Pit No.: SA01 Sheet 1 of 1	
Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.20m			
Date Excavated: 04/09/2024			Level:			Depth : 2.90m 0.80m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES					Grass over (loose) dark brown slightly sandy slightly clayey GRAVEL with a moderate cobble content of angular to sub-angular brick, concrete and rare sandstone, with roots and rootlets. Gravel is fine to coarse angular to sub-angular of brick, concrete and sandstone, with rare slag and fine ash. Also contains inclusions of wood and tile (MADE GROUND).			
1.40	D		1.40			Firm light grey mottled light brown slightly gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded of sandstone. Also contains rare inclusions of wood.			
			2.10			Firm light grey mottled light brown slightly sandy gravelly CLAY with a low cobble content sub-rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone.			
			2.90			End of Trialpit at 2.90 m			
Remarks:			Groundwater:			Key:			
1. Terminated at 2.9m bgl.			1. Groundwater rising from the base of pit and standing at 2.85m bgl.			D - Small disturbed sample			
2. Soil infiltration test undertaken.			Stability:			B - Bulk disturbed sample			
			1. Generally stable in the short term.			ES - Environmental soil sample			
						W - Water sample			

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Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.10m			
Date Excavated: 04/09/2024			Level:			Depth : 2.60m 0.90m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES		0.05			Bituminous Material (Loose to medium dense) black and dark grey sandy GRAVEL with a moderate cobble and low boulder (0.4m x 0.15m) content of angular brick and concrete. Gravel is fine to coarse angular to sub-angular of brick, concrete, fine ash and rare sandstone (MADE GROUND).			
1.20	D		1.20			Firm light grey mottled light brown gravelly CLAY with a low cobble content of sub-rounded sandstone. Gravel is fine to coarse sub-angular to sub-rounded of sandstone.			
			1.90			Firm to stiff grey mottled light brown slightly sandy very gravelly CLAY with a low cobble content of sub-rounded sandstone. Gravel is fine to coarse sub-angular to rounded of sandstone.			
			2.60			End of Trialpit at 2.60 m			
Remarks: 1. Terminated at 2.6m bgl. 2. Soil infiltration test undertaken.			Groundwater: 1. Minor groundwater seepage at 1.1m bgl. 2. Groundwater standing at 2.55m bgl after 20 min.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

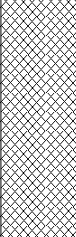
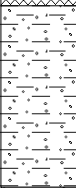
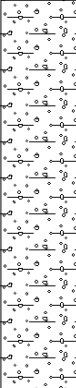
Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Cwmgors			Project No.: 14301		Trial Pit No.: SA03 Sheet 1 of 1	
Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.30m			
Date Excavated: 05/09/2024			Level:			Depth : 2.70m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.20			Reinforced CONCRETE (approx 5mm rebar diameter).			
			0.60			(Loose to medium dense) red sandy GRAVEL with a low cobble and boulder (0.3m x 0.15m) content of angular to sub-angular brick. Gravel is fine to coarse angular to sub-angular of brick with rare slag, and sandstone (MADE GROUND).			
1.10	D		0.70			(Medium dense) black and dark grey sandy GRAVEL. Gravel is fine to coarse angular to sub-angular of slag and fine ash with rare brick and sandstone (MADE GROUND).			1
			1.80			Firm greyish brown gravelly CLAY with a low cobble and boulder (0.3m x 0.2m) content of sub-rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and rare angular to sub-angular of siltstone and mudstone.			
			2.70			Stiff bluish grey gravelly CLAY with a low cobble and boulder (0.4m x 0.2m) of sub-rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			2
						End of Trialpit at 2.70 m			3
									4
									5
Remarks: 1. Terminated at 2.7m bgl. 2. Soil infiltration test undertaken.			Groundwater: 1. No groundwater encountered			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term.						

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Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.20m			
Date Excavated: 05/09/2024			Level:			Depth : 2.70m 0.60m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES		0.30			Grass over soft brown and red sandy gravelly CLAY with a low cobble content of angular brick, and roots and rootlets. Gravel is fine to coarse angular to sub-angular of brick and rare sandstone (MADE GROUND).			
			0.70			(Loose) black and dark grey sandy GRAVEL with a low cobble content of sub-angular slag. Gravel is fine to coarse angular to sub-angular of slag and fine ash with rare brick (MADE GROUND).			
1.10	D		0.80			Firm yellowish brown slightly gravelly CLAY. Gravel is fine to coarse sub-angular to rounded of sandstone.			
						Firm to stiff bluish grey gravelly CLAY with a moderate cobble and low boulder (0.3m x 0.25m) content of sub-rounded sandstone and angular to sub-angular siltstone and mudstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			
			2.70			End of Trialpit at 2.70 m			
Remarks: 1. Terminated at 2.7m bgl. 2. Soil infiltration test undertaken.			Groundwater: 1. Major groundwater inflow at 0.65m infilling the base of pit.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term.						

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Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.40m			
Date Excavated: 05/09/2024			Level:			Depth : 2.80m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.15			(Loose to medium dense) brown and red sandy clayey GRAVEL with a low cobble content of angular to sub-angular brick. Gravel is fine to coarse angular to sub-angular of brick, slag and fine ash with rare sandstone (MADE GROUND).			
			0.65						
1.10	D		1.00			1			
			2.70						
			2.80			2			
						3			
						4			
						5			
Remarks: 1. Terminated at 2.8m bgl. 2. Soil infiltration test undertaken.			Groundwater: 1. Groundwater rising from the base of pit and standing at 2.5m bgl.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term.						

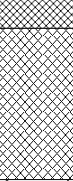
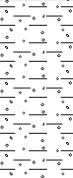
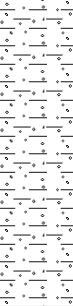
Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Cwmgors			Project No.: 14301		Trial Pit No.: TP01 Sheet 1 of 1	
Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.10m			
Date Excavated: 04/09/2024			Level:			Depth : 2.70m 0.80m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.60			Grass over (loose) dark brown and dark grey sandy slightly clayey GRAVEL with a low cobble and boulder (0.35m x 0.3m) content of angular to sub-angular brick, concrete and sandstone, with roots and rootlets. Gravel is fine to coarse angular to sub-angular of brick, concrete, sandstone with rare slag and fine ash (MADE GROUND).			
1.30	D					(Loose to medium dense) light brown slightly clayey GRAVEL with a moderate cobble and low boulder (0.3m x 0.2m) content of angular platy sandstone, siltstone and mudstone. Gravel is fine to coarse angular to sub-rounded of sandstone and angular to sub-angular of siltstone and mudstone with rare coal (MADE GROUND).			
			2.70			End of Trialpit at 2.70 m			
Remarks: 1. Terminated at 2.7m due to pit wall instability.			Groundwater: 1. No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Major instability below 0.6m associated with cobble and boulder removal.						

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Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.30m			
Date Excavated: 04/09/2024			Level:			Depth : 3.00m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.60	ES					Grass over (loose) brown and dark brown sandy slightly clayey GRAVEL with a moderate cobble and boulder (0.3m x 0.15m) content of angular brick, concrete, sandstone and rare slag, with roots and rootlets. Gravel is fine to coarse angular to sub-angular of brick, concrete, sandstone, rare slag and fine ash (MADE GROUND).			
1.70	D		1.60			(Medium dense) dark brown slightly sandy very clayey GRAVEL with a low cobble and boulder (0.35m x 0.2m) content of angular to sub-angular sandstone, siltstone and mudstone. Gravel is fine to coarse angular to sub-angular of platy sandstone, siltstone and mudstone (MADE GROUND).			
			3.00			End of Trialpit at 3.00 m			
Remarks: 1. Terminated at 3.0m bgl.			Groundwater: 1. No groundwater encountered.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Major instability between 0.3m and 1.7m associated with cobble and boulder removal.						

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Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.10m			
Date Excavated: 04/09/2024			Level:			Depth : 3.00m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES					Grass over (loose) dark brown slightly sandy slightly clayey GRAVEL with a moderate cobble and low boulder (0.4m x 0.3m) content of angular to sub-angular brick, concrete and rare sandstone, with roots and rootlets. Gravel is fine to coarse angular to sub-angular of brick, concrete and sandstone, with rare slag and fine ash. Also contains inclusions of wood and tile (MADE GROND).			
			0.80			Soft to firm light brown sandy gravelly CLAY. Gravel is fine to coarse angular to sub-angular of brick, concrete and sandstone (MADE GROUND).			
1.20	D		1.10			Firm light brown mottled light grey slightly gravelly CLAY. Gravel is fine to coarse sub-angular to sub-rounded of sandstone.			
			1.70			(Medium dense) brown and dark brown clayey GRAVEL with a moderate cobble and low boulder (0.3m x 0.2m) content of angular platy sandstone, siltstone and mudstone. Gravel is fine to coarse angular to sub-angular of platy sandstone, siltstone and mudstone.			
			3.00			End of Trialpit at 3.00 m			
Remarks:			Groundwater:			Key:			
1. Terminated at 3.0m bgl.			Stability:			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			1. Moderate instability below 0.3m associated with boulder removal.						

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Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.30m			
Date Excavated: 04/09/2024			Level:			Depth : 2.90m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.10			Bituminous Material			
						(Medium dense) black and dark grey sandy GRAVEL with a moderate cobble content of angular brick. Gravel is fine to coarse angular to sub-angular of brick, slag and fine ash with rare sandstone and concrete (MADE GROUND).			
			0.80			Firm grey mottled light brown slightly gravelly CLAY with a low cobble content of sub-rounded to rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and rare angular to sub-angular of siltstone and mudstone.			
1.30	D		1.20			Firm to stiff bluish grey gravelly CLAY with a low cobble and boulder (0.4m x 0.4m) content of sub-rounded to rounded sandstone. Gravel is fine to coarse sub-angular to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			
			2.90			End of Trialpit at 2.90 m			
Remarks:			Groundwater:			Key:			
1. Terminated at 2.9m bgl.			Stability:			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

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Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.10m			
Date Excavated: 04/09/2024			Level:			Depth : 2.20m		0.70m	
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.10			Bituminous Material			
			0.60			(Medium dense) black and dark grey sandy GRAVEL with a low cobble and boulder (0.3m x 0.2m) content of angular to sub-angular sandstone, and rare brick and concrete. Gravel is fine to coarse angular to sub-angular of sandstone, slag, fine and fine ash with rare brick and concrete (MADE GROUND).			
1.30	D					Firm to stiff greyish brown gravelly CLAY with a low cobble and boulder (0.35m x 0.2m) content of sub-rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone, with rare angular to sub-angular siltstone, mudstone and coal.			
					2.20		End of Trialpit at 2.20 m		
Remarks:			Groundwater:			1. No groundwater encountered.		Key:	
1. Terminated at 2.2m bgl.			Stability:			1. Generally stable in the short term.		D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample	
									

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Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.20m			
Date Excavated: 05/09/2024			Level:			Depth : 2.70m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.20	ES		0.20			Reinforced CONCRETE (approx 5mm rebar diameter).			
			0.60			(Loose to medium dense) dark grey sandy GRAVEL with a moderate cobble content of angular to sub-angular brick. Gravel is fine to coarse angular to sub-angular of brick, slag and fine ash with rare sandstone and concrete (MADE GROUND).			
			1.50			(Loose) brown very clayey GRAVEL with a moderate cobble and boulder (0.4m x 0.3m) content of sub-rounded to rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone with rare angular to sub-angular of siltstone and mudstone (Potentially Reworked Natural - MADE GROUND).			
1.50	D		1.50			Firm bluish grey gravelly CLAY with a moderate cobble and low boulder (0.35m x 0.2m) content of sub-rounded sandstone and angular to sub-angular siltstone and mudstone. Gravel is fine to coarse sub-rounded to rounded of sandstone, and angular to sub-angular of siltstone and mudstone.			
			2.70			End of Trialpit at 2.70 m			
Remarks:			Groundwater:			Key:			
1. Terminated at 2.7m bgl.			1. Moderate groundwater seepage below 1.3m. 2. Strata saturated below 1.3m.			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability:			1. Major pit wall instability below 0.4m.			

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Cwmgor			Project No.: 14301		Trial Pit No.: TP08 Sheet 1 of 1	
Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.40m			
Date Excavated: 04/09/2024			Level:			Depth : 2.80m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.15			Grass over soft dark brown sandy slightly gravelly CLAY with roots and rootlets. Gravel is fine to coarse sub-angular of sandstone (MADE GROUND).			
						Firm to stiff light grey gravelly CLAY. Gravel is fine to coarse angular to sub-angular of brick, sandstone and rare slag (MADE GROUND).			
			0.50			(Medium dense to dense) black and dark grey sandy GRAVEL. Gravel is fine to coarse angular to sub-angular of slag, fine ash and rare brick (MADE GROUND).			
			0.60			Firm light grey mottled light brown sandy gravelly CLAY. Gravel is fine to coarse sub-angular to rounded of sandstone and angular to sub-angular of siltstone, mudstone and rare coal.			
1.10	D		1.30			(Medium dense) bluish grey sandy clayey GRAVEL with a moderate cobble and low boulder (0.6m x 0.3m) content of sub-angular to sub-rounded sandstone. Gravel is fine to coarse sub-angular to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			
			2.00			Stiff bluish grey gravelly CLAY. Gravel is fine to coarse sub-angular to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			
			2.80			End of Trialpit at 2.80 m			
Remarks:			Groundwater:			Key:			
1. Terminated at 2.8m bgl.			1. Strata saturated between 1.3m and 2.0m. 2. Moderate inflow from 1.8m bgl.			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: Moderate instability between 0.8m and 2.0m.						

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Cwmgor			Project No.: 14301		Trial Pit No.: TP09 Sheet 1 of 1	
Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.30m			
Date Excavated: 04/09/2024			Level:			Depth : 2.30m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES		0.40			Grass over (medium dense) black and dark grey sandy slightly clayey GRAVEL with roots and rootlets. Gravel is fine to coarse angular to sub-angular of slag and fine ash with rare sandstone (MADE GROUND).			
						Firm to stiff bluish grey gravelly CLAY with a low cobble and boulder (0.3m x 0.2m) sub-rounded to rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and rare angular to sub-angular of siltstone and mudstone.			
1.20	D		1.40			(Loose to medium dense) brown sandy clayey GRAVEL with a moderate cobble and boulder (0.4m x 0.3m) content of sub-rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			
						End of Trialpit at 2.30 m			
			2.30						
Remarks:			Groundwater:			Key:			
1. Terminated at 2.3m due to pit wall instability.			1. Moderate groundwater inflow below 1.4m. 2. Groundwater standing at 2.1m bgl.			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability:						
			1. Major pit wall instability below 1.4m associated with cobble and boulder removal.						

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Cwmgors			Project No.: 14301		Trial Pit No.: TP10 Sheet 1 of 1	
Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.40m			
Date Excavated: 05/09/2024			Level:			Depth : 2.70m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.10	ES		0.20			Soft brown slightly gravelly CLAY with roots and rootlets. Gravel is fine to coarse angular to sub-angular of brick. Also contains inclusions of wood chippings (MADE GROUND).			
			0.40			(Medium dense) red sandy GRAVEL. Gravel is fine to coarse angular to sub-angular of brick with rare slag and sandstone (MADE GROUND).			
			0.70			(Medium dense to dense) black and dark grey sandy GRAVEL with a low cobble content of angular to sub-angular slag. Gravel is fine to coarse angular to sub-angular of slag, fine ash and rare brick (MADE GROUND).			
			0.90			Firm brown mottled light grey gravelly friable CLAY. Gravel is fine to coarse sub-angular to rounded of sandstone and rare angular to sub-angular of siltstone and mudstone.			
1.10	D					Firm to stiff bluish grey gravelly CLAY with a moderate cobble and low boulder (0.35m x 0.25m) content of sub-rounded sandstone and angular to sub-angular siltstone and mudstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			1
			2.00			Stiff bluish grey CLAY with a low cobble and boulder (0.4m x 0.25m) content of sub-rounded to rounded sandstone.			2
			2.70			End of Trialpit at 2.70 m			3
									4
									5
Remarks: 1. Terminated at 2.7m bgl.			Groundwater: 1. Minor groundwater seepage at 2.5m bgl.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term.						

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Cwmgor			Project No.: 14301		Trial Pit No.: TP11 Sheet 1 of 1	
Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.30m			
Date Excavated: 05/09/2024			Level:			Depth : 2.80m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.40	ES		0.15			Grass over soft brown slightly gravelly CLAY with roots and rootlets. Gravel is fine to coarse angular to sub-angular of brick (MADE GROUND).			
			0.70			(Medium dense) black and dark grey sandy GRAVEL with a low cobble content of angular brick and one boulder of sub-angular sandstone (0.4m x 0.3m), and roots. Gravel is fine to coarse angular to sub-angular of brick, slag and fine ash with rare sandstone (MADE GROUND).			
1.20	D		2.00			Firm to stiff brownish grey gravelly CLAY with a low cobble and boulder content of sub-angular to sub-rounded sandstone. Gravel is fine to coarse sub-angular to rounded of sandstone.			
			2.80			Stiff bluish grey gravelly CLAY with a moderate cobble and low boulder (0.3m x 0.25m) of sub-rounded to rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			
			End of Trialpit at 2.80 m						
Remarks: 1. Terminated at 2.8m bgl.			Groundwater: 1. Minor groundwater seepage at 0.5m bgl.			Key: D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability: 1. Generally stable in the short term.						

Intégral Géotechnique Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name: Cwmgor			Project No.: 14301		Trial Pit No.: TP12 Sheet 1 of 1	
Location: Neath Port Talbot			Client: Bluefield Land Limited			Logged By: AG		Scale 1:25	
Equipment: JCB 3CX			Coordinates:			Dimensions 2.00m			
Date Excavated: 05/09/2024			Level:			Depth : 2.80m 0.70m			
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES		0.25			Grass over soft dark brown gravelly CLAY with roots and rootlets. Gravel is fine to coarse sub-angular to sub-rounded of sandstone and angular to sub-angular brick, slag and fine ash (MADE GROUND).			
			0.70			(Medium dense) dark grey sandy GRAVEL with a low cobble content of angular brick. Gravel is fine to coarse sub-angular to sub-rounded of sandstone and angular to sub-angular brick, slag and fine ash (MADE GROUND).			
1.20	D		1.20			Firm to stiff orangish brown mottled light grey CLAY.			
						Stiff bluish grey gravelly CLAY with a moderate cobble and boulder (0.5m x 0.4m) content of sub-rounded to rounded sandstone. Gravel is fine to coarse sub-rounded to rounded of sandstone and angular to sub-angular of siltstone and mudstone.			
			2.80			End of Trialpit at 2.80 m			
Remarks:			Groundwater:			Key:			
1. Terminated at 2.8m bgl.			1. Minor groundwater seepage at 1.3m bgl.			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability:						
			1. Minor instability below 1.1m associated with cobble removal.						

APPENDIX B

SOIL INFILTRATION TEST RESULTS

14301 Cwmgors, Neath Port Talbot

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	2.90		
Water Depths (m)			
Water depth at start of test	1.71		
Water depth at end of test	1.71		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	1.19		
Effective storage depth (75%)	0.89		
Effective storage depth (50%)	0.60		
Effective storage depth (25%)	0.30		
Outflow Time (min)			
Time for measured outflow	239		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m³)			
Over measured effective depth	0.00		
Over 100% effective depth	2.09		
From 75% - 25% effective depth	1.05		
Surface Area (m²)			
For 100% effective storage	8.90		
For 50% effective storage	5.33		
Over measured depth	1.76		
Soil Infiltration Rate (m/s)	Cycle 1	Cycle 2	Cycle 3
Over 100% effective depth	#DIV/0!		
Over measured depth	0.0E+00		
Over 75% - 25% effective depth	#DIV/0!		



14301 Cwmgors, Neath Port Talbot

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	2.60		
Water Depths (m)			
Water depth at start of test	1.72		
Water depth at end of test	1.72		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	0.88		
Effective storage depth (75%)	0.66		
Effective storage depth (50%)	0.44		
Effective storage depth (25%)	0.22		
Outflow Time (min)			
Time for measured outflow	252		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m³)			
Over measured effective depth	0.00		
Over 100% effective depth	1.66		
From 75% - 25% effective depth	0.83		
Surface Area (m²)			
For 100% effective storage	7.17		
For 50% effective storage	4.53		
Over measured depth	1.89		
Soil Infiltration Rate (m/s)	Cycle 1	Cycle 2	Cycle 3
Over 100% effective depth	#DIV/0!		
Over measured depth	0.0E+00		
Over 75% - 25% effective depth	#DIV/0!		

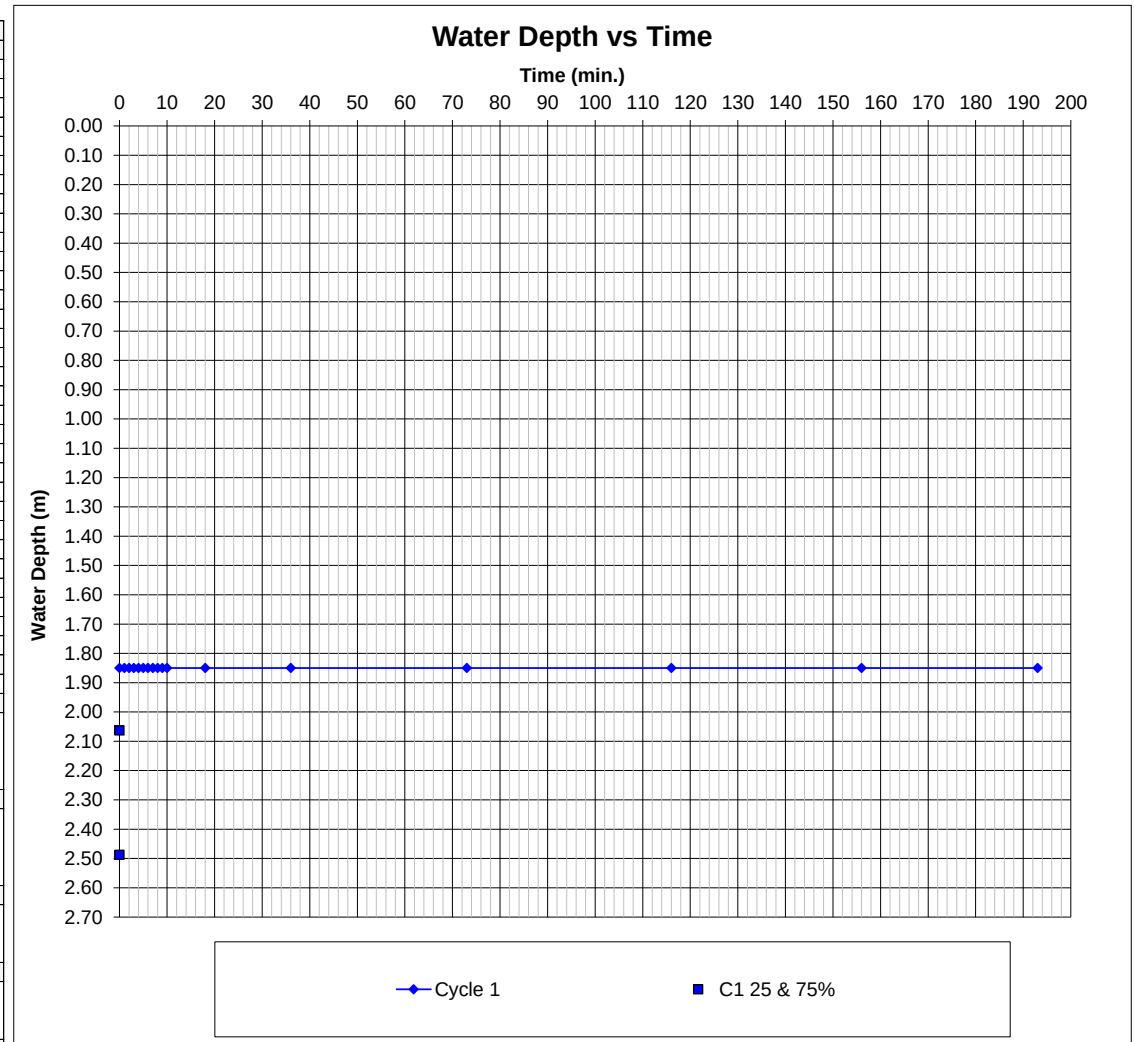
BRE365 SOIL INFILTRATION RATE TEST - SA03

14301 Cwmgors, Neath Port Talbot

Trial Pit Information	
Length (m)	2.30
Width (m)	0.70
Depth (m)	2.70
Groundwater	Dry
Weather Conditions	Light Rain
Date	05-Sep-24

Remarks
1. No groundwater encountered.
2. Trial pit generally stable in the short term.
3. Negligible infiltration observed.
4. Insufficient infiltration in order to calculate design rate

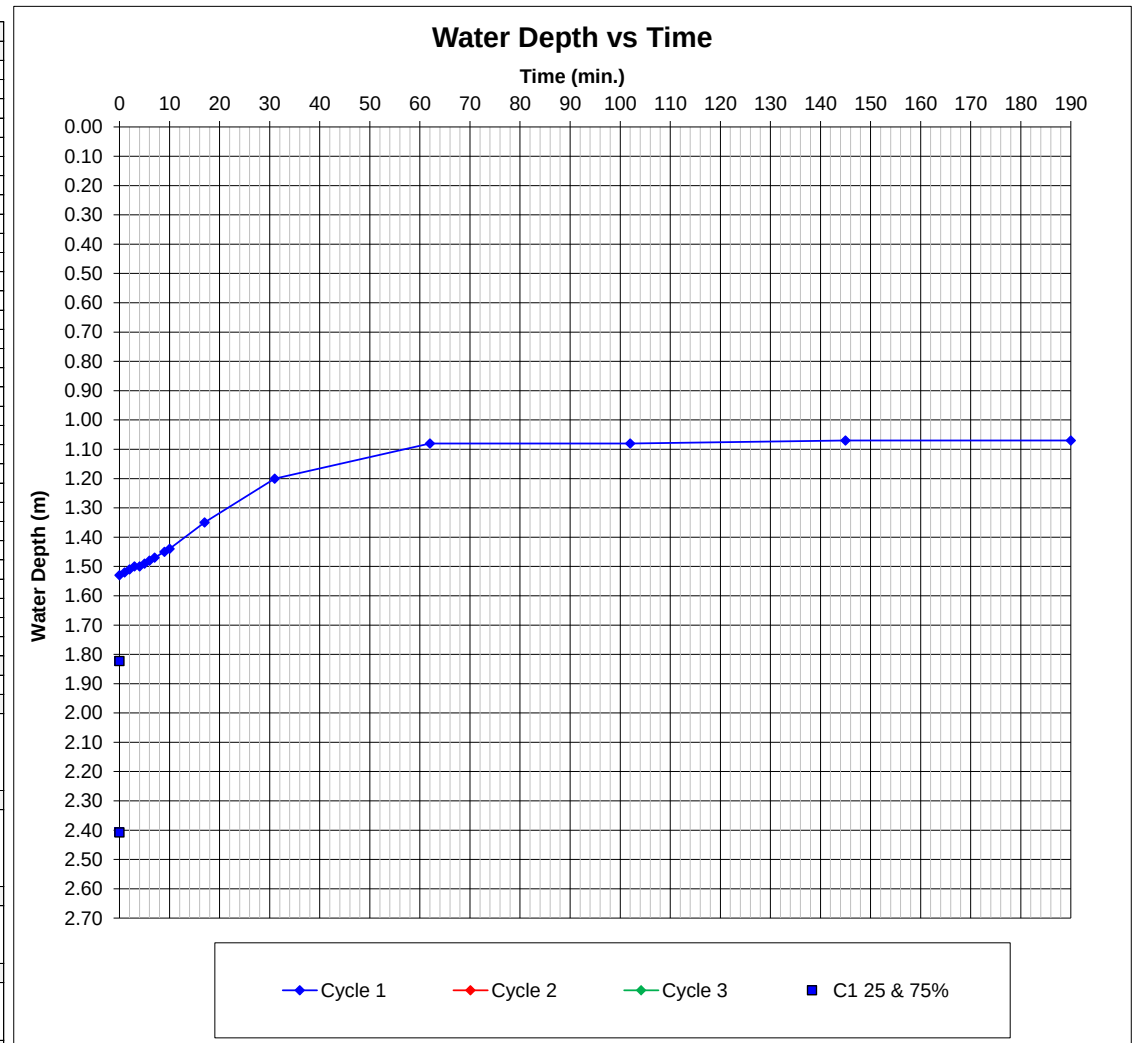
Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	2.70		
Water Depths (m)			
Water depth at start of test	1.85		
Water depth at end of test	1.85		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	0.85		
Effective storage depth (75%)	0.64		
Effective storage depth (50%)	0.43		
Effective storage depth (25%)	0.21		
Outflow Time (min)			
Time for measured outflow	193		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m ³)			
Over measured effective depth	0.00		
Over 100% effective depth	1.37		
From 75% - 25% effective depth	0.68		
Surface Area (m ²)			
For 100% effective storage	6.71		
For 50% effective storage	4.16		
Over measured depth	1.61		
Soil Infiltration Rate (m/s)	Cycle 1	Cycle 2	Cycle 3
Over 100% effective depth	#DIV/0!		
Over measured depth	0.0E+00		
Over 75% - 25% effective depth	#DIV/0!		



14301 Cwmgors, Neath Port Talbot

Remarks
1. Major groundwater inflow at 0.65m bgl. 2. Trial pit generally stable in the short term. 3. Negligible infiltration observed. 4. Insufficient infiltration in order to calculate design rate 5. Rise in water level observed due to groundwater inflow.

Final Excavation Depth (m)	Cycle 1	Cycle 2	Cycle 3
At end of testing cycle	2.70		
Water Depths (m)			
Water depth at start of test	1.53		
Water depth at end of test	1.53		
Effective depth (measured)	0.00		
% Effective storage depth	0.00		
Effective Storage Depths (m)			
Effective storage depth (100%)	1.17		
Effective storage depth (75%)	0.88		
Effective storage depth (50%)	0.59		
Effective storage depth (25%)	0.29		
Outflow Time (min)			
Time for measured outflow	190		
Time for 100% outflow			
Time for 75-25% outflow			
Volume of Outflow (m³)			
Over measured effective depth	0.00		
Over 100% effective depth	1.80		
From 75% - 25% effective depth	0.90		
Surface Area (m²)			
For 100% effective storage	8.33		
For 50% effective storage	4.93		
Over measured depth	1.54		
Soil Infiltration Rate (m/s)	Cycle 1	Cycle 2	Cycle 3
Over 100% effective depth	#DIV/0!		
Over measured depth	0.0E+00		
Over 75% - 25% effective depth	#DIV/0!		



14301 Cwmgors, Neath Port Talbot

Remarks
1. Groundwater rising from bottom of trial pit to 2.75m bgl after 20 mins. 2. Trial pit generally stable in the short term. 3. Negligible infiltration observed. 4. Insufficient infiltration in order to calculate design rate

[illegible]

APPENDIX C

LABORATORY CHEMICAL TEST RESULTS



Integral Geotechnique
Integral House
7 Beddau Way
Castlegate Business Park
CF83 2AX

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7 Woodshots Meadow,
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Analytical Report Number : 24-040805

Project / Site name:	Cwmgors, Neat Port Talbot	Samples received on:	09/09/2024
Your job number:	14301	Samples instructed on/ Analysis started on:	09/09/2024
Your order number:	14301 AG	Analysis completed by:	17/09/2024
Report Issue Number:	1	Report issued on:	17/09/2024
Samples Analysed:	16 soil samples		

Signed: _____

Anna Goc
PL Head of Reporting Team
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: 24-040805
Project / Site name: Cwmgor, Neat Port Talbot
Your Order No: 14301 AG

Lab Sample Number				310211	310212	310213	310214	310215
Sample Reference				TP02	TP03	TP04	TP07	TP09
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.10	0.10	0.20	0.50
Date Sampled				04/09/2024	04/09/2024	04/09/2024	05/09/2024	04/09/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	37	27.8	44	44.4	< 0.1
Moisture Content	%	0.01	NONE	8.1	16	14	13	6.8
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.8	0.8	0.8

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	KSZ	KSZ	KSZ

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.4	8	8	10.4	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	790	1700	660	1500	170
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	53	100	60	250	120
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0264	0.051	0.0299	0.124	0.0578
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	26.4	51	29.9	124	57.8
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-	-	-	-
Sulphide	mg/kg	1	MCERTS	33	2.5	10	9.2	25
Total Sulphur	mg/kg	50	MCERTS	860	1000	1200	880	1000
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2	4	4.1	2.4	0.7
Loss on Ignition @ 450°C	%	0.2	MCERTS	4.8	7.9	8.3	5.7	2.7

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.07	0.11	0.71	0.39	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.23	0.1	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.18	0.19	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.26	0.16	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.36	0.26	2.2	1.8	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.13	0.06	1.3	0.46	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.7	0.69	14	5.1	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.53	0.54	12	4.3	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.33	0.4	11	3.4	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.5	0.59	13	3.9	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.48	0.69	15	5.9	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.19	0.28	5.4	2.4	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.25	0.38	9.2	4.4	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.15	0.27	5.8	3.5	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.08	< 0.05	0.91	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.18	0.29	6.1	3.4	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	3.88	4.64	96.2	40.4	< 0.80
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4041



Environmental Science

Analytical Report Number: 24-040805

Project / Site name: Cwmgor, Neat Port Talbot

Your Order No: 14301 AG

Lab Sample Number				310211	310212	310213	310214	310215
Sample Reference				TP02	TP03	TP04	TP07	TP09
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	0.10	0.10	0.20	0.50
Date Sampled				04/09/2024	04/09/2024	04/09/2024	05/09/2024	04/09/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	30	130	100	26	9.5
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.7	3.2	1.1	0.87	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.3	0.5	0.3	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	6.8	< 0.2	1.7	< 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	34	130	22	110	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	140	900	2200	120	33
Lead (aqua regia extractable)	mg/kg	1	MCERTS	160	1000	100	290	20
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.8	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	29	79	74	40	44
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	3.4	1.5	5.4	1.9
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	66	230	41	480	29
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	190	3800	170	1000	100

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	1.6	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	3.3	5	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	8.2	13	< 8.0
TPHCWG - Aliphatic >EC16 - EC35 _{EH_CU_1D_AL}	mg/kg	10	MCERTS	< 10	< 10	40	70	< 10
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	32	57	< 8.0
TPHCWG - Aliphatic >EC35 - EC44 _{EH_CU_1D_AL}	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	19	< 8.4
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10	44	77	< 10
TPHCWG - Aliphatic >EC5 - EC44 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	< 10	44	95	< 10

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	3.3	2.4	< 2.0
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	32	13	< 10
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	270	52	< 10
TPHCWG - Aromatic >EC35 - EC40 _{EH_CU_1D_AR}	mg/kg	10	NONE	< 10	< 10	31	15	< 10
TPHCWG - Aromatic >EC35 - EC44 _{EH_CU_1D_AR}	mg/kg	8.4	NONE	< 8.4	< 8.4	37	27	< 8.4
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10	310	68	< 10
TPHCWG - Aromatic >EC5 - EC44 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10	350	94	< 10

TPH Total >EC5 - EC44 _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	< 10	< 10	390	190	< 10
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



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Environmental Science

Analytical Report Number: 24-040805

Project / Site name: Cwmgor, Neat Port Talbot

Your Order No: 14301 AG

Lab Sample Number				310216	310217	310218	310219	310220
Sample Reference				TP10	TP11	SA01	SA02	SA05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.40	0.50	0.50	0.10
Date Sampled				05/09/2024	05/09/2024	04/09/2024	04/09/2024	05/09/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	36.7	42.1	50.8	33.6	56.6
Moisture Content	%	0.01	NONE	22	20	14	25	24
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.8	0.8	0.8

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	KSZ	SCA	SCA

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.5	8.5	7.8	7.6	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	910	880	3800	580	1200
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	36	96	78	94	140
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0178	0.0481	0.0388	0.0468	0.0702
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	17.8	48.1	38.8	46.8	70.2
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	-	-	-	-	-
Sulphide	mg/kg	1	MCERTS	< 1.0	7.6	< 1.0	1.5	12
Total Sulphur	mg/kg	50	MCERTS	540	880	1600	570	1400
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	5.2	3.6	2.8	4.8	4
Loss on Ignition @ 450°C	%	0.2	MCERTS	11	13	9.5	11	8.9

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.34	0.34	0.32	1.5	0.3
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.07	0.48	0.06
Acenaphthene	mg/kg	0.05	MCERTS	0.08	< 0.05	0.22	2.7	0.37
Fluorene	mg/kg	0.05	MCERTS	0.07	0.08	0.25	2.8	0.25
Phenanthrene	mg/kg	0.05	MCERTS	0.5	1.1	2.6	31	2.8
Anthracene	mg/kg	0.05	MCERTS	0.07	0.21	0.75	12	0.64
Fluoranthene	mg/kg	0.05	MCERTS	0.6	1.4	4.9	65	3.5
Pyrene	mg/kg	0.05	MCERTS	0.47	1	3.9	52	2.9
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.28	0.72	2.5	40	1.6
Chrysene	mg/kg	0.05	MCERTS	0.5	0.8	2.8	39	1.8
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.55	0.84	3.3	47	2.1
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.18	0.44	1.1	18	0.9
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.29	0.52	2.3	37	1.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.23	0.44	1.6	21	1.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.07	0.12	0.4	5.6	0.24
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.24	0.46	1.7	22	1.1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	4.48	8.51	28.8	395	21
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4041



Environmental Science

Analytical Report Number: 24-040805

Project / Site name: Cwmgor, Neat Port Talbot

Your Order No: 14301 AG

Lab Sample Number				310216	310217	310218	310219	310220
Sample Reference				TP10	TP11	SA01	SA02	SA05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.40	0.50	0.50	0.10
Date Sampled				05/09/2024	05/09/2024	04/09/2024	04/09/2024	05/09/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21	23	220	48	22
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.5	1.5	1.8	1.4	1.8
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.5	0.5	0.6	1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	0.9	< 0.2	1.3	1.9
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	20	140	31	20	89
Copper (aqua regia extractable)	mg/kg	1	MCERTS	53	81	780	440	77
Lead (aqua regia extractable)	mg/kg	1	MCERTS	66	92	1100	160	86
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.7	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	47	45	48	46	70
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	3.2	1.6	6.7
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	50	480	80	42	510
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	150	220	1600	260	290

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	1.2	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	2.8	< 2.0	2.6	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC16 - EC35 _{EH_CU_1D_AL}	mg/kg	10	MCERTS	< 10	13	< 10	14	< 10
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	13	< 8.0	14	< 8.0
TPHCWG - Aliphatic >EC35 - EC44 _{EH_CU_1D_AL}	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	17	< 10	16	< 10
TPHCWG - Aliphatic >EC5 - EC44 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10	17	< 10	16	< 10

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	16	< 2.0
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	14	160	< 10
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	18	310	< 10
TPHCWG - Aromatic >EC35 - EC40 _{EH_CU_1D_AR}	mg/kg	10	NONE	< 10	< 10	< 10	22	< 10
TPHCWG - Aromatic >EC35 - EC44 _{EH_CU_1D_AR}	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	27	< 8.4
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10	31	490	< 10
TPHCWG - Aromatic >EC5 - EC44 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	< 10	< 10	31	510	< 10

TPH Total >EC5 - EC44 _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	< 10	17	31	530	< 10
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-040805
Project / Site name: Cwmgor, Neat Port Talbot
Your Order No: 14301 AG

Lab Sample Number				310221	310222	310223	310224	310225
Sample Reference				TP03	TP05	TP07	TP10	SA01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.30	1.30	1.10	1.40
Date Sampled				04/09/2024	04/09/2024	05/09/2024	05/09/2024	04/09/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	11	7.7	9.1	25
Total mass of sample received	kg	0.1	NONE	0.5	0.5	0.5	0.5	0.5

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	-	-	-	-	-

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.1	6.2	6.7	7.1	7.9
Total Cyanide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	99	7.5	74	29	40
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	49.6	3.76	37	14.4	19.8
Sulphide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-	-	-	-
Loss on Ignition @ 450°C	%	0.2	MCERTS	-	-	-	-	-

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-	-	-	-	-
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Analytical Report Number: 24-040805
 Project / Site name: Cwmgor, Neat Port Talbot
 Your Order No: 14301 AG

Lab Sample Number				310221	310222	310223	310224	310225
Sample Reference				TP03	TP05	TP07	TP10	SA01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.30	1.30	1.10	1.40
Date Sampled				04/09/2024	04/09/2024	05/09/2024	05/09/2024	04/09/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Test Limit of detection	Test Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	-	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC16 - EC35 _{EH_CU_1D_AL}	mg/kg	10	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-	-	-	-	-
TPHCWG - Aliphatic >EC35 - EC44 _{EH_CU_1D_AL}	mg/kg	8.4	NONE	-	-	-	-	-
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aliphatic >EC5 - EC44 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	-	-	-	-	-

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	-	-	-	-	-
TPHCWG - Aromatic >EC35 - EC40 _{EH_CU_1D_AR}	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC35 - EC44 _{EH_CU_1D_AR}	mg/kg	8.4	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	-	-	-	-	-
TPHCWG - Aromatic >EC5 - EC44 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	-	-	-	-	-

TPH Total >EC5 - EC44 _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	-	-	-	-	-
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-040805
Project / Site name: Cwmgor, Neat Port Talbot
Your Order No: 14301 AG

Lab Sample Number				310226
Sample Reference				SA05
Sample Number				None Supplied
Depth (m)				1.10
Date Sampled				05/09/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	

Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	8.5
Total mass of sample received	kg	0.1	NONE	0.5

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-
Asbestos Analyst ID	N/A	N/A	N/A	-

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.7
Total Cyanide	mg/kg	1	MCERTS	-
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	89
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-
Water Soluble SO ₄ 16hr extraction (2:1)	mg/l	1.25	MCERTS	44.3
Sulphide	mg/kg	1	MCERTS	-
Total Sulphur	mg/kg	50	MCERTS	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-
Loss on Ignition @ 450°C	%	0.2	MCERTS	-

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	-
Acenaphthylene	mg/kg	0.05	MCERTS	-
Acenaphthene	mg/kg	0.05	MCERTS	-
Fluorene	mg/kg	0.05	MCERTS	-
Phenanthrene	mg/kg	0.05	MCERTS	-
Anthracene	mg/kg	0.05	MCERTS	-
Fluoranthene	mg/kg	0.05	MCERTS	-
Pyrene	mg/kg	0.05	MCERTS	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-
Chrysene	mg/kg	0.05	MCERTS	-
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	-
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	-
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Analytical Report Number: 24-040805
 Project / Site name: Cwmgor, Neat Port Talbot
 Your Order No: 14301 AG

Lab Sample Number				310226
Sample Reference				SA05
Sample Number				None Supplied
Depth (m)				1.10
Date Sampled				05/09/2024
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-

Petroleum Hydrocarbons

TPHCWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.01	MCERTS	-
TPHCWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	-
TPHCWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	-
TPHCWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-
TPHCWG - Aliphatic >EC16 - EC35 _{EH_CU_1D_AL}	mg/kg	10	MCERTS	-
TPHCWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	-
TPHCWG - Aliphatic >EC35 - EC44 _{EH_CU_1D_AL}	mg/kg	8.4	NONE	-
TPHCWG - Aliphatic >EC5 - EC35 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	-
TPHCWG - Aliphatic >EC5 - EC44 _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	-

TPHCWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.01	MCERTS	-
TPHCWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.01	MCERTS	-
TPHCWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.02	MCERTS	-
TPHCWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	-
TPHCWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	-
TPHCWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	-
TPHCWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	-
TPHCWG - Aromatic >EC35 - EC40 _{EH_CU_1D_AR}	mg/kg	10	NONE	-
TPHCWG - Aromatic >EC35 - EC44 _{EH_CU_1D_AR}	mg/kg	8.4	NONE	-
TPHCWG - Aromatic >EC5 - EC35 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	-
TPHCWG - Aromatic >EC5 - EC44 _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	-

TPH Total >EC5 - EC44 _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	-
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 24-040805

Project / Site name: Cwmgors, Neat Port Talbot

* 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 *
310211	TP02	None Supplied	0.6	Brown loam and sand with stones and vegetation
310212	TP03	None Supplied	0.1	Brown loam and sand with stones and vegetation
310213	TP04	None Supplied	0.1	Brown sand with gravel and stones
310214	TP07	None Supplied	0.2	Brown sandy loam with vegetation and stones
310215	TP09	None Supplied	0.5	Brown clay with gravel
310216	TP10	None Supplied	0.1	Brown loam and sand with vegetation and stones
310217	TP11	None Supplied	0.4	Brown loam and clay with vegetation and stones
310218	SA01	None Supplied	0.5	Brown sandy loam with vegetation and stones
310219	SA02	None Supplied	0.5	Brown sandy loam with vegetation and stones
310220	SA05	None Supplied	0.1	Brown loam and clay with gravel and vegetation
310221	TP03	None Supplied	1.2	Brown clay and sand
310222	TP05	None Supplied	1.3	Brown clay and sand with gravel
310223	TP07	None Supplied	1.3	Grey clay and sand with gravel
310224	TP10	None Supplied	1.1	Brown clay and sand with gravel
310225	SA01	None Supplied	1.4	Brown clay and sand
310226	SA05	None Supplied	1.1	Brown clay and loam with gravel and vegetation

Analytical Report Number : 24-040805

Project / Site name: Cwmgors, Neat Port Talbot

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 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, 2021	A001B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	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
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
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	L038B	D	MCERTS
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	L038B	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Loss on ignition of soil @ 450°C	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
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazine followed by colorimetry	In-house method	L080-PL	W	MCERTS
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	L080-PL	W	MCERTS

Analytical Report Number : 24-040805

Project / Site name: Cwmgors, Neat Port Talbot

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
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	L080-PL	W	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

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' 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.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution

APPENDIX D

LABORATORY GEOTECHNICAL TEST RESULTS



Laboratory Report



Contract Number: 74645

Client Ref: **14301**
Client PO: **14301/AG**

Date Received: **10-09-2024**
Date Completed: **16-09-2024**
Report Date: **16-09-2024**

Client: **Integral Geotechnique (Wales) Limited**

This report has been checked and approved by:

Contract Title: **Cwmgors, Neath Port Talbot**
For the attention of: **Aidan Gamble**

Brendan Evans
Office Administrator

Description	Qty
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	6
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	6
Disposal of samples for job	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

- * - denotes test included in laboratory scope of accreditation
- # - denotes test carried out by approved contractor
- @ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:

Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)
Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)
Wayne Honey (HR & HSE Manager)

APPENDIX E

SUMMARY OF LABORATORY CHEMICAL TEST RESULTS

SUMMARY OF LABORATORY SOIL TEST RESULTS

METALS AND SEMI-METALS

Job No.: 14301
 Site: Cwmgors, Neath Port Talbot
 Soil Type: Made Ground
 Soil Organic Matter: 1%

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	TP02	0.60	30	0.7	1.7	0.9	34	< 1.8	140	160	< 0.3	29	< 1.0	66	190
2	TP03	0.10	130	0.3	3.2	6.8	130	< 1.8	900	1000	0.8	79	3.4	230	3800
3	TP04	0.10	100	0.5	1.1	< 0.2	22	< 1.8	2200	100	< 0.3	74	1.5	41	170
4	TP07	0.20	26	0.3	0.87	1.7	110	< 1.8	120	290	< 0.3	40	5.4	480	1000
5	TP10	0.10	21	0.7	1.5	0.9	20	< 1.8	53	66	< 0.3	47	< 1.0	50	150
6	TP11	0.40	23	0.5	1.5	0.9	140	< 1.8	81	92	< 0.3	45	< 1.0	480	220
7	SA01	0.50	220	0.5	1.8	< 0.2	31	< 1.8	780	1100	0.7	48	3.2	80	1600
8	SA02	0.50	48	0.6	1.4	1.3	20	< 1.8	440	160	< 0.3	46	1.6	42	260
9	SA05	0.10	22	1	1.8	1.9	89	< 1.8	77	86	< 0.3	70	6.7	510	290
Screening Criteria Value			37.0	290.0	1.7	11.0	-	6.0	2400.0	200.0	1.2	130.0	250.0	410.0	3700.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	-	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

INORGANIC CHEMICALS & OTHERS

Job No.: 14301
 Site: Cwmgors, Neath Port Talbot
 Soil Type: Made Ground
 Soil Organic Matter: 1%

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	TP02	0.60	< 1.0	4.80	8.10	< 1.0	8.40	0.026	790.00	33.00	860.00	2.00	3.44	Not-detected	#N/A
2	TP03	0.10	< 1.0	7.90	16.00	< 1.0	8.00	0.051	1700.00	2.50	1000.00	4.00	6.88	Not-detected	#N/A
3	TP04	0.10	< 1.0	8.30	14.00	< 1.0	8.00	0.030	660.00	10.00	1200.00	4.10	7.05	Not-detected	#N/A
4	TP07	0.20	< 1.0	5.70	13.00	< 1.0	10.40	0.124	1500.00	9.20	880.00	2.40	4.13	Not-detected	#N/A
5	TP10	0.10	< 1.0	11.00	22.00	< 1.0	7.50	0.018	910.00	< 1.0	540.00	5.20	8.94	Not-detected	#N/A
6	TP11	0.40	< 1.0	13.00	20.00	< 1.0	8.50	0.048	880.00	7.60	880.00	3.60	6.19	Not-detected	#N/A
7	SA01	0.50	< 1.0	9.50	14.00	< 1.0	7.80	0.039	3800.00	< 1.0	1600.00	2.80	4.82	Not-detected	#N/A
8	SA02	0.50	< 1.0	11.00	25.00	< 1.0	7.60	0.047	580.00	1.50	570.00	4.80	8.26	Not-detected	#N/A
9	SA05	0.10	< 1.0	8.90	24.00	< 1.0	7.40	0.070	1200.00	12.00	1400.00	4.00	6.88	Not-detected	#N/A
Screening Criteria Value			34.0	-	-	120.0	-	-	-	-	-	-	-	-	0.001
Source of Screening Criteria Value			ATRISK	-	-	S4UL	-	-	-	-	-	-	-	-	IOM

SUMMARY OF LABORATORY SOIL TEST RESULTS

POLYAROMATIC HYDROCARBONS (PAH)

Job No.: 14301
Site: Cwmgors, Neath Port Talbot
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	TP02	0.60	< 0.05	< 0.05	0.13	0.33	0.25	0.48	0.18	0.19	0.5	< 0.05	0.7	< 0.05	0.15	0.07	0.36	0.53
2	TP03	0.10	< 0.05	< 0.05	0.06	0.4	0.38	0.69	0.29	0.28	0.59	0.08	0.69	< 0.05	0.27	0.11	0.26	0.54
3	TP04	0.10	0.18	0.23	1.3	11	9.2	15	6.1	5.4	13	< 0.05	14	0.26	5.8	0.71	2.2	12
4	TP07	0.20	0.19	0.1	0.46	3.4	4.4	5.9	3.4	2.4	3.9	0.91	5.1	0.16	3.5	0.39	1.8	4.3
5	TP10	0.10	0.08	< 0.05	0.07	0.28	0.29	0.55	0.24	0.18	0.5	0.07	0.6	0.07	0.23	0.34	0.5	0.47
6	TP11	0.40	< 0.05	< 0.05	0.21	0.72	0.52	0.84	0.46	0.44	0.8	0.12	1.4	0.08	0.44	0.34	1.1	1
7	SA01	0.50	0.22	0.07	0.75	2.5	2.3	3.3	1.7	1.1	2.8	0.4	4.9	0.25	1.6	0.32	2.6	3.9
8	SA02	0.50	2.7	0.48	12	40	37	47	22	18	39	5.6	65	2.8	21	1.5	31	52
9	SA05	0.10	0.37	0.06	0.64	1.6	1.5	2.1	1.1	0.9	1.8	0.24	3.5	0.25	1.1	0.3	2.8	2.9
Screening Criteria Value			210.0	170.0	2400.0	7.2	2.2	2.6	320.0	77.0	15.0	0.24	280.0	170.0	27.0	2.3	95.0	620.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

PETROLEUM HYDROCARBONS

Job No.: 14301
Site: Cwmgors, Neath Port Talbot
Soil Type: Made Ground
Soil Organic Matter: 1%

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	TP02	0.60	< 0.010	< 0.010	< 0.010	< 1.0	< 2.0	< 10	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	< 2.0	< 10	< 10	< 10
2	TP03	0.10	< 0.010	< 0.010	< 0.010	< 1.0	< 2.0	< 10	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	< 2.0	< 10	< 10	< 10
3	TP04	0.10	< 0.010	< 0.010	< 0.010	< 1.0	3.3	40	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	3.3	32	270	31
4	TP07	0.20	< 0.010	< 0.010	< 0.010	1.6	5	70	19	< 0.010	< 0.010	< 0.020	< 1.0	2.4	13	52	15
5	TP10	0.10	< 0.010	< 0.010	< 0.010	< 1.0	< 2.0	< 10	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	< 2.0	< 10	< 10	< 10
6	TP11	0.40	< 0.010	< 0.010	< 0.010	1.2	2.8	13	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	< 2.0	< 10	< 10	< 10
7	SA01	0.50	< 0.010	< 0.010	< 0.010	< 1.0	< 2.0	< 10	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	< 2.0	14	18	< 10
8	SA02	0.50	< 0.010	< 0.010	< 0.010	< 1.0	2.6	14	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	16	160	310	22
9	SA05	0.10	< 0.010	< 0.010	< 0.010	< 1.0	< 2.0	< 10	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	< 2.0	< 10	< 10	< 10
Screening Criteria Value			42.0	100.0	27.0	130.0	1100.0	65000.0	65000.0	0.1	130.0	34.0	74.0	140.0	260.0	1100.0	1100.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

METALS AND SEMI-METALS

Job No.: 14301
 Site: Cwmgors, Neath Port Talbot
 Soil Type: Superficial Deposits
 Soil Organic Matter: 1%

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	TP09	0.50	9.5	0.4	1.1	< 0.2	22	< 1.8	33	20	< 0.3	44	1.9	29	100
Screening Criteria Value			37.0	290.0	1.7	11.0	-	6.0	2400.0	200.0	1.2	130.0	250.0	410.0	3700.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	-	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

INORGANIC CHEMICALS & OTHERS

Job No.: 14301
 Site: Cwmgors, Neath Port Talbot
 Soil Type: Superficial Deposits
 Soil Organic Matter: 1%

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	TP09	0.50	< 1.0	2.70	6.80	< 1.0	8.50	0.058	170.00	25.00	1000.00	0.70	1.20	Not-detected	#N/A
2	TP03	1.20	-	-	20.00	-	7.10	0.050	-	-	-	-	<0.1	-	#N/A
3	TP05	1.30	-	-	11.00	-	6.20	0.004	-	-	-	-	<0.1	-	#N/A
4	TP07	1.50	-	-	7.70	-	6.70	0.037	-	-	-	-	<0.1	-	#N/A
5	TP10	1.10	-	-	9.10	-	7.10	0.014	-	-	-	-	<0.1	-	#N/A
6	SA01	1.40	-	-	25.00	-	7.90	0.020	-	-	-	-	<0.1	-	#N/A
7	SA05	1.10	-	-	8.50	-	7.70	0.044	-	-	-	-	<0.1	-	#N/A
Screening Criteria Value			34.0	-	-	120.0	-	-	-	-	-	-	-	-	0.001
Source of Screening Criteria Value			ATRISK	-	-	S4UL	-	-	-	-	-	-	-	-	IOM

SUMMARY OF LABORATORY SOIL TEST RESULTS

POLYAROMATIC HYDROCARBONS (PAH)

Job No.: 14301
Site: Cwmgors, Neath Port Talbot
Soil Type: Superficial Deposits
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	TP09	0.50	< 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			210.0	170.0	2400.0	7.2	2.2	2.6	320.0	77.0	15.0	0.24	280.0	170.0	27.0	2.3	95.0	620.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

PETROLEUM HYDROCARBONS

Job No.: 14301
 Site: Cwmgor, Neath Port Talbot
 Soil Type: Superficial Deposits
 Soil Organic Matter: 1%

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	TP09	0.50	< 0.010	< 0.010	< 0.010	< 1.0	< 2.0	< 10	< 8.4	< 0.010	< 0.010	< 0.020	< 1.0	< 2.0	< 10	< 10	< 10
Screening Criteria Value			42.0	100.0	27.0	130.0	1100.0	65000.0	65000.0	0.1	130.0	34.0	74.0	140.0	260.0	1100.0	1100.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

FIGURES

Site Location



Figure 1: Site Location

Project: Cwmgors, Neath Port Talbot

Job no.: 14301

Client: Bluefield Land Limited

Scale: 1:50,000

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Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
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Tel: 029 2080 7991



Figure 2: Site Plan

Project: Cwmgors, Neath Port Talbot

Client: Bluefield Land Limited

Job No.: 14301

Scale: 1:1200 at A3

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Figure 3: Proposed Development Plan

Project: Cwmgor, Neath Port Talbot

Client: Bluefield Land Limited

Job No.: 14301

Scale: 1:1200 at A3

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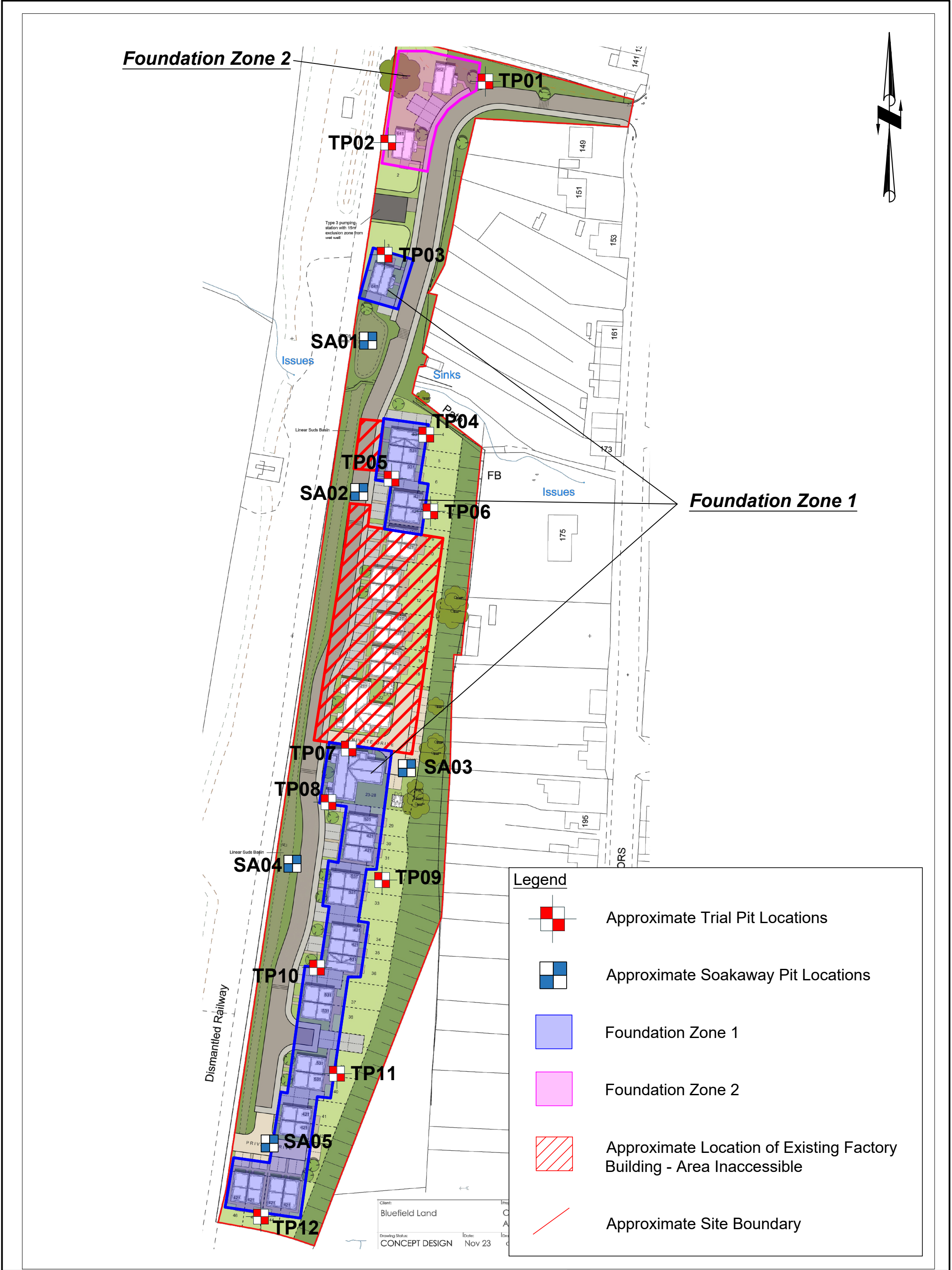


Figure 4: Foundation Zones