

GLYNCORRWG INDUSTRIAL UNITS, PORT TALBOT

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Report No H3091-23/G2

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REPORT STRUCTURE

TITLE	VOLUME No
DESK STUDY AND FIELD RECONNAISSANCE	H3091-23/G1
GROUND INVESTIGATION REPORT (FACTUAL ACCOUNT and INTERPRETATIVE ASSESSMENT)	H3091-23/G2

**C O N T E N T S**

Page

EXECUTIVE SUMMARY	1
1 INTRODUCTION.....	2
2 SITE SETTING.....	3
2.1 Location and Description	3
2.2 Published Geology.....	3
2.3 Coal Mining.....	4
3 FIELDWORK	5
3.1 General.....	5
3.2 Exploratory Holes	5
3.3 Field Testing	7
3.4 Groundwater and Ground Gas Monitoring	7
3.5 Groundwater Sampling	8
4 LABORATORY TESTING.....	8
4.1 Geotechnical Testing	8
4.2 Geoenvironmental Testing.....	8
5 GROUND CONDITIONS AND GROUNDWATER.....	9
5.1 Strata Encountered.....	9
5.2 Evidence of Contamination	10
5.3 Made Ground (Colliery Spoil).....	10
5.4 Till.....	11
5.5 Brithdir Member - Sandstone	12
5.6 Groundwater.....	13
6 PROPOSED WORKS	14
7 GEOTECHNICAL ENGINEERING ASSESSMENT.....	15
7.1 Scope of Geotechnical Investigation	15
7.2 Foundations.....	17
7.3 Chemical Considerations for Buried Concrete	19
7.4 Pavement Design	23
7.5 Sustainable Drainage Systems (SuDS)	23
7.6 Foundation Construction.....	24
8 GEOENVIRONMENTAL ASSESSMENT	25
8.1 Assessment Basis	25
8.2 Potential Site Sources of Contamination, Pathways and Receptors.....	25
8.3 Scope of Geo-environmental Investigation.....	27
8.4 Generic Assessment Criteria	29
8.5 Risks to Human Health	31
8.6 Risks to Adjacent Land Users.....	31
8.7 Groundwater Contaminants	32
8.8 Risks to Controlled Waters	32
8.9 Relevant Pollutant Linkages – Groundwater	33
8.10 Permanent Ground Gases	33
8.11 Summary of Site Investigation Findings and Updated Conceptual Model.....	36



9	REFERENCES.....	39
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APPENDIX A FIGURES AND DRAWINGS

APPENDIX B EXPLORATORY HOLE RECORDS

APPENDIX C FIELD TESTING

APPENDIX D INSTRUMENTATION AND MONITORING

APPENDIX E GEOTECHNICAL LABORATORY TEST RESULTS

APPENDIX F GEOENVIRONMENTAL LABORATORY TEST RESULTS

APPENDIX G PHOTOGRAPHS

APPENDIX H GEOENVIRONMENTAL ASSESSMENT

**EXECUTIVE SUMMARY**

A summary of the findings of the assessment is presented below.

SECTION	DETAILS
Site location	2.7 km north northeast of Cymmer. The site address is: Glyncorrwg Workshops, Ynysycorrwg Road, Glyncorrwg, Port Talbot, SA13 3EA.
Fieldwork and Lab	Three boreholes, five inspection pits, three trial pits and field testing [dynamic probing]. Phased investigation. Geotechnical, geochemical and geoenvironmental testing. Groundwater and gas monitoring over three month period.
Proposed Development	Four new industrial units with associated parking, soft landscaping and water detention basin.
Ground Conditions	Up to 5.7 m of Made Ground (Colliery Spoil) encountered. Discontinuous and thin layer of Till encountered in north of site. Perched groundwater encountered around 1.0, 4.0 and 6.5 m.
Engineering Geological Model	The Made Ground and natural Till are unsuitable for foundation purposes. All foundations should be designed to transfer loads of the proposed development to the underlying bedrock, the Brithdir Member. The depth of the bedrock was found to be approximately 4.5 to 6.5 m below ground level (and may potentially be deeper beneath other parts of the site). It is considered that the industrial units to be constructed could be supported by piled foundations, extending to within the upper part of the Brithdir Member. As a possible alternative the designer may wish to consider a ground improvement technique, such as vibrated stone columns. Shallow groundwater should be anticipated. Unable to calculate soil infiltration rate from soakaway testing due to low permeability ground conditions. A SuDS option is unlikely to be feasible. Concrete to be designed to ground aggressivity classes DS-2 and AC-2 or DS-3 and AC-3 depending on the foundation design chosen. Coal Authority report notes nearby coal outcrop, dipping shallowly to the north. Although not anticipated beneath the site, there is the potential for shallow unrecorded mine working beneath the site. However, the Coal Authority report concludes that the site is 'acceptably free from coal mining related risk'.
Geoenvironmental Generic Quantitative Risk Assessment (GQRA)	Low risk presented to human health and controlled waters from contaminants analysed. Moderate gas generation potential, with moderate risk. CS2 (Type D development) gas protection measures recommended. Basic protection measures required for Radon.
Recommendations	Further gas monitoring could confirm worst case scenario encountered.

1 INTRODUCTION

SOCOTEC UK Limited (SOCOTEC) was commissioned in November 2023 by Neath Port Talbot County Borough Council (NPT) to carry out a site investigation to provide geoenvironmental and geotechnical parameters for the design and construction of additional industrial units at the Glyncorrwg workshops site.

The scope of the investigation was specified by SOCOTEC and comprised boreholes, field testing, monitoring, laboratory testing and reporting. The fieldwork was carried out on 14 December 2023, with the field testing (TRL probes) cancelled due to a hard layer near surface. Additional fieldwork was agreed due to unexpected ground conditions on the site with trial pits and additional boreholes carried out in two further phases on 31 January and between 21 and 27 February 2024. Soakaway and Dynamic Cone Penetrometer (DCP) testing was carried out supplementary to the main investigation on 9 and 10 May 2024. Updated site drawings of the proposed works were provided to SOCOTEC on 1 July 2024 (drawing references ISU-EPT-XX-XX-DR-A-1201-P03 and ISU-EPT-XX-XX-DR-A-6201-P04). This issue of the report indicates where changes to the proposed development varies from the original drawings and scope of works outlined in drawing reference A1278-100.

The investigation was performed in accordance with the general requirements of BS 5930:2015+A1 (2020), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2021) and other relevant related standards identified. The information is also presented in digital data format as defined in AGS 4.0.4 (2017).

This report presents a description of the ground investigation work carried out together with the factual records of the fieldwork, monitoring and laboratory testing. It comprises the Factual Account section of a Ground Investigation Report (GIR), as defined in the UK Specification for Ground Investigation draft Third Edition (2022), also identified as the Factual Report section in BS 5930:2015+A1 (2020). It also includes a discussion of the ground conditions and engineering parameters, and a geoenvironmental assessment. Other aspects of the project are reported as shown on the Report Structure page.

2 SITE SETTING

2.1 Location and Description

Glyncorrwg workshops is located approximately 2.7 km north northeast of Cymmer, at National Grid reference SS 873985, see Site Location Plan in Appendix A. The site address is: Glyncorrwg Workshops, Ynysycorrwg Road, Glyncorrwg, Port Talbot, SA13 3EA.

The area of investigation was rectangular, measuring approximately 20 by 75 m, situated on the southeastern boundary of the Glyncorrwg workshops site. It is generally level at an elevation of about 215 mOD.

The site is bounded to the northwest by the existing Glyncorrwg workshop industrial units, to the northeast by the site entrance, beyond which Glyncorrwg Rugby and Football Club is located, to the southeast by Ynysycorrwg Road and to the southwest by Glyncorrwg Ponds and Mountain Bike Centre. The Afon Corrwg is located approximately 115 m northwest of the site and Glyncorrwg Ponds are located approximately 330 m to the southwest.

2.2 Published Geology

The published geological map for the area, (BGS Sheet 248, 1963), and the BGS GeoIndex Onshore online viewer (2024) show the site to be located on Devensian Till, which is likely to consist of clay, silt, sand and gravel. Alluvium is shown to west of the site, associated with the Afon Corrwg.

The underlying bedrock comprises the Brithdir Member of the Pennant Sandstone Formation, of Carboniferous age, which is a greenish grey sandstone with conglomerate lenses at the base of sandstone units, and thin mudstones / siltstones and some coal seams (see Section 2.3). The bedrock is indicated to dip 10 degrees to the north-northeast.

Based on the site history, described in the Desk Study (Volume G1), Made Ground was anticipated to be present on site.

2.3 Coal Mining

There are many coal mines in the local area (see Volume G1 for details), with the nearest noted as Glyncorrwg Colliery, 141 m to the northeast of the site. However, there are no recorded shafts or adits within 20 m of the site.

Although the published geological maps indicate no sub-crops beneath the actual site area, there are eight inferred coal seams indicated within 1 km of the site, and the site lies within the influence of recorded workings in five coal seams. The nearest inferred coal seam sub-crop is shown immediately beyond the northeastern corner of the site, arcing around the eastern, northern and western boundaries of site, see Figure 1.

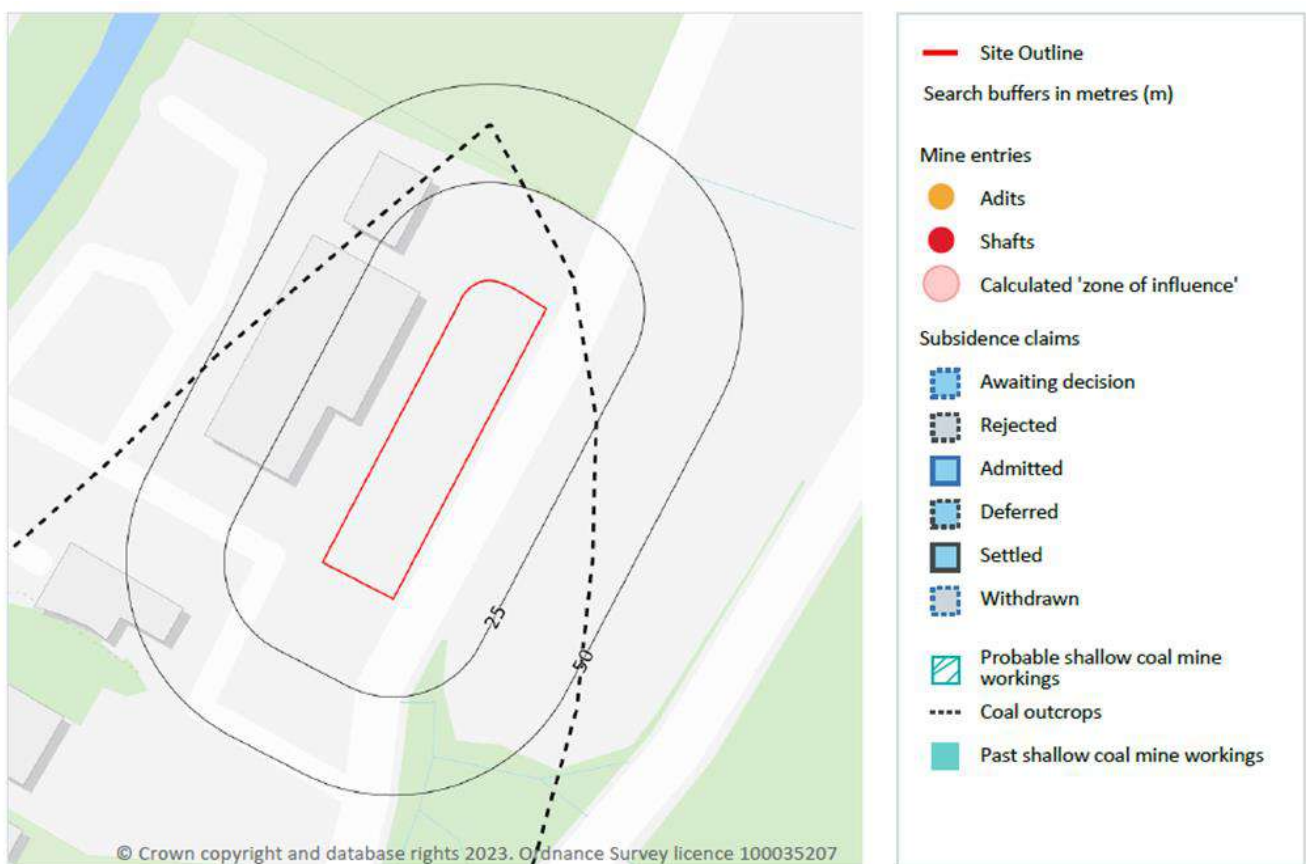


Figure 1 Extract from CON29 GS-7ME-HNV-PX9-FWR from Volume G1.



According to the BGS GeoIndex online viewer, the inferred coal seam is not laterally extensive and has been displaced by an inferred north-northwest to south-southeast trending fault located approximately 200 m southwest of the site. This is likely to represent the Brithdir (or Graig Uchaf) seam, which dips away from the site to the north-west. However, due to the faulting in the area, a similar sub-crop of the same seam is shown to the south-west of the site, and this probably passes beneath the site. Records held by the BGS for old boreholes situated to the north-east and south-west of the site indicate coal seams at depths below about 13 m.

The Coal Authority report presented in Volume G1 notes five workings beneath the site, at depths of between 270 and 445m. These were last worked in 1945, and any ground movements due to this coal mining activity should have stopped. The Coal Authority report states that the property is considered 'to be acceptably free from coal mining related risk', and that 'No further action is required with regards to past coal mining'.

3 FIELDWORK

3.1 General

The exploratory hole locations were selected by SOCOTEC in accordance with drawing reference A1278-100 and set out from local features. The positions were surveyed by SOCOTEC to National Grid and Ordnance Datum, and the locations are shown on the Exploratory Hole Location Plan in Appendix A.

All exploratory hole locations were surveyed for underground services, prior to any excavation, using a Cable Avoidance Tool (CAT). Hand dug service inspection pits were then excavated to a depth of 1.2 m with simultaneous scanning using a CAT for the borehole locations.

3.2 Exploratory Holes

The exploratory holes are listed in Table 1.

The exploratory hole logs are presented in Appendix B. These include descriptions of the strata encountered together with details of the equipment and methods used, sampling and field testing carried out, water depths and other field observations. Explanations of the terms and abbreviations



used on the logs are given in the Key to Exploratory Hole Records in Appendix B, along with other explanatory information. The geological material descriptions are in accordance with BS 5930:2015+A1 (2020), following BS EN ISO 14688 1 (2018) and BS EN ISO 14689 (2018) for soils and rocks, respectively.

TABLE 1 SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	DEPTH RANGE (m)	REMARKS
Inspection pits (hand dug)	5	0.30 to 0.50	Phase 1 attempts to progress borehole locations – terminated on hard material. BHG01 to BHG01D, various locations.
Dynamic (windowless) sampling	1	6.00	Phase 1 WSG01
Dynamic probing	1	6.40	Phase 1 continuation of WSG01-DP
Trial pits (machine dug)	5	3.00 to 3.50	Phase 2 to determine if the hard stratum was bedrock or compacted Made Ground (TPG01 to TPG03) Phase 3 to undertake soakaway testing (SAG01 and SAG02)
Cable percussion boring	2	6.30 and 10.00	Phase 3 completion of boreholes. Inspection pits pre excavated using the machine excavator, then backfilled prior to boring. CPG01 and CPG02

Standard penetration tests (SPT) in the boreholes were carried out in accordance with BS EN ISO 22476-3+A1 (2011). The SPT hammer energy ratio certificates are included in Appendix B and the results are presented on the logs without any corrections to the measured blow-counts or derived N values.

Geotechnical samples were transferred from site to the Bridgend office of SOCOTEC for temporary retention. Samples taken for geoenvironmental testing were transferred directly from site to the SOCOTEC environmental chemistry laboratory.

Photographs of the trial pits and dynamic sample liners are presented in Appendix F.



3.3 Field Testing

The field (in situ) testing carried out is listed in Table 2 and the results are presented in Appendix C, unless otherwise stated.

TABLE 2 SUMMARY OF FIELD TESTS

TYPE	QUANTITY	REMARKS
Dynamic probing	1	Type DPSH-B. Maximum depth of 6.40 m Presented in Appendix B
Dynamic cone penetrometer	2	TRL Probe
Soakaway testing	2	BRE DG 365 method

3.4 Groundwater and Ground Gas Monitoring

Ground gas and groundwater monitoring instrumentation was installed in selected boreholes specified by SOCOTEC; details are shown on the logs and summarised in Appendix C. Monitoring carried out by SOCOTEC during and after the phased fieldwork periods is listed in Table 3. The records are included in Appendix C.

TABLE 3 SUMMARY OF MONITORING

TYPE	REMARKS
Groundwater and gas monitoring visit WSG01	5 January 2024
Groundwater only WSG01	12 January 2024
Groundwater and gas monitoring visit WSG01	24 January 2024
Groundwater and gas monitoring visit WSG01	12 February 2024
Groundwater monitoring visit WSG01, CPG01 and CPG02	29 February 2024
Groundwater and gas monitoring visit WSG01 and CPG01 Groundwater monitoring only CPG02	6 March 2024
Groundwater and gas monitoring visit WSG01 and CPG01. WSG01 gas monitoring terminated due to water uptake. Groundwater monitoring only CPG02	Supplemental visit – 13 March 2024
Groundwater and gas monitoring visit WSG01 and CPG01 Groundwater monitoring only CPG02	Supplemental visit – 20 March 2024



3.5 Groundwater Sampling

Sampling of groundwater from the installation in borehole WSG01 was attempted on 24 January 2024; however, there was insufficient water to obtain a sample.

An additional sampling visit was carried out on 29 February 2024, following completion of the Phase 3 borehole installations. Groundwater sampling was completed by SOCOTEC from the 10 m installation in Borehole CPG01, although there was insufficient water in the other installations to obtain samples. The results of subsequent laboratory testing on the sample are included in Appendix E.

4 LABORATORY TESTING

4.1 Geotechnical Testing

Geotechnical laboratory testing of selected samples was scheduled by SOCOTEC. The main testing was carried out at the SOCOTEC laboratory in Coventry, with geochemical testing carried out by DETS, in accordance with test methods as stated within the test reports. The completed testing is listed in Table 3 and the results are presented in Appendix D.

TABLE 4 SUMMARY OF GEOTECHNICAL LABORATORY TESTS

TEST TYPE ¹	QUANTITY	REMARKS
Classification/index tests		
Water content	3	
Atterberg limits	2	
Particle size distribution	2	By sieving
Geochemical tests		
pH and sulphate contents	10	BRE SD1 Suite D

Note 1 : Test type names based on Thomas Telford (2022) Table 15.4 and Bill K.

4.2 Geoenvironmental Testing

Geoenvironmental laboratory testing was scheduled by SOCOTEC on selected soil samples recovered during the fieldwork, and water samples taken by SOCOTEC from the installations. The



testing was carried out by SOCOTEC at the environmental chemistry laboratory, in accordance with test methods as stated within the test reports. The completed testing is listed in Table 4 and the results are presented in Appendix E.

TABLE 5 SUMMARY OF GEOENVIRONMENTAL LABORATORY TESTS

TYPE	QUANTITY	REMARKS / ANALYTES
Suite E soil suite	10	Metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Zn), pH, Water soluble sulphate (as SO ₄), Soil organic matter, Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG), Speciated polycyclic aromatic hydrocarbons (US EPA 16 PAHs), Volatile organic compounds (VOCs), Phenols, Cyanide (total), Asbestos screen, ID and quantification
PCB soil suite	5	Polychlorinated biphenyls (PCBs) 7 congeners Phase 2 and 3
Waste Acceptance Criteria	2	Phase 2
Suite F water suite	1	Metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Zn), pH, Sulphate (as SO ₄), Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG), Speciated polycyclic aromatic hydrocarbons (US EPA 16 PAHs), Volatile organic compounds (VOCs), Phenols, Cyanide (total)

5 GROUND CONDITIONS AND GROUNDWATER

5.1 Strata Encountered

Descriptions of the strata encountered are given on the exploratory hole records. The downward succession encountered is broadly uniform across the site and is summarised in 6. The downward succession of strata is shown on a schematic geological cross-section presented as Section 1 in Appendix A.

TABLE 6 SUMMARY OF GROUND CONDITIONS

STRATUM	TOP (m)	TOP (mOD)	THICKNESS RANGE (m)	REMARKS
Made Ground (Colliery Spoil)	0.00	209.4 to 209.9	0.30 to 5.70	Ground surfacing. Base not encountered in majority of locations.
Till	4.00 and 5.60	204.1 and 205.8	0.40 and 0.80	CPG01 and WSG01 only



STRATUM	TOP (m)	TOP (mOD)	THICKNESS RANGE (m)	REMARKS
Brithdir Member	4.40 to 6.40	203.3 to 205.4	0.60 to 3.60	CPG01, CPG02 and WSG01 only. Base not encountered

5.2 Evidence of Contamination

Olfactory and visual evidence of hydrocarbon contamination was encountered in any of the exploratory holes.

5.3 Made Ground (Colliery Spoil)

The term *Made Ground* has been used to classify all anthropogenic (man-made) materials present. Although the standard defines Made Ground as referring to non-engineered material, the difficulty of assessing which materials have been placed in accordance with an engineering specification often precludes the distinction. Strata identified as Made Ground on the borehole logs, and in the discussion of ground conditions here, include manufactured materials (e.g. concrete), imported 'soils' (e.g. granular fill) and *in situ* soils that have been disturbed in some way by construction or other human activity.

The site surfacing was variable and comprised either a soft dark grey gravelly silt, brown gravelly slightly silty sand or dark brown sandy slightly clay gravel. Roots and rootlets noted to a maximum depth of 0.40 m. This was underlain by a hard layer or crust that was generally not possible to break through with hand digging tools, except at the location of WSG01. The investigation was continued using a machine excavator to break through the thin layer.

The Made Ground was primarily recovered as sand or gravel, locally with frequent cobbles of sandstone and mudstone (as encountered within the machine excavated trial pits). In WSG01, in the northern part of the site, it consisted of firm dark grey slightly sandy to sandy gravelly clay. Based on the local site history this material, with its inherent variability, has been assumed to be spoil from the nearby collieries used to raise the ground level. This material tends to comprise the waste product from the deep mining of coal and is derived from the rocks adjacent to the coal seams, such as siltstone, sandstone and mudstone.

The results of the field and laboratory tests are summarised in Table 7.

**TABLE 7 SUMMARY OF MATERIAL PROPERTIES – MADE GROUND**

PARAMETER	NO OF RESULTS	TYPICAL RANGE OF VALUES	REMARKS
Liquid limit, W_L	1	37	
Plastic limit, W_P	1	23	
Plasticity index, PI	1	14	
Moisture content, w %	1	12	
Modified Plasticity Index, I_p %	1	3	Low volume change potential
Atterberg limits classification	1	Clay of medium (CIM) plasticity, see Figure A5.	
Particle size distribution	2	Coarse soil with fines content 14 to 15%	
SPT N60 value	10	5 to 35	Coarse soil, see Figure A4
	3	7 to 18	Fine soil, see Figure A4

The SPT carried out within the coarse material recorded SPT 'N' values of between 4 and 29, with the lowest value correlating with a water strike, which may have impacted the density. The results indicate a relative density to be typically medium dense, this being generally consistent with depth, see Figure A4.

Published correlations between SPT 'N' value and strength using an f_1 value of 4.5 (Stroud and Butler, 1975) suggest an undrained shear strength for the fine soil in WSG01 of about 37 to 89 kPa (i.e. low to high strength). There is no correlation with the strength changes against depth.

5.4 Till

The Till was encountered as a thin layer below the Made Ground within two boreholes only (in CPG02 the Made Ground was found to be underlain directly by the Brithdir Member). This comprised a firm slightly gravelly sandy clay in CPG01 and a firm sandy silt in WSG01. Although these materials have been interpreted as Till, it is possible that they may alternatively represent Alluvium from the Afon Corrwg.

The results of the field and laboratory tests are summarised in Table 7.

**TABLE 8 SUMMARY OF MATERIAL PROPERTIES – TILL**

PARAMETER	NO OF RESULTS	TYPICAL RANGE OF VALUES	REMARKS
Liquid limit, W _L	1	47	
Plastic limit, W _P	1	32	
Plasticity index, PI	1	15	
Moisture content, w %	1	33.4	
Modified Plasticity Index, I _p %	1	8	Low volume change potential
Atterberg limits classification	1	Silt of medium (SiM) plasticity, see Figure A5.	
SPT N60 value	2	8 and 37	See Figure A6

The two SPT carried out both cross into the underlying Brithdir Member in the last 50 mm of the test depth range. The incremental blow counts are reasonably consistent for the duration of the test, i.e. no large increase or decrease for the last increment, indicating they may be representative of the fine soil encountered. Published correlations between SPT 'N' value and strength using an f_1 value of 4.5 (Stroud and Butler, 1975) suggest an undrained shear strength for the clay of about 185 kPa (i.e. very high strength) and 42 kPa for the silt (i.e. medium strength). This strength agrees with the consistency assessed from sample inspection.

5.5 Brithdir Member - Sandstone

The material recovered from the Brithdir Member comprised brown sandy slightly silty or clayey subangular fine to coarse gravel of mudstone, siltstone and sandstone. The granular material recovery within cable percussion boreholes required over seven hours of slow boring or chiselling to progress less than 4 m into the geological unit. It is not clear how this material might occur in situ, i.e. bedrock broken up by the drilling and chiselling process, or granular material. This is in part due to the drilling process used to locate natural ground below the colliery spoil. Using an alternative method, such as a rotary rig, could assist with the determination whether this is bedrock or superficial deposits. Due to the timeframe this was not possible to complete prior to reporting.

The results of the field tests carried out are summarised in Table 9.

**TABLE 9 SUMMARY OF FIELD TESTS – BRITHDIR MEMBER**

PARAMETER	NO OF RESULTS	TYPICAL RANGE OF VALUES	REMARKS
SPT N60 value	7	18 and 55 [other tests extrapolated to between 93 and >250]	5 tests to refusal (50), result shown in brackets are extrapolated, see Figure A4

The SPT carried out within the granular material recorded SPT 'N' values of 17 and 46, with five SPT recording greater than 50 blows without achieving the 300 mm test drive (i.e. refusal). This indicates a medium dense to very dense relative density, with a general increase in density with depth at the two locations, see Figure A4.

The dynamic probe continuation of WSG01 into the Brithdir Member recorded 46 and 50 blows for the first two 100 mm increments, respectively, before termination of the test.

5.6 Groundwater

Five groundwater entries into the boreholes or trial pits during fieldwork were recorded as either seepage or slow inflow, as summarised in Table 10. These are all within or at the base of the Made Ground and therefore probably represent groundwater 'perched' on top of the underlying Till. These observations may not represent equilibrium due to the short period over which the holes were open.

TABLE 10 SUMMARY OF GROUNDWATER ENTRIES

HOLE ID	DEPTH OF STRIKE (m)	RISE AFTER 20 MINUTES (m)	GROUNDWATER DEPTH (mOD)	STRATUM
CPG01	5.60	No rise	204.1	Made Ground/Till boundary
CPG02	5.70	5.60	204.2	Made Ground/Brithdir Member boundary
TPG02	0.60	Slow inflow	209.2	Made Ground
TPG03	0.20	Slow inflow	209.8	Made Ground
WSG01	1.20	1.00	208.5	Made Ground

Groundwater monitoring standpipes were installed in three boreholes. The results of the monitoring carried out on eight occasions between January and March 2024 are summarised in Table 11.

**TABLE 11 SUMMARY OF INSTALLATION AND MONITORING**

HOLE ID	RESPONSE ZONE (m)	GROUNDWATER DEPTH (m)	GROUNDWATER DEPTH (mOD)	STRATUM
WSG01	0.50 to 1.50	0.54 to 1.34	208.4 to 209.2	Made Ground
CPG01	1.00 to 4.00	3.85 to 4.90	204.8 to 205.8	Made Ground
CPG01	6.50 to 10.00	6.28 to 6.70	202.9 to 203.4	Brithdir Member
CPG02	5.80 to 6.30	4.59 to 4.97	204.8 to 205.1	Brithdir Member

The measured depth of the installation in CPG02 indicates that the tip of the standpipe may have sunk into the bentonite seal. This would mean that it would be less likely to record groundwater levels, and any water in the pipe might simply be surface water. As such, the readings from this installation have been discounted within this assessment. No gas monitoring was carried out in this installation.

The readings from the functional wells indicate little variation over time in the groundwater level within each installation. However, the wells do not appear to correlate to the same phreatic surface and may indicate two perched water tables within the Made Ground (at around 1 m and 4 m depth) and a lower water table within the Brithdir Member at around 6.50 m, see Figure C4 in Appendix C.

It should be appreciated that seasonal fluctuations in groundwater level occur, and other effects such as investigations and constructions activities, and water abstraction may also change groundwater levels.

6 PROPOSED WORKS

From information provided by NPT the proposed development comprises:

- Construction of four adjoining single storey units for light industrial usage
- Associated car parking allocated to the units
- Swale
- Anticipated to be lightly loaded structures, probably portal frames.



Updated site drawings supplied to SOCOTEC on 1 July 2024 (drawing references ISU-EPT-XX-XX-DR-A-1201-P03 and ISU-EPT-XX-XX-DR-A-6201-P04) indicate the following amendments to the original scope of works:

- Swale updated to water detention basin.
- Waste compound indicated.
- Type of surface landscaping indicated, including permeable block paving at the parking space locations, tarmac to provide access to the parking facilities and concrete surfacing on approach to the roller shutter doors of the building.

7 GEOTECHNICAL ENGINEERING ASSESSMENT

7.1 Scope of Geotechnical Investigation

7.1.1 General

The required *Scope of Works* was part of an email issued by NPT (dated 20 November 2023). The *Scope of Works* indicated that “final interpretive reports with enough information to allow the D&B contractor to fully design the building, external works and any SUDs required as their SAB applications dictates.”

It should be noted that updated drawings supplied to SOCOTEC post-completion of the ground investigation (drawing references ISU-EPT-XX-XX-DR-A-1201-P03 and ISU-EPT-XX-XX-DR-A-6201-P04) indicate a revision to the flood defences on site from a swale to a water detention basin, proposed in the same area as the original swale.

7.1.2 Rationale

The ground investigation was designed by SOCOTEC (based on drawing reference A1278-100) to assess both geotechnical and geoenvironmental aspects of the site. From a geotechnical perspective the exploratory holes were positioned on a non-targeted basis to provide a spread of information across the site. In the tender offer, the proposed intrusive investigation was specified as follows:

- Five boreholes to provisional depths of between 5.00 and 6.00 mbgl, or bedrock, if encountered.



- Monitoring standpipes in three of the boreholes.
- In situ SPTs in the boreholes.
- In situ DCP tests
- In situ vane tests in the borehole inspection pits.
- Six groundwater monitoring visits to be carried out at fortnightly intervals.
- Geotechnical Laboratory testing.
- Chemical Laboratory testing.

Based on the above Scope of Works, and the general investigation objectives, SOCOTEC proposed the following laboratory testing rationale:

- Sufficient testing to allow for characterisation of ground conditions parameters for the strata encountered, emphasis on depths likely to impact proposed foundation solution.
- BRE SD1 testing based on encountered ground conditions and likely depth for concrete on site.

Soakaway testing for the swale location (as indicated on drawing A1278-100) was required to be carried out as an in situ test to confirm the supposition that the fine soil would not be suitable for a Sustainable Drainage System (SuDS). Two pits were excavated and tests carried out in the proposed area of the swale in accordance with the spacing recommended within BRE 365.

It should be noted that permeable paving was not part of the scope at the time of the investigation, as such any impact on this has not been considered as part of this investigation.

7.1.3 Constraints

This geotechnical assessment is based on the data available at the time of writing.

- The location and the design of the borehole installations were provided by SOCOTEC. The response zones were generally set below groundwater levels, which suited the groundwater level monitoring and sampling, for which the installations were primarily intended. Selected shallow installations were intended for gas monitoring, however, the groundwater information recorded within these wells can also be utilised within the geotechnical assessment.



- The unexpected thickness of Made Ground at the site resulted in the extension of the fieldwork period into three phases of work, including the addition of machine excavated trial pits. The extended duration in conjunction with a fixed reporting timeframe resulted in insufficient time to carry out additional geotechnical laboratory testing on the later phase of work. Geochemical testing was carried out.
- Cancellation of the DCP tests due to near surface hard material (~ 0.30 m).
- Uncertainty over interpretation of the natural granular material as bedrock or superficial deposits.
- No investigation has been carried out at the location of waste compound, and comments on this part of the site are therefore beyond the scope of this report.

7.1.4 Post-investigation Monitoring Programme Rationale

A monitoring programme was undertaken to measure groundwater levels for geotechnical purposes. The monitoring programme was adjusted following Visit 4 to accommodate the reporting program completion requirement of end March 2024. Two supplemental visits were added to accommodate the installations within the third phase of fieldwork.

7.2 Foundations

Currently no loading information has been provided for the proposed industrial buildings, however it is assumed they will impose relatively light loads. Considering the ground conditions summarised in Section 5 the most notable features that are likely to influence foundation options are:

- **Made Ground:** significant depth of Colliery Spoil material, with up to 5.7 m encountered. The typical variability of Made Ground makes it unsuitable for foundation construction. Colliery Spoil can be subject to collapse compression (reduction in volume due to water level rises). Furthermore, settlement due to additional loading can occur, especially if the spoil was not laid under engineering control.
- **Presence of trees:** The ground may be influenced by the presence of trees along the eastern boundary of the construction area, as well as those to be removed from within and adjacent to the footprint of the proposed building. Any clay dominated materials beneath the site, such as the fine-grained Made Ground, could possibly undergo volume changes related to the presence of trees. This includes swelling due to moisture content increases following tree



removal, and then ongoing shrinkage and swelling as a reaction to moisture content variations driven by any trees to be retained. As these volume changes result in settlement and heave in near-surface materials, the presence of trees influences the type and depth of foundation that may be appropriate for lightly loaded structures, as well as determining other precautions that may need to be adopted.

- **Till:** thin discontinuous layer of fine soil (clay and silt) encountered below the Made Ground in two locations.
- **Perched groundwater:** potentially three phreatic surfaces (at depths of about 1.0, 4.0 and 6.5 m) encountered within the monitoring wells.

The Made Ground and Till are unsuitable for foundation purposes (the latter as it does not form a consistent stratum across the site area), and therefore all foundations should be designed to transfer loads of the proposed development to the underlying bedrock, i.e. the Brithdir Member.

As the depth of the bedrock was found to be approximately 4.5 to 6.5 m below ground level (and may potentially be deeper beneath other parts of the site), it is considered that the industrial units to be constructed could be supported by piled foundations, extending to within the upper part of the Brithdir Member. As a possible alternative the designer may wish to consider a ground improvement technique, such as vibrated stone columns, such that spread foundations may then be constructed at a shallow depth.

Further advice on suitable pile types and lengths, and final working loads, or on the viability of ground improvement methods, should be sought from appropriate specialist contractors. They should be provided with a copy of this report, and their attention should be drawn to the ground and groundwater conditions at the site, together with the presence of trees. Potential volume changes in the shallow depth soils may affect the required depths and construction of piles, and the design of pile caps, which may need to incorporate gaps or compressible materials to allow for the expansion of soils. There may also be the need to sleeve the upper sections of piles to reduce friction with the soils. The recommendations of NHBC (2024) in respect of precautions to take when building near trees should be fully adopted in the design.

A pile foundation is likely to require a certain depth of penetration into the bedrock. The exact nature of the bedrock has been difficult to assess from the boreholes completed. It is possible that it consists of layers of relatively intact rock that has been broken up by the drilling process and brought to the



surface in a fragmented state, or that the materials penetrated by the boreholes are weathered or otherwise non-intact in situ, and from a design perspective may possess characteristics more of a coarse grained soil than solid rock. This should be considered by the pile designer, both in terms of the most appropriate geotechnical properties to use in design, and in method required for the piles to achieve a suitable penetrate of this stratum. If necessary, additional details of the in situ nature of rock could be obtained through rotary coring.

Due to the significant thickness of Made Ground all floor slabs should be suspended, or otherwise supported by the ground improvement methods noted above.

7.3 Chemical Considerations for Buried Concrete

7.3.1 Assessment Principles

Concrete used in foundations, or in any other structures in contact with the ground or groundwater, can deteriorate over time due to an aggressive chemical environment, particularly in respect of acidic conditions or the presence of sulphates. Water-soluble sulphates are especially important as they are more mobile, therefore increasing the likelihood of contact with sub-surface concrete. In certain geological strata sulphide minerals, such as iron pyrite, can also present a risk as they can potentially generate additional sulphates through oxidation, should they become exposed to air.

All buried concrete should be designed in accordance with the BRE Special Digest (SD1): 2005, to ensure it is suitably resistant to the chemical environment present. This Digest sets out a method for defining a 'Design Sulphate' (DS) class and an 'Aggressive Chemical Environment for Concrete' (ACEC) class for a selected location, based on the assessment of the following factors:

1. **Site setting:** whether the site is underlain by natural materials (or Made Ground derived from clean, natural materials), or otherwise by Made Ground that may contain chemical residues associated with industrial activities (i.e., a 'brownfield' site).
2. **Groundwater mobility:** Whether groundwater is likely to be mobile or relatively static.

3. **Sulphate concentrations:** Water-soluble sulphate (WS) in the ground and, where appropriate, in the groundwater beneath the site. Also, concentrations of magnesium where the site is considered to have a brownfield setting.
4. **Acidity:** pH levels in the ground and groundwater. Where pH is less than 5.5, concentrations of nitrate and chloride should also be assessed, as these may indicate the presence of nitric or hydrochloric acid, which would enhance any sulphate concentrations present.
5. **The presence of pyrite:** Where pyrite is suspected, the measurement of total sulphur (TS) and total (i.e., acid-soluble) sulphate (AS) should be undertaken. These are used to estimate concentrations of 'oxidisable sulphide' (OS) which, if substantial, can indicate the presence of pyrite. Where present, and where it might become exposed, the DS class may need to be determined from the 'Total Potential Sulphate' (TPS), which is derived from the TS content.

DS and ACEC classes are determined from the 'characteristic' values of WS, pH and, where applicable, TPS. Characteristic values are based on the worst-case measured values, the mean of the worst two values, or the mean of the worst 20% of values, depending on the size of the data set.

7.3.2 Laboratory Testing

It is considered that the relevant characteristics of this site are as follows:

- Due to its industrial history and presence of Made Ground, the site may be regarded as brownfield.
- The site is underlain by primarily Made Ground, namely colliery spoil.
- Pyrite may be present in the underlying strata (Brithdir Member).

The above site attributes have been used to devise the following laboratory test rationale:

- Five samples of Made Ground tested for pH value, WS, AS and TS.
- Two samples of Till tested for pH value, WS, AS and TS.
- Three samples of Brithdir Member tested for pH value, WS, AS and TS.
- One groundwater sample tested for pH and TS, as part of the chemical testing.



Testing included dependent options as required. The test results are summarised in Table 11, together with calculated values for TPS and OS, and characteristic values for pH, WS and TPS (see remarks).

TABLE 12 SUMMARY OF SULPHATE RELATED TEST RESULTS

PARAMETER	RANGE	CHARACTERISTIC VALUE	REMARKS
MADE GROUND (Colliery Spoil) – Five results			
pH	7.4 to 8.4	7.6	Characteristic value based on average of two lowest results.
WATER SOLUBLE SULPHATE IN SOIL (SO ₄ mg/l)	21 to 230	142	Characteristic value based on average of two highest results and rounded to nearest 100 mg/l.
ACID SOLUBLE SULPHATE (SO ₄ %)	0.03 to 0.09	0.09	Characteristic value based on average of two highest results and rounded to nearest 100 mg/l.
TOTAL SULPHUR (%)	0.03 to 0.34	0.21	Characteristic value based on average of two highest results and rounded to nearest 100 mg/l.
TOTAL POTENTIAL SULPHATE (SO ₄ %)	0.09 to 1.02	0.63	TPS estimated as three times the total sulphur concentration. Characteristic value based on average of two highest results.
OXIDISABLE SULPHIDE (%)	0.06 to 0.93	N/A	Oxidisable sulphide = TPS - total sulphur. One of the five tests gave a result exceeding 0.3%, indicating probable presence of pyrite.
ALL– Ten results			
pH	6.6 to 8.4	6.6	Characteristic value based on average of the lowest 20% of results.
WATER SOLUBLE SULPHATE IN SOIL (SO ₄ mg/l)	13 to 230	100	Characteristic value based on average of the highest 20% of results and rounded to the nearest 100 mg/l.
WATER SOLUBLE SULPHATE IN GROUNDWATER (SO ₄ mg/l)	22	22	Characteristic value based on single result available.
ACID SOLUBLE SULPHATE (SO ₄ %)	0.01 to 0.09	0.09	Characteristic value based on average of the highest 20% of results and rounded to the nearest 100 mg/l.
TOTAL SULPHUR (%)	0.01 to 0.34	0.3	Characteristic value based on average of the highest 20% of results and rounded to the nearest 100 mg/l.
TOTAL POTENTIAL SULPHATE (SO ₄ %)	0.03 to 1.02	0.89	Characteristic value based on average of the highest 20% of results and rounded to the nearest 100 mg/l.
OXIDISABLE SULPHIDE (%)	0.02 to 0.93	N/A	Oxidisable sulphide = TPS - total sulphur. Two of the ten tests gave a result exceeding 0.3%, indicating probable presence of pyrite. One in the Made Ground and another in the Brithdir Member.

7.3.3 Site Assessment

Based on the relevant site attributes, and adopting the characteristic values from the laboratory test data, as summarised above, the following DS and ACEC classes can be determined from Tables C1 and C2 in BRE (2005):

- The characteristic WS of 100 mg/l for the **Made Ground** suggests a DS class of **DS-1** can be used. However, one of the estimated OS concentrations in the Made Ground exceeded 0.3%, indicating the probable presence of pyrite. As such, where these materials are likely to become disturbed and exposed to air (in, for example, shallow excavations for pile caps), the DS class will need to be based on the characteristic TPS value, should this be higher than the DS class determined from the WS. In this case the characteristic TPS value of 0.63% indicates a DS class of **DS-2**. Despite the DS class based on the WS indicating DS-1, the worst case should be applied in this instance to ensure potential oxidation of sulphide bearing minerals during construction have been considered.
- Based on a DS class of DS-2 within the Made Ground, adopting a characteristic pH value of 7.6, and assuming a mobile groundwater regime, an ACEC class of **AC-2** is considered applicable. This may be adopted in the context of pile caps, for example.
- Where excavations or foundation options extend deeper than the Made Ground (for example piled foundations) and into the Brithdir Member, **all strata** test results need to be considered. Should the characteristic value for WS be used to determine the DS class, it would be **DS-1**. However, two of the estimated OS concentrations across all test results exceeded 0.3%, indicating the probable presence of pyrite in the Made Ground and Brithdir Member. Under such circumstances the DS class may be based on the characteristic TPS value. In this instance, the characteristic TPS value of 0.89% indicates a DS class of **DS-3**.
- Based on a DS class of DS-3 for **all strata** encountered, adopting a characteristic pH value of 6.6, and assuming a mobile groundwater regime, an ACEC class of **AC-3** is considered suitable.

The higher ACEC classes would be applicable in cases where foundation concrete would be in contact with materials that have been disturbed, and therefore aerated, by the construction process. BRE (2005) notes, however, that in the case of piled foundations, such disturbance and exposure to air is



less likely and, as such, the designer may wish to use the lower DS and ACEC classes based on the water-soluble sulphates, as discussed above.

7.4 Pavement Design

Two dynamic cone penetrometer tests were carried out to derive CBR values within the proposed areas for car parking in the southern area of the site underlain by soft standing. The tests were carried out from ground level.

The test results indicated equivalent CBR values generally between 63 and 74 % to depths of up to 0.31 m, with the CBR values increasing greatly beyond this depth, terminating at 0.36 and 0.49 m, respectively. The high values are as would be expected in the compact granular Made Ground encountered. Due to the heterogenous nature of the Made Ground, however, soft spots may be encountered, and further investigation is likely to be needed to confirm sufficient consistency across the relevant area of pavement construction. The CBR values from the two tests indicate that a CBR of about 10% should be acceptable for preliminary design purposes, although this assumption should be verified with further testing when the formation level has been established.

As there has been no update to the proposed location of the car parking facilities on site following receipt of the updated design drawings (drawing references ISU-EPT-XX-XX-DR-A-1201-P03 and ISU-EPT-XX-XX-DR-A-6201-P04), the results of the DCP tests are still applicable.

7.5 Sustainable Drainage Systems (SuDS)

Infiltration, or soakaway, testing was required for proposed SuDS design. For infiltration based SuDS to drain effectively the site surfacing and underlying ground conditions need to be free draining.

The findings of the ground investigation indicated the presence of shallow groundwater and Made Ground (colliery spoil) that is coarse grained in nature and potentially, therefore, of moderate permeability. Nevertheless, this gravel dominated material was found to be slightly clayey, which could affect the permeability / infiltration rate significantly. Shallow groundwater impacts the site suitability for discharge of water into the ground. In addition, colliery spoil can be subject to collapse compression (reduction in volume due to water level rises).



Two soakaway tests were carried out in the area of the proposed swale (as indicated on drawing A1278-100). The findings may be summarised as follows:

- No shallow groundwater was encountered in the 3.0 m deep pits.
- There was a steady amount of soakage initially, with both tests dropping below 75% effective soakage depth within an hour.
- The soakaway tests were terminated after 20 hours (SAG01) and 19.5 hours (SAG02), without reaching 25% effective soakage depth. No soil infiltration rate is able to be calculated for SAG02.
- SAG01 almost achieved 25% effective soakage depth so the data plot can be extrapolated and an estimated infiltration rate of 1.6×10^6 can be provided. Based on the rate of soakage SAG01 is estimated to have needed 31.5 hours in total (an additional 11 hours) for the water level to fall the final 0.06 m).

Local Authority provisions may limit the use of SuDS in Made Ground materials, and this should be considered before detailed design. The performance of the two infiltration rate tests show that the materials possess generally poor drainage characteristics, indicating that the site may not be suitable for a SuDS type solution.

Following completion of the ground investigation, updated drawings supplied to SOCOTEC indicate that the swales has been revised to comprise a water detention basin at the same location.

7.6 Foundation Construction

While detailed guidance on temporary works is beyond the scope of this report, it is recommended that the following general observations be taken into consideration.

- Excavation of Made Ground and superficial materials for the proposed foundations (for example, pile caps) should be generally within the scope of conventional backhoe excavators, although the dense nature of some of these materials, and the possible presence of very coarse particles (cobbles and boulders), should be considered.
- All open excavations should be made safe by suitable fencing around their perimeter, and excavation sides should be battered to an appropriate safe angle, or otherwise supported to



prevent failure. No entry to excavations should be undertaken without the development of a full risk assessment.

- Groundwater at the site is generally shallow. Should groundwater be encountered, or surface run-off be allowed to enter excavations, such water should be removed from excavations as soon as possible to avoid deterioration of the exposed materials. Sump pumping methods may be feasible, although as the granular material is likely to be of high permeability alternative methods, such as exclusion or groundwater lowering may be required, depending on the extent of the excavations required.

8 GEOENVIRONMENTAL ASSESSMENT

8.1 Assessment Basis

In line with existing legislation and the current regime for contaminated land, the site has been assessed using the tiered risk-based approach detailed in the Environment Agency's Land Contamination Risk Management Guidance. To undertake this assessment, it is necessary to define a conceptual model for the site that identifies the potential sources of contamination, the receptors and the pathways that can connect them. For there to be a risk from contamination, there must first be a source, a receptor, and a pathway by which the receptor can be exposed to the contaminant, i.e. a contaminant linkage. This assessment has been based on a conceptual site model initially developed in a desk study issued by SOCOTEC (Report No. H3091-23/G1, dated March 2024).

Following receipt of updated site plan drawings in July 2024 (drawing references ISU-EPT-XX-XX-DR-A-1201-P03 and ISU-EPT-XX-XX-DR-A-6201-P04) it should be noted that the revised development plan now includes a water detention basin in place of the swale as initially indicated in drawing reference A1278-100. There is also a waste storage area indicated on the revised plan, however this would fall within the considerations for a commercial development, therefore the CSM is still valid.

8.2 Potential Site Sources of Contamination, Pathways and Receptors

The desk study report covering the site area, noted in Section 8.1, included a preliminary conceptual site model (CSM) and risk assessment.

The CSM in the desk study identified the following potential sources:

- Made Ground used to create a raised platform, representing a potential source of metals, petroleum hydrocarbons, asbestos, acid and alkaline conditions.
- Organic matter in Alluvium (for example in the vicinity of the Afon Corrwg) and in Made Ground is a potential source of ground gases such as methane and carbon dioxide.
- Colliery spoil and waste deposition and / or coal mine gas emissions from disused shafts and workings. Presence, location and condition of mine entry caps are unknown.
- Leaking of cooling oils from electrical substation.
- Spills and leaks of substances stored and used in the production / process and release to ground and groundwater from current packaging industry.
- Content unknown - anecdotal evidence suggests water tank associated with former furniture manufacturing. Possible heating oil or process chemical storage.
- Spill / leaks of substances stored and used in the garage and release to ground and ground water i.e. new and waste oils, fuels and possibly paints and thinners associated with workshops.

Potential pathways were identified in the desk study as dermal contact, ingestion, the inhalation of contaminated dust, the downward migration of leachate to the groundwater, lateral migration and volatisation of contaminated groundwater, surface groundwater flow and the migration of ground gases.

The potential receptors were deemed to be the future land users, together with construction workers and subsequent maintenance workers, surface water and the groundwater beneath the site (Undifferentiated and Secondary A aquifers). It may be noted that, while offsite land users are unlikely to be in close proximity of any construction activities, they represent a potential receptor to any contaminated materials that might, for example, be exposed during and following construction and transported offsite as transient windborne dusts.

A preliminary risk assessment was incorporated into the CSM in the desk study, and this defined the majority of the risks as low, with the following exceptions for which the risk was assessed as moderate or moderate to low:



- Dermal contact with Made Ground aggregate impacting construction workers or future site users.
- Ground gases from natural organic soils or shallow mine working and coal seams emissions affecting construction workers or future site users.
- The inhalation and ingestion of contaminated dust affecting construction workers and future site users.
- Leaching and migration of mobile soil contamination and contaminated groundwater

The risk from radon gas at the site is shown in the desk study to be moderate. Basic radon protection measures are required as, based on British Geological Survey data, part of the site is in a higher probability radon area (between 5 and 10% of homes are estimated to be at or above the Action Level).

The preliminary CSM and risk assessment included in the desk study have been developed further, using the findings of the intrusive investigation and associated laboratory testing, and are presented in Appendix G.

8.3 Scope of Geo-environmental Investigation

8.3.1 General

The required *Scope of Works* was part of an email issued by NPT (dated 20 November 2023). The *Scope of Works* indicated that “final interpretive reports with enough information to allow the D&B contractor to fully design the building, external works and any SUDs required as their SAB applications dictates.”

8.3.2 Rationale

The ground investigation was designed by SOCOTEC to assess both geotechnical and geoenvironmental aspects of the site. From a geoenvironmental perspective the exploratory holes were positioned on a non-targeted basis. In the tender offer, the proposed geoenvironmental intrusive investigation was specified as follows:



- Five boreholes to provisional depths of between 5.00 and 6.00 mbgl, or bedrock, if encountered.
- Monitoring standpipes in three of the boreholes.
- Six gas monitoring visits to be carried out at fortnightly intervals.
- Chemical Laboratory testing.

Based on the above Scope of Works, and the general investigation objectives, SOCOTEC proposed the following laboratory testing rationale:

- One sample per position tested, targeting Made Ground plus natural where encountered.
- Test suites to include heavy metals and metalloids, US EPA 16 PAH, pH, cyanide, asbestos, TPHCWG and VOC.
- Groundwater testing (one per installation) to determine water quality and risk to receptors.

In addition, the monitoring visits were used as an opportunity to check gas concentrations in the monitoring pipes that had been installed.

8.3.3 Constraints

This geoenvironmental assessment is based on the data available at the time of writing.

- The location and the design of the borehole installations were provided by SOCOTEC. The response zones were generally set below groundwater levels, which suited the groundwater level monitoring and sampling, for which the installations were primarily intended. Selected shallow installations were intended for gas monitoring, however, the groundwater information recorded within these wells can also be utilised within the geotechnical assessment.
- The location and the design of the borehole installations were provided by SOCOTEC. Some response zones were set below groundwater levels, which suited the groundwater level monitoring and sampling, for which those installations were primarily intended. Shallow wells were designed for gas monitoring, as standpipes situated above the water table were required to assess potential ground gas risk and potential contaminant linkage.
- Due to unexpected ground conditions the investigation was carried out in phases. A fixed reporting period meant a reduced monitoring timeframe was available for the latest phase of work – installations within the cable percussion boreholes.

8.3.4 Post-investigation Monitoring Programme Rationale

A monitoring / sampling programme was undertaken to measure groundwater levels and ground gas concentrations (methane, carbon dioxide, and oxygen) in all the boreholes, and to recover groundwater samples. The monitoring programme was adjusted following visit 4 to accommodate the reporting program completion requirement of end March 2024.

- Eight gas monitoring visits, details per visit are summarised in Table 3
 - WSG01 – six gas monitoring visits completed, one with a reduced dataset due to water uptake.
 - CPG01 install 4 m – three gas monitoring visits completed.
 - CPG01 install 10 m – three gas monitoring visits completed.
 - GPG02 – no gas monitoring visits completed. Installation believed to be sealed within the bentonite not allowing any gas or groundwater entry.
- Two groundwater monitoring visits
 - 24 January 2024 – insufficient water to sample WSG01
 - 29 February 2020 - CPG01 install 10m sampled; CPG02 and WSG01 insufficient water to sample.

8.3.5 Zoning and Averaging Areas

For this geoenvironmental assessment, the site has been considered as a whole.

8.4 Generic Assessment Criteria

8.4.1 General

This section presents the second tier of assessment and uses generic qualitative risk assessment (GQRA) criteria along with assumptions detailed herein to evaluate the risks presented by the identified contaminant linkages to the future land-use receptors.

The GQRA involves comparing contaminant concentrations observed at the site with appropriate Generic Assessment Criteria (GAC) for the intended future land use, in order to identify contaminants



of concern and determine whether further assessment of risk or risk management is required. The assessment criteria used depends upon the source media and the receptor under consideration. The GACs are available for a number of receptor types and further description of SOCOTEC's adopted criteria are provided below.

8.4.2 Human Health Screening Criteria

On completion of the construction of new industrial units, the ongoing use of the site will be within an industrial estate. Therefore, for the assessment of potential risk, the land use scenario of 'Commercial' has been adopted.

The potential risks to human health in the intended end use have been evaluated using human health criteria comprising:

- Category 4 Screening Levels (C4SLs)
- Suitable for Use Levels
- Soil Guideline Values (SGVs)

A conservative approach using human health screening criteria derived with 1% SOM have been used. The actual range of values tested are 15 to >31.6 %.

In accordance with the requirements of the LCRM guidance, SOCOTEC have adopted the precautionary approach and where GACs for the contaminants have values in the more than one published document, C4SLs take precedent.

8.4.3 Controlled Water Screening Criteria

A preliminary Tier 2 assessment of the analysis results for the groundwater samples recovered has been undertaken, which has involved the comparison of groundwater sample concentrations against relevant screening values for the receptors listed below:

- Surface water – Afon Corrwg 110m northeast
- Groundwater (Undifferentiated aquifer of the Till and Secondary A aquifer of the bedrock).



The concentrations recorded in the groundwater samples have been compared to the UK Drinking Water Standards (DWS) and the Environment Agency's Freshwater Environmental Quality Standards (EQS) published in the document, The River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Directions 2015.

8.4.4 Ground Gases Screening Criteria

The ground gas risk assessment has been undertaken in accordance with British Standard BS8485:2015 and normative reference CIRIA C665 (CIRIA, 2007).

8.5 Risks to Human Health

The maximum recorded concentrations of contaminants in soils on site have been compared with the commercial C4SLs and, where C4SLs are not available, GAC (1% SOM) in Table G1 in Appendix G of this report.

This table shows that the concentrations of the contaminants of concern (CoCs) have all been recorded below the relevant GACs indicating that there is not, potentially, an unacceptable risk to human health, with regards to soil contamination, in the proposed future site use. No asbestos fibres were detected in any of the samples screened.

The assessment criteria referred to above are based on chronic risks and, therefore, are not strictly applicable to potential acute risks that would be relevant to construction or maintenance workers. Nevertheless, given the low contaminant concentrations found, the ground conditions encountered and the lack of a significant sources of contamination, the risk to construction and future maintenance workers is considered to be generally low. All potential occupational hygiene risk should be assessed by the contractor and controlled by an appropriate Construction Phase Safe Systems of work. Such controls are likely to include adopting good hygiene procedures and having a discovery strategy in place.

8.6 Risks to Adjacent Land Users

The potential pathways for dispersion of airborne contamination and the inhalation of transient dusts (which would allow off site migration of contamination) are unlikely to be active in the site's current state given the largely vegetated surface and low concentrations of contaminants in the site soil.



Levels of dust may increase during the construction phase works, whilst excavating and drilling through the soils although, given the generally low concentrations of contaminants in the predominantly natural soils, the likelihood of exposure is considered negligible.

There is a potential for offsite receptors to be exposed to contaminants in the groundwater, due to the lateral migration of groundwater through the site. This risk is assessed in the following sections.

8.7 Groundwater Contaminants

For the purposes of the generic risk assessment, groundwater samples have been assessed by comparison against adopted screening values for the groundwater receptor identified at the site (i.e., Undifferentiated and Secondary A B aquifers) and the river which may be in hydraulic continuity with the shallow groundwater.

The target concentrations (Ct) have been based on the Environmental Quality Standards (EQS), UK Drinking Water Standards (DWS).

To determine whether there is a source of contamination at a concentration posing a risk to the quality of controlled waters, contaminant concentrations recorded in samples of groundwater taken from borehole installations have been compared to their respective target concentrations (Ct) in Table G2 and G3 in Appendix G.

8.8 Risks to Controlled Waters

The assessment for the concentrations of contaminants in the groundwater at CPG01 recorded the following exceedances of the screening criteria:

- EQS:
 - Cadmium, Nickel, Zinc
 - Fluoranthene
- UKDWS:
 - No exceedances

8.9 Relevant Pollutant Linkages – Groundwater

The limited number of exceedances of the EQS values consist of cadmium, nickel, zinc and fluoranthene. The exceedances are only just above the relevant screening values.

The source of these elevated concentrations is unconfirmed as this installation is within the natural ground (Brithdir Member). It is unclear whether the slightly elevated metal concentrations are representative of the groundwater in the bedrock aquifer across the wider site area or restricted to the local area and have been impacted by the vertical migration of mobile metals and PAH leached from the site soil. Given the soil results were low across the site i.e. no potential source and the footprint of the site is very small in comparison to the wider industrial estate, it is considered unlikely that this is directly derived from the site soil. In addition, the proposed development plans show that the new construction will comprise hardstanding cover over most of the site area which is likely to sever the leaching pathway and significantly reduce the risk presented to groundwater and freshwater receptors.

The presence of a low permeability Till within this borehole may act as an aquitard and restrict migration into the shallow groundwater within the Made Ground. However, the Till appears to be discontinuous across the site and, as such, migration into or from other groundwater bodies may be possible.

The closest surface water body to CPG01 in which the EQS exceedances were found is the Afon Corrwg that runs a roughly 110 m to the north. However, it is unclear if the river is in hydraulic continuity with the natural groundwater in the bedrock aquifer. As noted within Section 5.6 there are potentially three phreatic surfaces, two within the Made Ground and one within the Brithdir Member (as with this water sample). Nevertheless results are considered likely to be in line with general background concentrations for the groundwater in the wider area and the river, and this could be assessed further by sampling and analysis of the river water, particularly upstream from the site.

8.10 Permanent Ground Gases

The assessment methodology detailed in British Standard BS8485 require the calculation of a Gas Screening Value (GSV), which considers the peak concentrations of methane and carbon dioxide with respect to the borehole flow rate. A 'characteristic situation' (CS) can then be determined from the calculated GSV. The site's characteristic situation then corresponds to a set of appropriate gas

protection score for the CS for a specific land use type or combination of types where there is a multipurpose development.

8.10.1 Summary of Investigation of Permanent Ground Gases

The investigation was scoped to study the gas regime of the site and assess the risk presented by any ground gases to construction works whilst excavating and conducting boring works in the construction phase (the overall risk is considered low to moderate). The below provides an overview of the results of the partial ground gas monitoring visits carried out following the ground investigation:

- Methane was not recorded above the limit of detection (0.1% v/v) on any of the monitoring visits.
- Carbon dioxide concentrations (0.2% and 0.4 % v/v) were recorded above the instruments limit of detection (0.1% v/v) at one monitoring installation (WSG01) on four occasions. Peak concentrations of between 2.1 to 9 % v/v were recorded within the two installations within CPG01.
- Significantly depleted oxygen (<10% v/v) was recorded in both CPG01 standpipes during the available monitoring visits. Close to atmospheric oxygen levels were recorded in WSG01 throughout the monitoring period.
- The maximum flow rate recorded in the monitoring programme was 0.2 l/hr.
- Ground gas monitoring was undertaken during periods of variable atmospheric pressures in the range 983 to 1007 mb; and
- Phased fieldwork resulted in one installation (WSG01) for the full monitoring period and a reduced monitoring period for the other installations (CPG01), limiting the ability to carry out gas monitoring.
- Fully saturated response zone within Brithdir Member.

8.10.2 Findings of Risk from Permanent Ground Gases

Based on the results of the monitoring visits carried out, the maximum recorded gas concentration was 9 % carbon dioxide.



In accordance with Table 4 of BS8485 for the proposed land use sensitivity as a large industrial /retail park style (Type D) the gas protection score and measures would be:

- Made Ground (worst case CPG01)
 - GSV methane = <0.001
 - GSV carbon dioxide = 0.009
 - CS 1, though with >5% carbon dioxide and depleted oxygen this should be CS 2.
 - Minimum gas protection score – 1.5
- Brithdir Member (CPG01 install 10m)
 - GSV methane = <0.001
 - GSV carbon dioxide = 0.01
 - CS 1, though with >5% carbon dioxide and depleted oxygen this should be CS 2
 - Minimum gas protection score – 1.5
- Radon
 - Basic radon gas protection measures required (in accordance with BRE BR211 Radon, ‘Basic Protection Measures’).
- Where a gas resistant membrane is required, it should meet the requirements specified in Clause 7.2.4 of BS8485.

The concentrations of ground gases appear to be reflective of the ground conditions encountered where generally moderate grade sources of ground gases such as Made Ground with a high organic content (colliery spoil) were encountered in some of the areas investigated. The monitoring within the Brithdir Member indicated a moderate source of ground gas, which may relate to a deeper coal gas source.

In general, the results are likely to be influenced by the low atmospheric pressure over which most of the readings were taken and the fully saturated response zone within the Brithdir Member (CPG01, 10 m). Potential longer term variations in ground gas conditions and worst case scenario pressure variations are therefore not represented.

Further ground gas monitoring visits and / or with continuous ground gas monitoring visits can provide confidence that the ground gas regime derived for the site is representative of the worst case scenario i.e. undertaken during critical variations in atmospheric pressure (as defined in CL:AIRE Technical Bulletin TB 17, ‘Ground Gas and Worst Case Conditions’).



Based on the gas regime and slightly elevated concentrations above 5% v/v of carbon dioxide (albeit with low peak flow rates which indicates a low generation potential and unlikely to initiate ingress), the limited ground gas data available to support otherwise and the radon risk, gas protection measures are recommend being installed in the proposed commercial development in accordance with Characteristic Situation 2 for a Type D building with a minimum gas protection score of 1.5 points.

The ground gas monitoring data shows elevated concentrations of carbon above the Work Exposure Limit (specified in HSE EH40). The elevated concentrations of carbon dioxide are considered to present a high potential risk to construction workers in confined spaces such as excavations and should be assessed and controlled as part of the contractor's risk assessment for the construction phase works.

8.11 Summary of Site Investigation Findings and Updated Conceptual Model

Following the GQRA, the Preliminary CSM provided in the preliminary risk assessment presented in the desk study report has been updated and refined as presented in Appendix G.

The ground investigation and subsequent assessment have not indicated levels of soil contamination that would represent an unacceptable risk to human health.

The analysis of groundwater samples has indicated slight exceedances of the EQS screening levels for cadmium, nickel, zinc and fluoranthene in CPG01. In general, the risk to surface waters (i.e., the Afon Corrwg) is considered generally low and representative of the wider groundwater conditions and is likely to be mitigated by the construction of hardstanding surfaces that will cover most of the site in the end development and sever the leaching pathway.

A review of the ground conditions, organic content of the Made Ground and potential sources of ground gas in the updated PCSM indicate the site is of low to moderate gas generation potential (i.e., considered unlikely to generate hazardous ground gases) and presents a moderate risk. A limited gas monitoring programme has indicated methane concentrations below the limit of detection and maximum carbon dioxide concentration of 9%. Further ground gas monitoring visits and / or with continuous ground gas monitoring and assessment can provide confidence that the ground gas regime derived for the site is representative of the worst case scenario i.e. has been undertaken during critical variations in barometric pressure.



These findings indicate that both radon and ground gas precaution measures are likely to be required to sever the ingress pathway and mitigate the potential risks presented to future site users by ground gases. It is recommended that gas protection measures for a gas regime CS2 (Type D development), 1.5 points are designed and installed by a suitably qualified contractor and comply with the requirements. A separate risk assessment for construction workers should be undertaken.

The remedial measures outlined in this report should be developed into a Remediation Strategy to document the design and installation of the gas protection measure in the proposed development. This should be submitted to the Local Authority and Environment Agency for comment and / or approval before proceeding with construction.

The potential risks presented to construction workers from contaminants in the ground and ground water, or from ground gases, are considered generally low, but should be assessed and controlled as part of the contractor's risk assessment for the works. Such controls may include confined space working arrangements such as excavations, wearing personal protective equipment such as gloves, providing welfare and washing facilities and maintaining good hygiene standards such as washing hands before eating, smoking/vaping or drinking after coming into contact with site soils.

Due to the limited nature of all site investigations and the constraints of the investigation identified, there always remains the possibility that previously undiscovered contamination may be encountered during the subsequent development of the site.

Revised development drawings were provided to SOCOTEC in July 2024 (drawing references ISU-EPT-XX-XX-DR-A-1201-P03 and ISU-EPT-XX-XX-DR-A-6201-P04), showing the proposed development essentially remains the same commercial development (with areas of soft landscaping, an area for waste storage and associated infrastructure) with no change to the sensitivity of the critical receptors, therefore the findings of the existing CSM are still applicable. The development would increase the area covered by hardstanding cover as present, as assessed in the original CSM, but it is understood permeable surface coverage (small areas of permeable block paving) are proposed in each carparking space to allow water ingress and percolation to occur rather than discharge to surface water drainage.

The revision of drainage design from a swale to a detention basin is a potential area of concern, as the proposed water detention basin may require deeper excavation into the Made Ground, which may



result in greater exposure of anthropogenic soils if it remains unlined. In addition, the depth of the revised drainage feature may not have been targeted sufficiently during the intrusive phase of works undertaken prior to the release of the updated site plans. There may also be additional human health risks to consider, which were not assessed as part of the refined CSM developed in accordance with the GI carried out.

Review of the investigation report shows that the area for the intended water detention basin has sufficient coverage (exploratory holes BH01, CPG01 and TP03), however based on the original development plan and CSM no samples of the deeper material were tested and assessed for potential contamination. A sample of colliery spoil taken from CPG02 at 4.0 m depth was tested and assessed and comprises similar material to that encountered in CPG01. Upon reviewing the composition of colliery spoil across the site, the colliery spoil encountered and tested from CPG02 can be considered representative of the colliery spoil in this area. As such the deeper Made Ground has been characterised and potential risk from exposed deeper soils has been assessed and considered within the refined CSM.

It is currently unknown if the water detention basin would allow percolation and increase leaching of site soils or if it will be lined and dispel collected water into a drainage system. If allowed to discharge to ground within the Made Ground, then the risks to controlled waters are increased compared to what has been assessed in the current refined CSM due to the risk of leaching contaminants to groundwater receptors. However, if the water detention basin is designed to act as a soakaway, allowing discharge of water directly into natural ground, then the likelihood of leaching contaminated soils to groundwater receptors is reduced. Further design information on the retention basin is required to confirm the point of discharge.

Furthermore, the replacement of a swale with a water detention basin would not increase the risk from ground gases, however the potential risk to construction workers involved in deeper excavation may be increased due to potential rapid migration of coal mine gases through the underlying bedrock and liberation from potential colliery spoil. The risk from ground gas is an occupational health risk and should be assessed in the Principal Contractor Risk Assessment and Method Statement (RAMS) and managed by their Safe Systems of Work (SSoW).



9 REFERENCES

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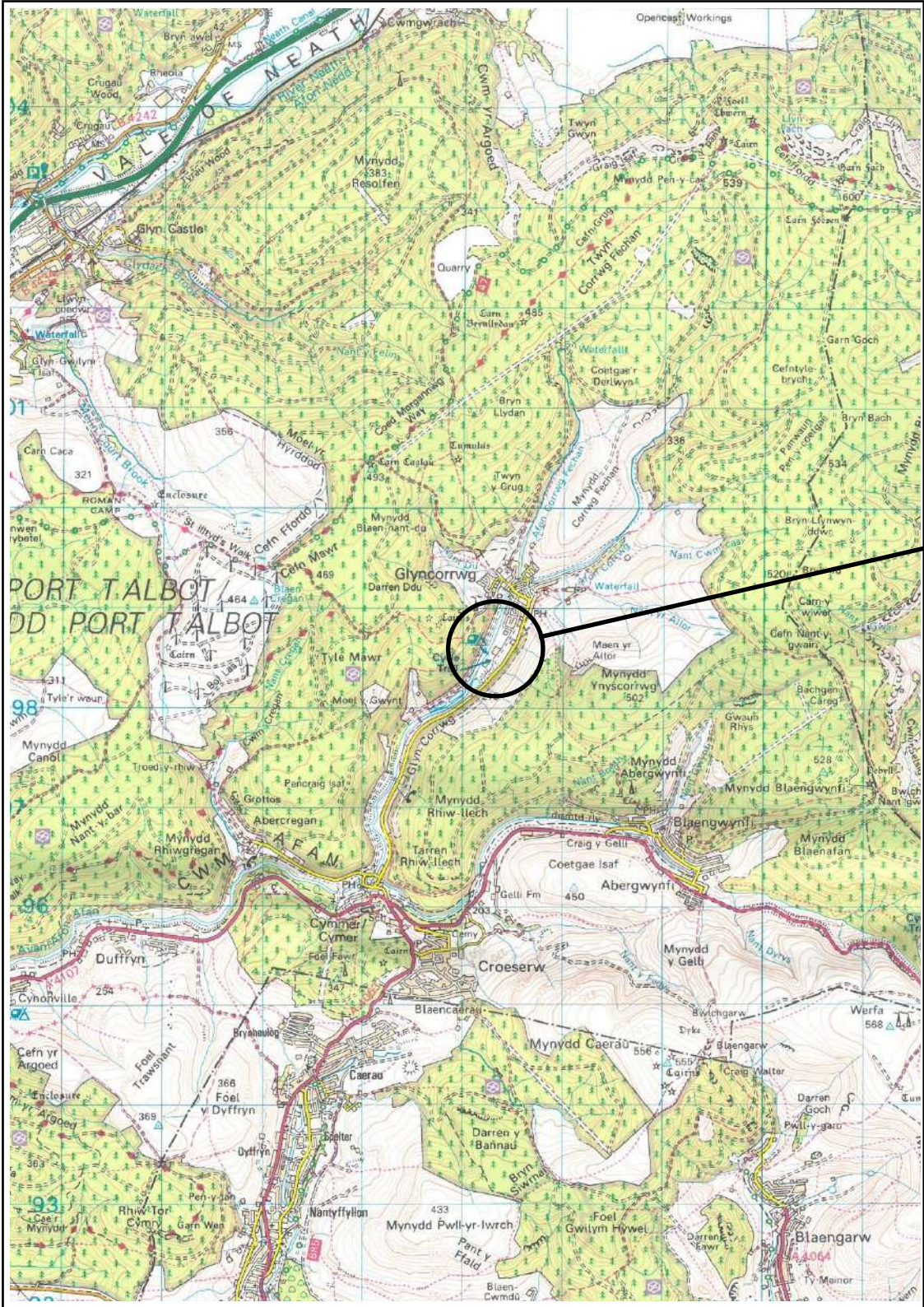


APPENDIX A

FIGURES AND DRAWINGS

Site Location Plan	A1
Exploratory Hole Location Plan	A2
Proposed Plan & Elevations – <i>from client</i>	A1279
Original Site Location Plan – <i>from client</i>	A1278
Updated Site Location Plans – <i>from client</i>	ISU-EPT-XX-XX-DR-A-1201-P03 and ISU-EPT-XX-XX-DR-A-6201-P04
Cross Section Plan	A3
Cross Section	Section 1
SPT N Value - Level Profile	Figure A4
Plasticity Chart	Figure A5

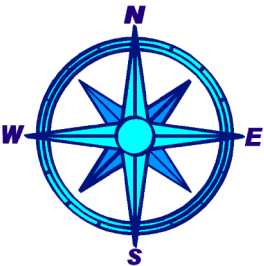
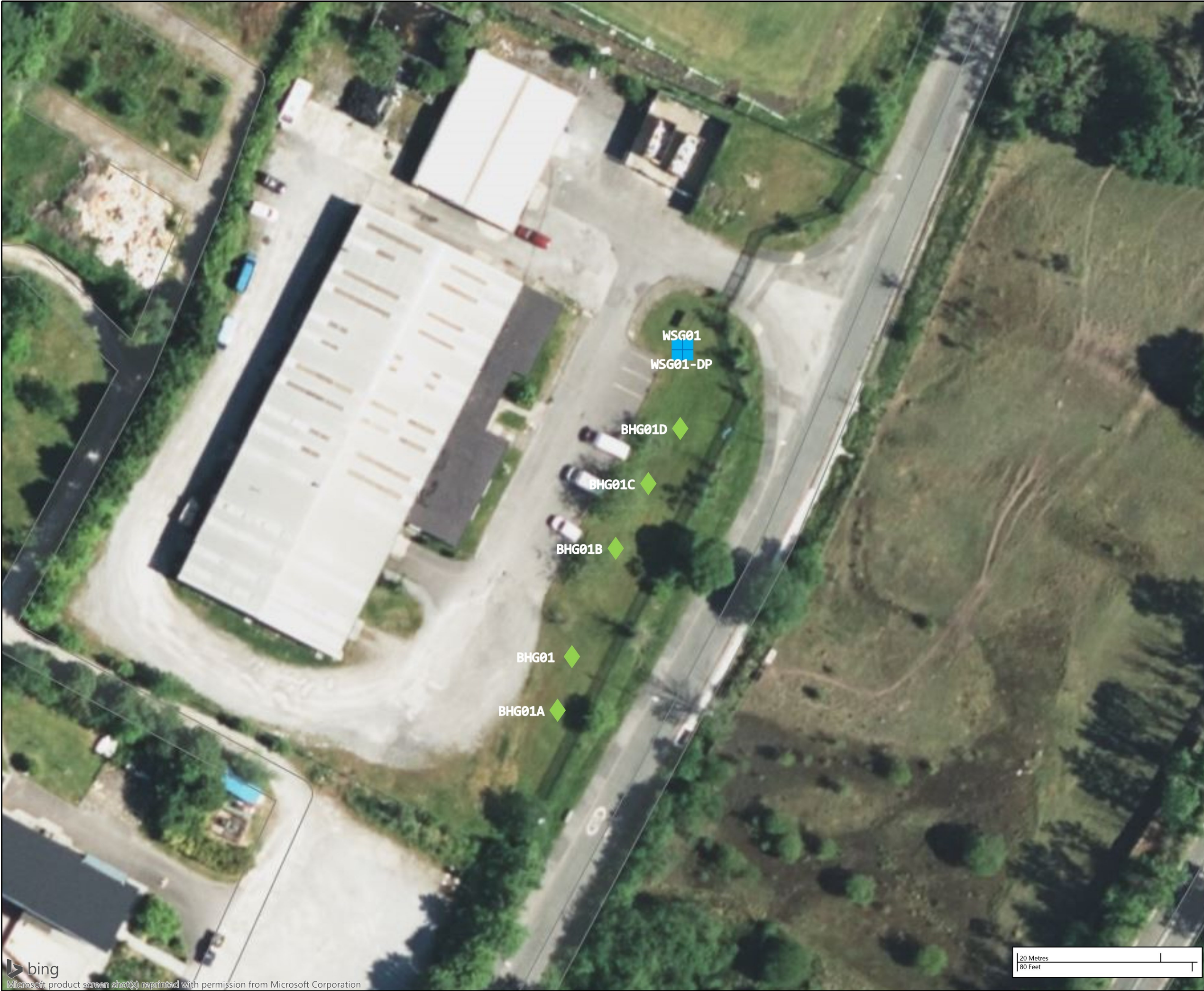
Site Location Plan



THE
SITE

Reproduced from the 1996 Ordnance Survey 1:50 000 scale Landranger Map No 166 by permission of Ordnance Survey on behalf of The Controller of His Majesty's Stationery Office, © Crown copyright, SOCOTEC UK Limited. All rights reserved. Licence Number 100006060

Notes: Scale 1:50 000	<table><tr><td>Project</td><td>Glyncorrwg Industrial Units</td></tr><tr><td>Project No.</td><td>H3091-23/G</td></tr><tr><td>Carried out for</td><td>NPT</td></tr></table>	Project	Glyncorrwg Industrial Units	Project No.	H3091-23/G	Carried out for	NPT	<table><tr><td>Figure</td><td>A1</td></tr></table>	Figure	A1
Project	Glyncorrwg Industrial Units									
Project No.	H3091-23/G									
Carried out for	NPT									
Figure	A1									



Notes:
Site Plan created using Professional
incorporating Bing Maps included under
licence with Bentley Ltd.

Scale:
1:500

Surveyed By:
SOCOTEC Uk Limited

Surveyed Date:
03/01/2024

Key:
 Dynamic sample borehole with dynamic probe follow-on
 Inspection Pits

EXPLORATORY HOLE
LOCATION PLAN

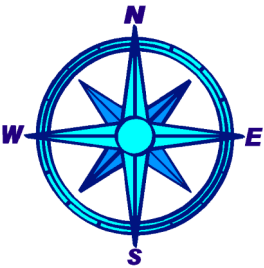


Project ID:
H3091-23_G

Project Title:
Glyncorrwg Industrial Units

Client:
Neath & Port Talbot County Council

Figure:
A2-1



Notes:
Site Plan created using Professional
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Scale:
1:500

Surveyed By:
SOCOTEC Uk Limited

Surveyed Date:
31/01/2024

Key:
● Cable percussion borehole
◆ Trial Pits

EXPLORATORY HOLE
LOCATION PLAN

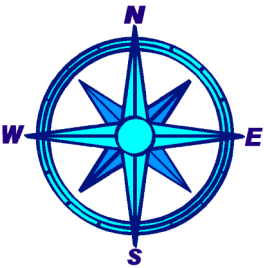


Project ID:
H3091-23_G

Project Title:
Glyncorrwg Industrial Units

Client:
Neath & Port Talbot County Council

Figure:
A2-2



Notes:
Site Plan created using Professional
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Scale:
1:500

Surveyed By:
SOCOTEC Uk Limited

Surveyed Date:
13/05/2024

- Key:
- Dynamic cone penetrometer test
 - Soakaway trial pits

EXPLORATORY HOLE
LOCATION PLAN

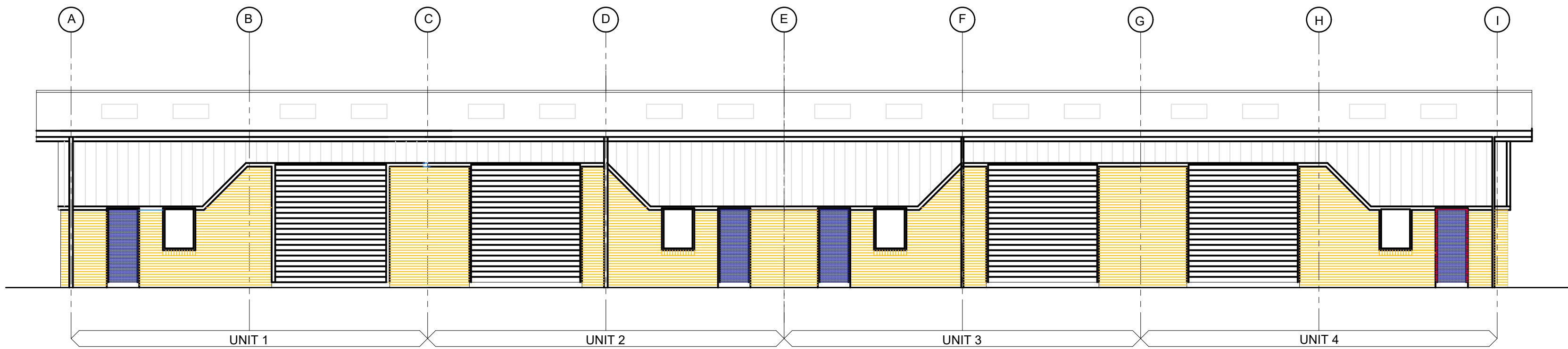


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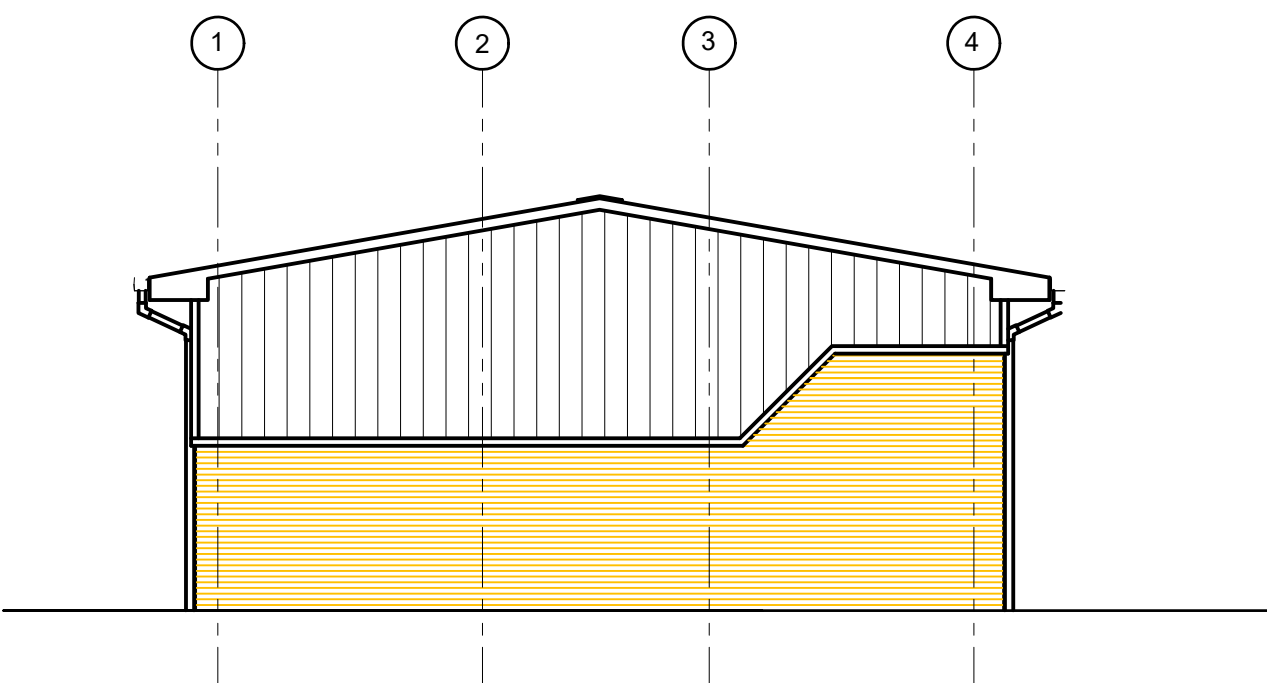
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Glyncorrwg Industrial Units

Client:
Neath & Port Talbot County Council

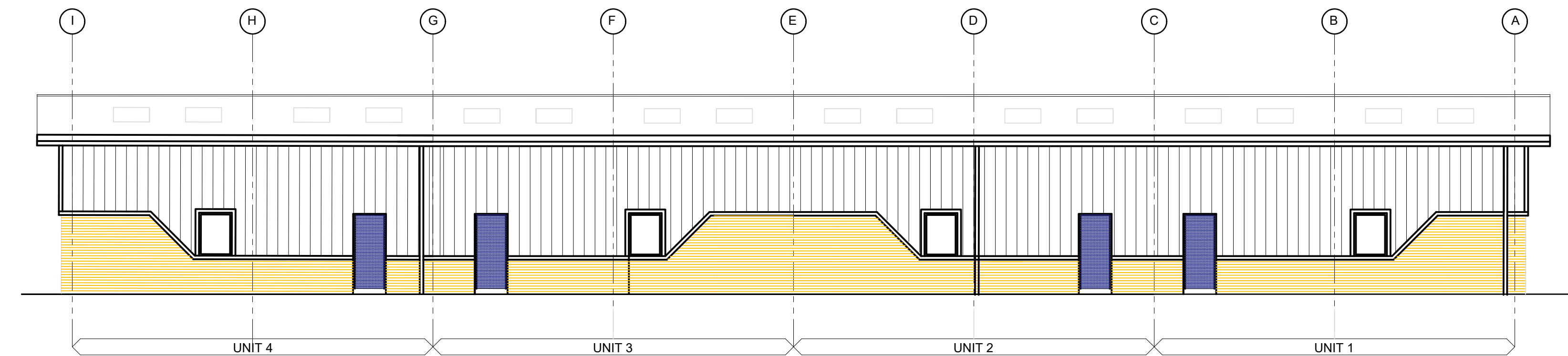
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A2-3



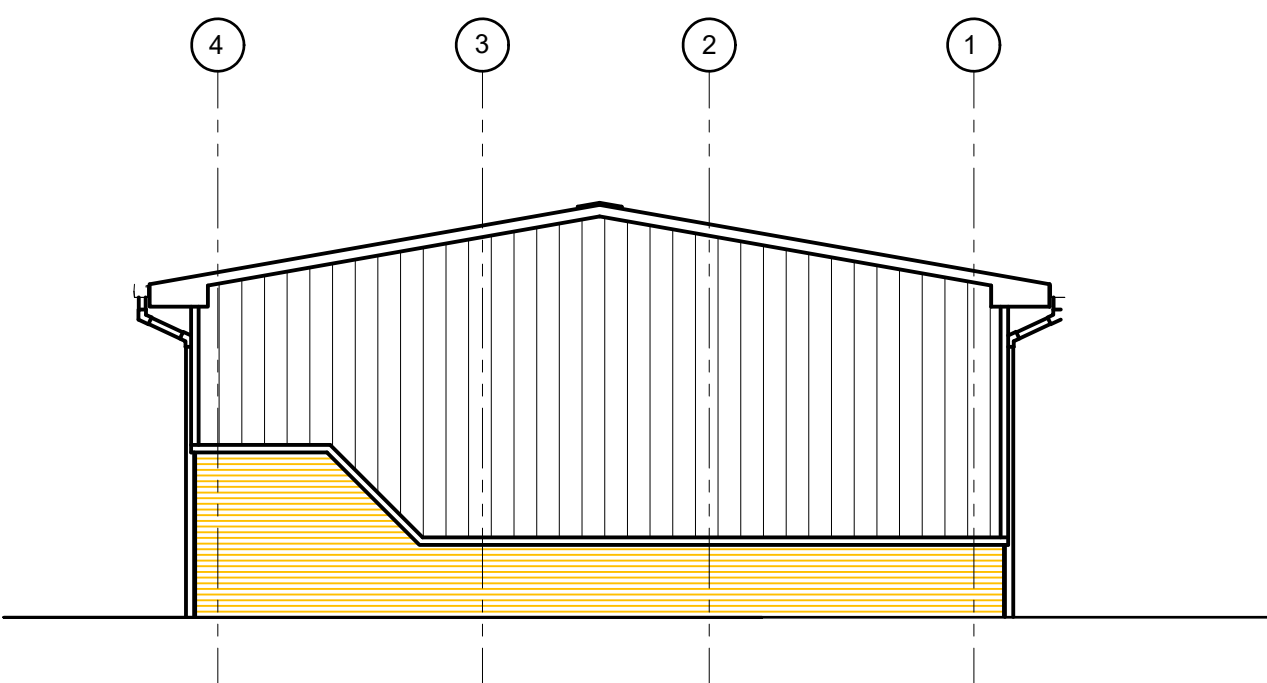
FRONT ELEVATION



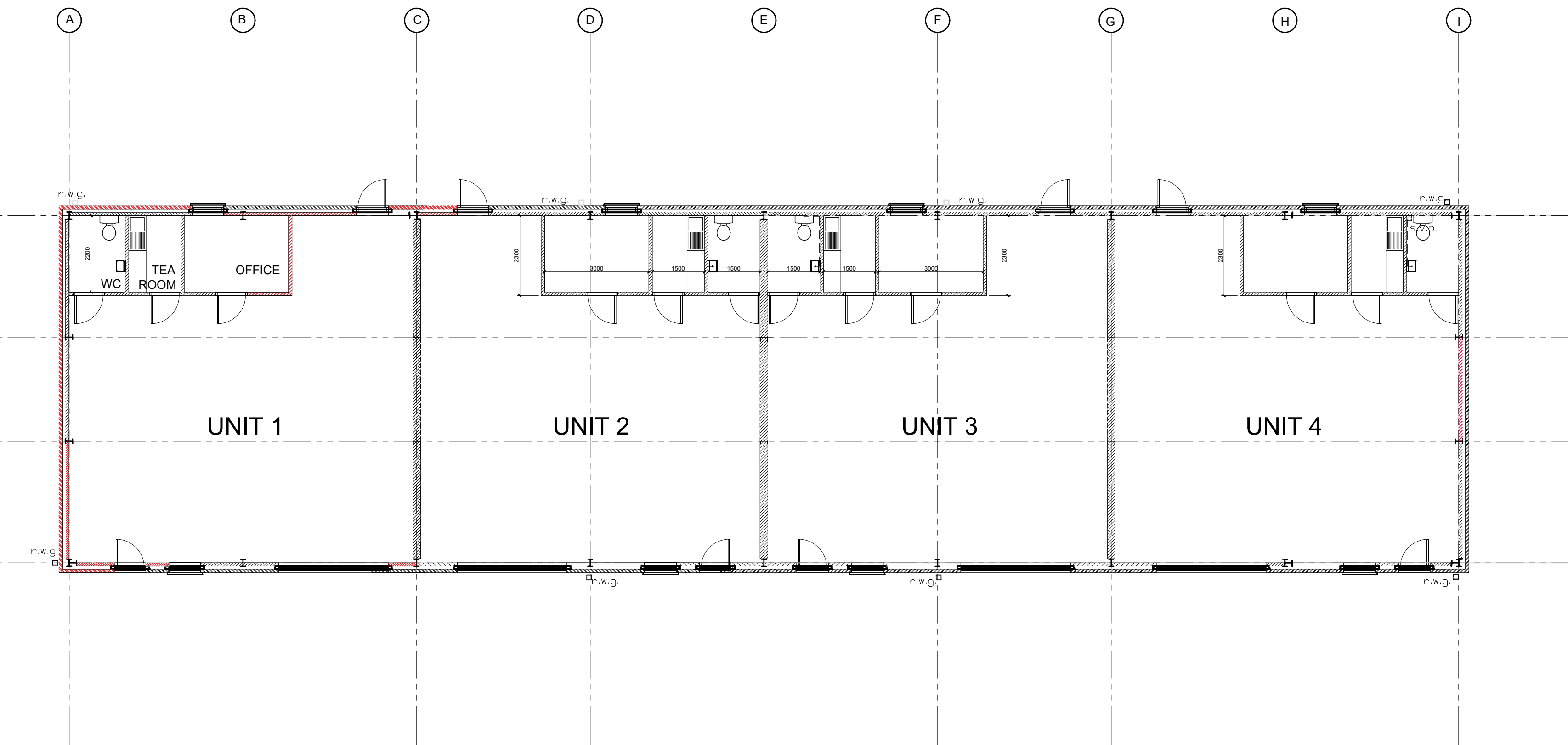
SIDE ELEVATION



REAR ELEVATION



SIDE ELEVATION



EXTERNAL FINISHES

- External walls - Approved Face brickwork and European Profile powder coated insulated wall cladding with colour code trims.
- Roof - European Profile powder coated insulated roofing sheets to match wall cladding with European Profile translucent rooflights inset as shown.
All rain watergoods to be colour coded steel.
- Windows & Doors - Powder coated steel / aluminium to match colour coded trims etc.
Powder coated steel roller shutter doors to match all doors and windows.

NOTES

1. All dimensions in millimetres unless otherwise stated.

Rev	Details	Dr	Ch	Apr	Date
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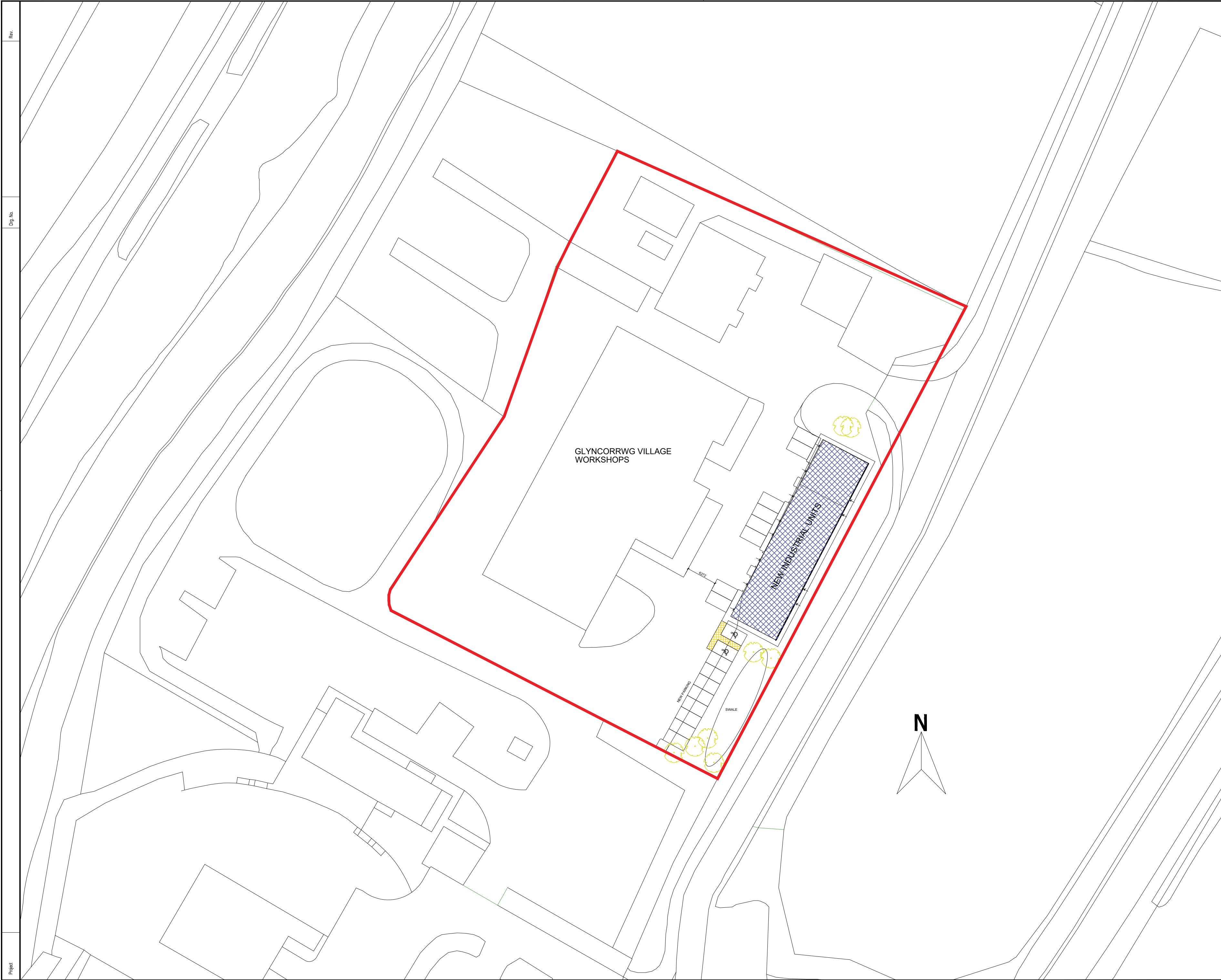


PROPERTY & REGENERATION
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DIRECTOR OF ENVIRONMENT AND REGENERATION
THE QUAYS, BRUNEL WAY
BAGLAN ENERGY PARK SA11 2GG
www.npt.gov.uk

Project
NEW INDUSTRIAL UNITS
CWMGORS WORKSHOPS
CWMGORS

Drawing Title
PROPOSED PLAN & ELEVATIONS

File No.		Property Ref. No.			
Drawn	WGH	Checked		Approved	
Date	APR 23	Date		Date	
Scales	1:100@A1				
Drawing No. A1279 - 101					Rev.



Rev.	
Dwg. No.	
Project	

NOTES

1. All dimensions in millimetres unless otherwise stated.

Rev	Details	Dr	Ch	Apr	Date
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Neath Port Talbot

Castell-nedd Port Talbot

County Borough Council Cyngor Bwrdeistref Sirol

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Project

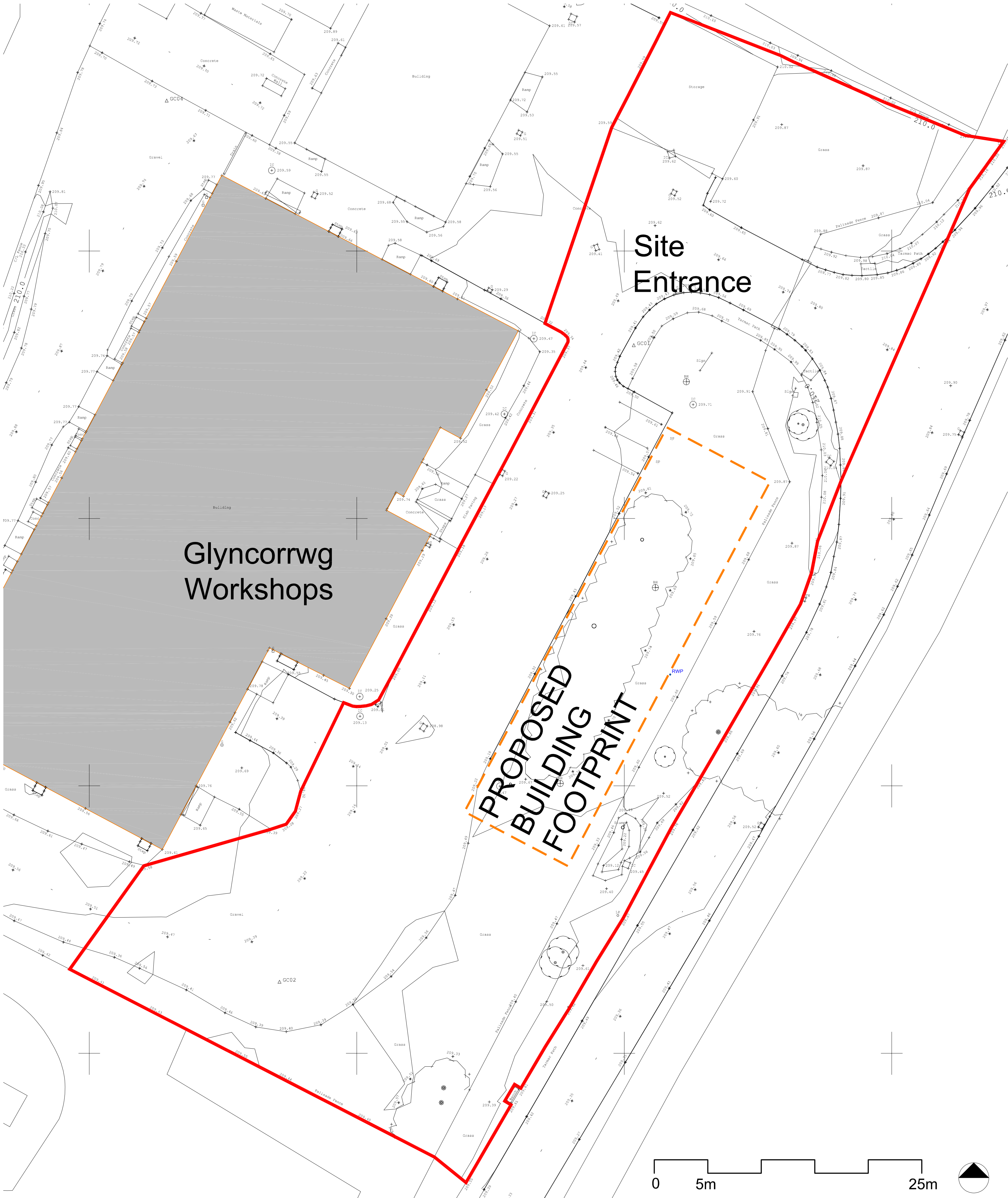
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GLYNCORRWG VILLAGE WORKSHOPS
GLYNCORRWG

Drawing Title

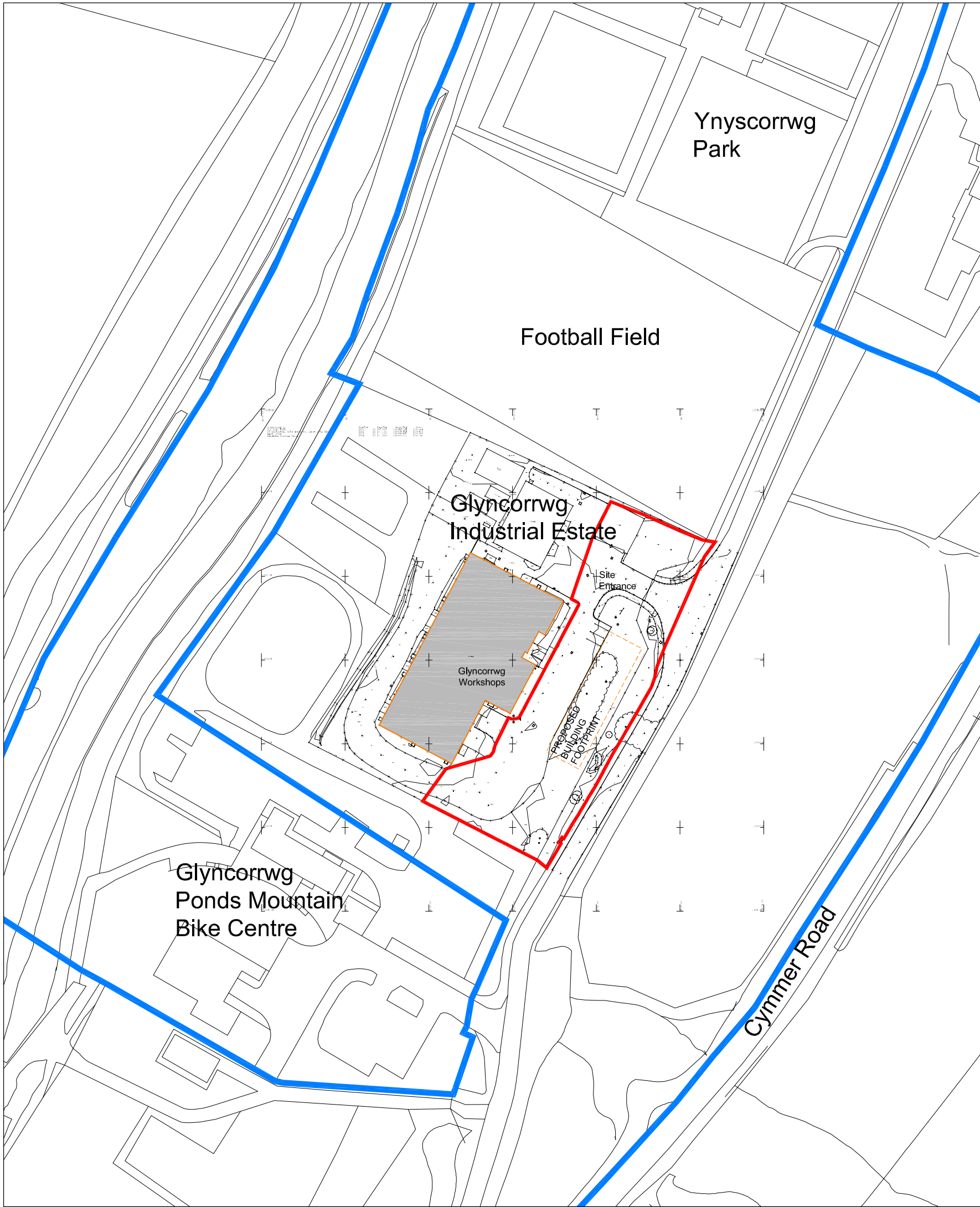
SITE LOCATION PLAN

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Drawn	WG	Checked		Approved	
Date	APR 2023	Date		Date	
Scales	1:500@A2				
Drawing No.	A1278 -100	Rev.			

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Existing Site Plan 1:200



Site Location Plan 1:1250

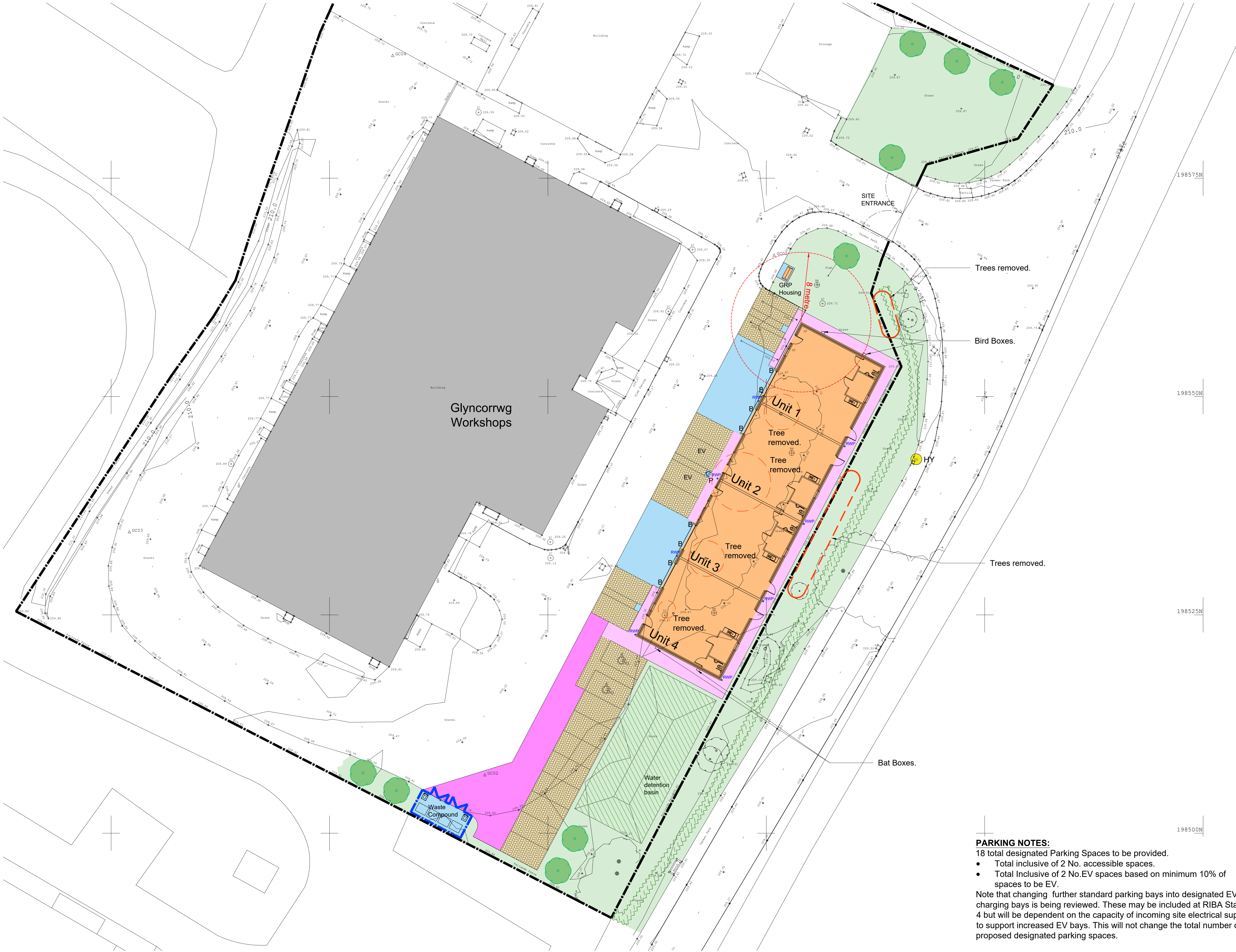
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KEY

— Proposed site works area
3500m² (0.35 hectares)

— Site ownership

P03	Planning Issue	27/06/24	MT
P02	Planning Issue	20/06/24	MT
P01	Stage 3 Issue	29/05/24	MT
No.	Revision Description	Date	By
EPT PARTNERSHIP CHARTERED ARCHITECTS			
Client: Andrew Scott Ltd			
Project: NPT New Industrial Units			
Drawing Title: Site Location Plan Glyncorrwg			
Status: Work in progress			
Scale : As Indicated		Original sheet size : A1	
Project	Originator	Functional Breakdown	Spatial Breakdown
ISU - EPT -	XX -	XX -	DR - A - 1201 - P03
EPT internal project ref.	Drawn by:	Checked by:	Exported from model:



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- GENERAL NOTES**
- Site M&E services - refer to M&E drgs
 - Site drainage - refer to Civils drgs
 - Site setting out & levels - refer to Civils drgs
 - Hard landscaping details - refer to Civils drgs
 - Soft landscaping - refer to landscape drgs

- ACCESS NOTES**
- All slopes along footpaths no steeper than 1:21
 - Level access provided at personnel/fire door and vehicle access door locations.

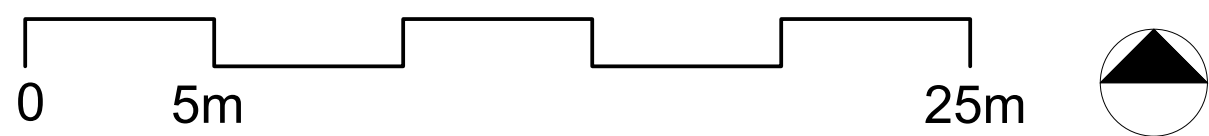
- H&S NOTES**
- ⚠ Site Hazards Identified:
1. Site adjacent occupied workshop site. Careful management of deliveries to works area and site works boundary to be fenced off securely at all times to prevent unauthorised access.
 2. Multiple below ground drainage and services including power within and around the proposed works site. Refer to underground utilities survey for below ground services locations.

- KEY**
- Proposed site works area
 - Existing buildings
 - Proposed New buildings
 - Proposed impermeable tarmac footpath. Refer to Civils drgs for details
 - Proposed impermeable tarmac carpark. Refer to Civils drgs for details
 - Proposed permeable block paving. Refer to Civils drgs for details.
 - Proposed concrete. Refer to Civils drgs for details. Access and Loading/Unloading only. No storage or work activities externally.
 - Existing/ proposed soft landscaping. Refer to landscape drgs
 - Proposed planting. Refer to landscape drgs
 - Proposed water retention features indicatively shown. Refer to specialist drawings for details
 - New trees indicatively shown. Refer to landscape drgs
 - Existing Palisade fence and gates to be retained
 - 1930mm high Eco weldmesh fencing and gates. Galv. steel powder coated. Colour: Black TBC by Client
 - RWP New square anti-climb PPC aluminium rainwater pipes shown indicatively
 - HY Existing Fire Hydrants
 - B Vehicle Bollards
 - P Pod point electrical vehicle charging
 - Indicates 8 metre distance from building for fire separation of waste storage.

PARKING NOTES:
18 total designated Parking Spaces to be provided.

- Total inclusive of 2 No. accessible spaces.
- Total Inclusive of 2 No.EV spaces based on minimum 10% of spaces to be EV.

Note that changing further standard parking bays into designated EV charging bays is being reviewed. These may be included at RIBA Stage 4 but will be dependent on the capacity of incoming site electrical supply to support increased EV bays. This will not change the total number of proposed designated parking spaces.

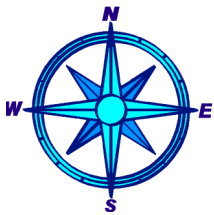


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P03	Planning Issue	27/06/24	MT
P02	RIBA Stage 3 Issue	29/05/24	MT
P01	Initial Issue	23/05/24	MT
No.	Revision Description	Date	By
EPT PARTNERSHIP CHARTERED ARCHITECTS			
Client: Andrew Scott Ltd			
Project: NPT New Industrial Units			
Drawing Title: Proposed Site Plan Glyncorrwg			
Status: Work in progress			
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Project	Originator	Functional Breakdown	Spatial Breakdown
ISU - EPT -	XX -	XX -	DR - A - 6201 - P04
EPT internal project ref: 11298	Drawn by: MT	Checked by: MT	Exported from model: Autocad native file



SOCOTEC

Cross Section Plan



Notes:
Site Plan created using
Professional incorporating
Bing Maps included under
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Scale:	Sheet Size:
1:500	A4

Surveyed By:

SOCOTEC Uk Limited

Surveyed Date:

03/01/2024

Key:

Legend Key

Sections - Section line 1

Project	Glyncorwg Industrial Units
Project No.	H3091-23_G
Carried out for	Neath & Port Talbot County Council

Figure:

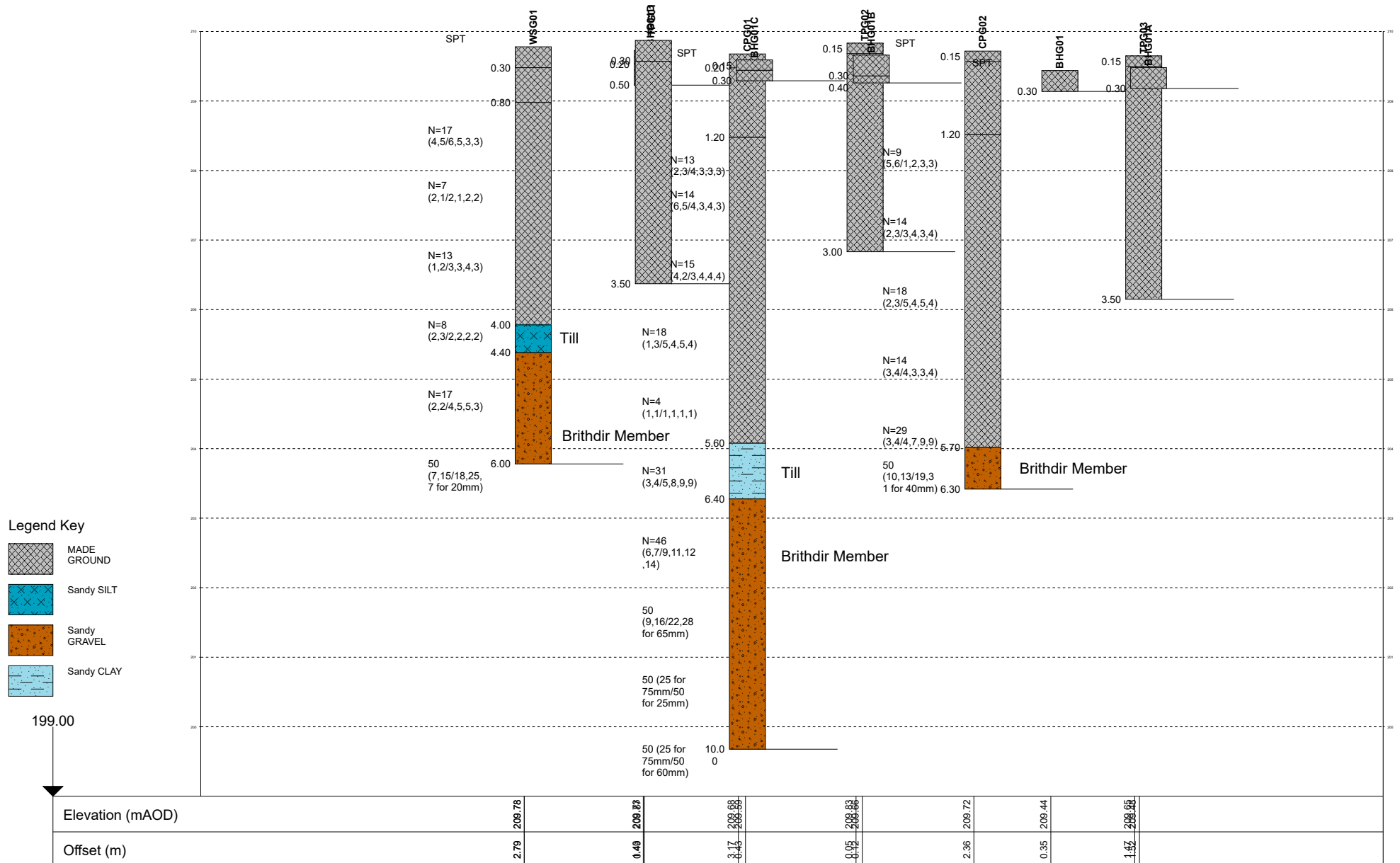
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Section 1

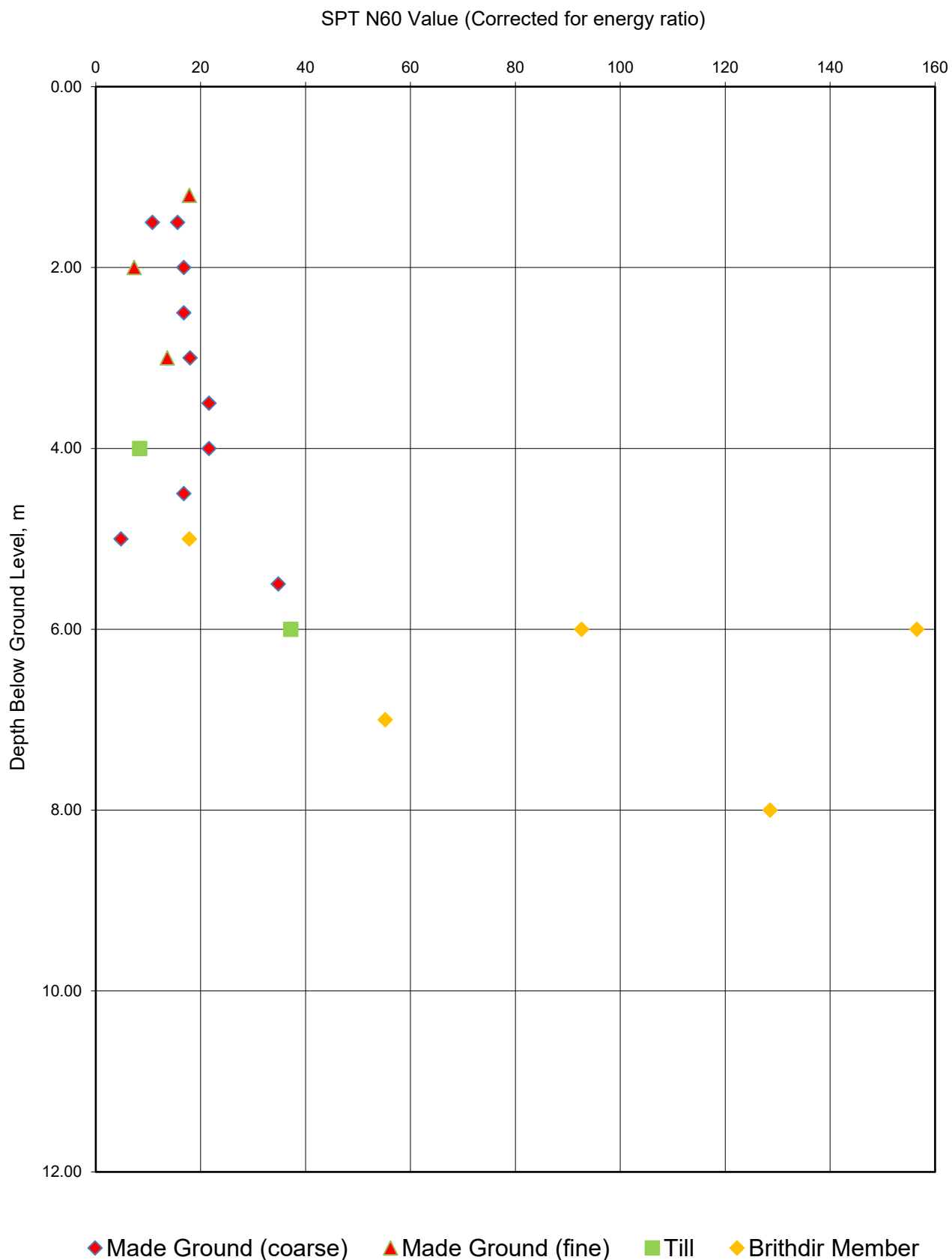
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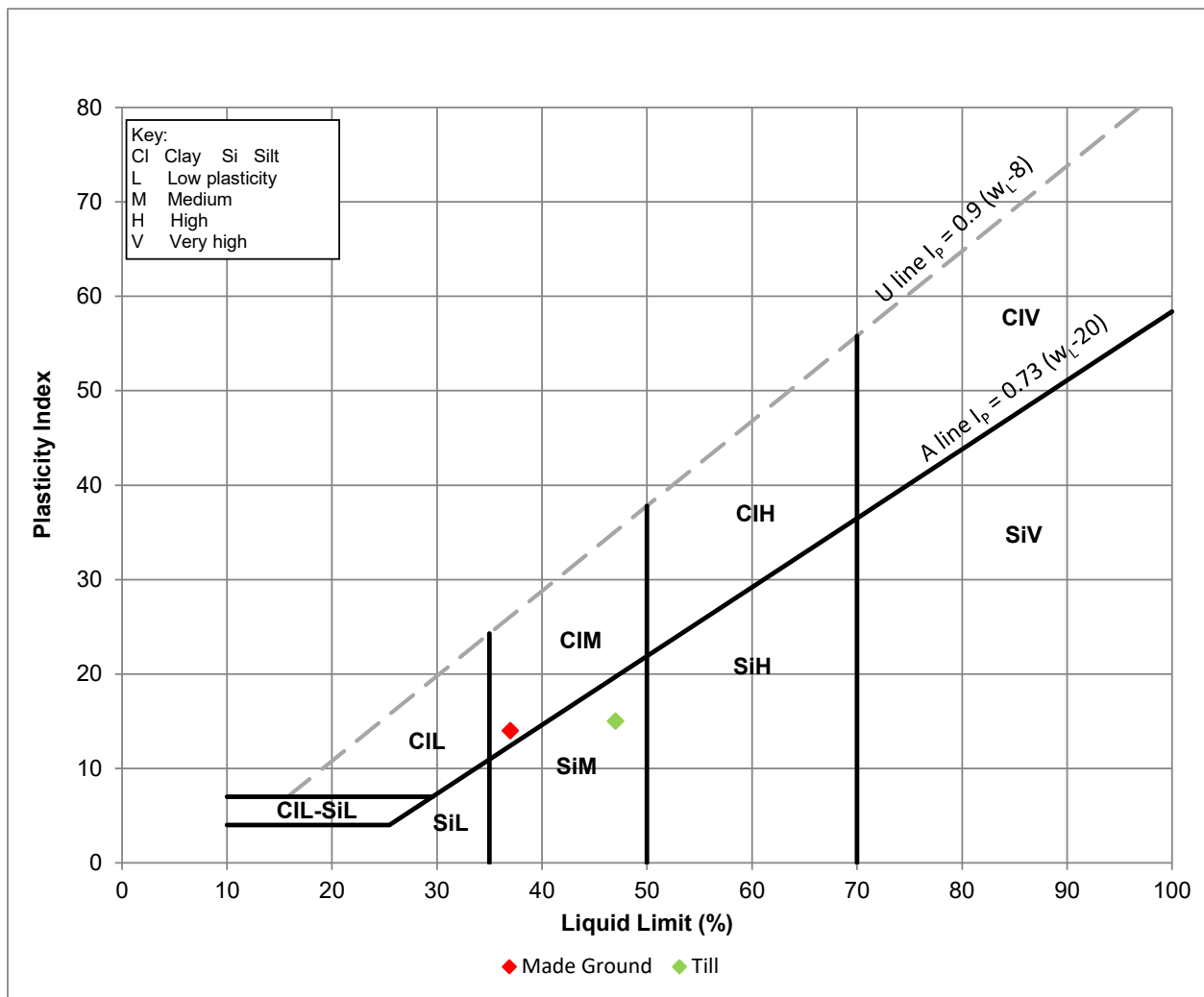
Engineer : Neath & Port Talbot County Council



SPT N Value - Depth Profile



Plasticity Chart



Notes:

Project Glyncorrwg Industrial Units
Project No. H3091-23_G
Carried out for Neath & Port Talbot County Council

Figure

A5



APPENDIX B

EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
Hammer Energy Ratio Certificates	LEGACYST; SAM1
Inspection Pit Logs	BHG01 to BHG01D
Borehole Logs	CPG01 and CPG02
Trial Pit Logs	TPG01 to TPG03, SAG01 and SAG02
Borehole Logs (Dynamic Sampling)	WSG01
Dynamic Probing Log	WSG01-DP

Key to Exploratory Hole Records

SAMPLES

Undisturbed

U	Driven tube sample	} nominally 100 mm diameter and 100% recovery unless otherwise stated
UT	Driven thin wall tube sample	
TW	Pushed thin wall tube sample	
P	Pushed piston sample	
CBR	CBR mould sample	
BLK	Block sample	
C	Core sample (from rotary core) taken for laboratory testing.	

Disturbed

D	Small sample (including samples recovered from SPT)
B	Bulk sample
LB	Large Bulk sample (comprising more than one container as required)

Other

W	Water sample	
G	Gas sample	
ES	Soil sample	} Environmental chemistry samples (in more than one container where appropriate)
EW	Water sample	

Comments to samples

Sequential sample reference numbers are assigned to every sample taken during hole construction.

NR - No Recovery. Used where tube sampling has been attempted but no sample obtained (for whatever reason).

Samples not shown on exploratory hole logs:

- subsamples / specimens taken for on-site testing, eg point load testing
- samples taken from borehole installations (ie water or gas) after hole construction

DYNAMIC SAMPLING

DYS	Dynamic sampling range showing tube / liner recovery (rec.) and diameter. Material retained as separate samples.
L	Retained complete liner sample (with sample reference number)

IN SITU/FIELD TESTS

SPT S or SPT C	Standard Penetration Test, open shoe (S) or solid cone (C). The Standard Penetration Test is defined in BS EN ISO 22476-3:2005+A1:2011. The open shoe configuration is used without a sample liner unless shown otherwise. Samples recovered by SPT open shoe are shown as type D. The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self-weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach the limiting value (usually 50) the total blow count beyond the seating drive is given (without the N = prefix). See Note 7 also.
IV	<i>in situ</i> field vane shear strength, peak (p) and remoulded (r), kPa
HV	Hand vane shear strength, peak (p) and remoulded (r), kPa
PP	Pocket penetrometer test, converted to shear strength, kPa
KFH, KRH, KPI	Permeability tests : KFH = falling head, KRH = rising head, KPI = packer inflow (water pressure test). Results presented on separate report sheets.
PID	VOC concentration using hand-held photo-ionisation detector, ppmv

DRILLING RECORDS

Classification of discontinuity state - as defined in BS 5930:2015+A1:2020

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm - presented as minimum, mode (or 'typical' value) and maximum spacing.
FI	Fracture Index - presented as number of fractures per metre.
NI	Non-intact - used to indicate where the core is fragmented (ie non-Solid Core).
NA	Not-applicable - used where a measurement is inappropriate (eg for non-rock materials, zones of no recovery)
NIDD	Non-intact Drilling Induced – used to indicate where rock believed to be non-fractured in the ground has been recovered as Non-intact due to the drilling process. (Used only where specified)
NDP	No Discontinuities Present – used to indicate where core is non-fractured. (Used only where specified as alternative representation to showing a single If value for the depth range of non-fractured core.)
CRF	Core Recovered in the Following run (length in m) – used to indicate length adjustment to TCR (and SCR, RQD and If accordingly) where slipped/dropped core from a core run has been recovered in the subsequent run.
AZCL	Assessed Zone of Core Loss – used to indicate estimated depth range corresponding to core loss (for TCR<100 %). Assumed to be at the start of the core run where no judgement is possible. Not shown for core loss less than 5 %.
Flush returns – presented as estimated percentage in the Records column, with colour where relevant.	

Key to Exploratory Hole Records

GROUNDWATER



Groundwater entry



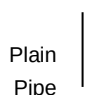
Depth to groundwater after observation period

INSTALLATIONS

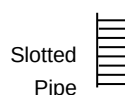
Any installations are shown on the Exploratory Hole Record in the rightmost Backfill column with appropriate graphic.

Standpipe/ piezometer

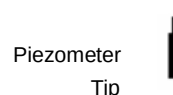
SP	Standpipe
SPIE	Standpipe piezometer
PPIE	Pneumatic piezometer
EPIE	Electronic piezometer



Plain
Pipe



Slotted
Pipe



Piezometer
Tip

Inclinometer or Slip Indicator

ICE	Biaxial inclinometer
ICM	Inclinometer tubing for use with probe
SLIP	Slip indicator



Pressure Cells

Settlement Points

ESET	Electronic settlement cell/gauge
ETM	Magnetic extensometer settlement point



EPCE	Electronic embedment pressure cell
PPCE	Electronic push-in pressure cell



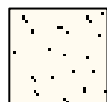
INSTALLATION / BACKFILL LEGENDS

A legend describing the installation is shown in the rightmost column. Legend symbols used to describe the backfill materials are indicated below.

Macadam



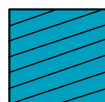
Concrete



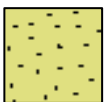
Grout



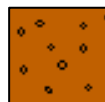
Bentonite



Sand



Gravel



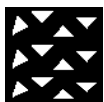
Arisings



STRATUM LEGENDS

The legend symbols used for graphical representation of soils, rocks and other materials on the borehole logs are shown below. For soils with significant proportions of secondary soil types, a combination of two or more symbols is used. Note that the Made Ground / Fill stratum legend does not differentiate between engineered and non-engineered anthropogenic materials.

Macadam



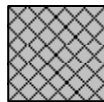
Concrete



Topsoil



Made Ground / Fill



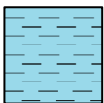
Peat



Void or No Information



Clay



Silt



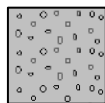
Sand



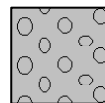
Gravel



Cobbles



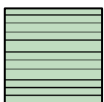
Boulders



Coal



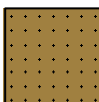
Mudstone



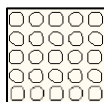
Siltstone



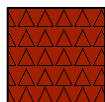
Sandstone



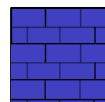
Conglomerate



Breccia



Limestone



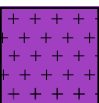
Chalk



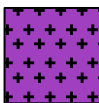
Igneous
(Fine)



Igneous
(Med)



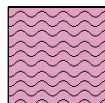
Igneous
(Coarse)



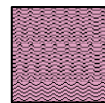
Metamorphic
(Fine)



Metamorphic
(Med)



Metamorphic
(Coarse)



Tuff



Key to Exploratory Hole Records

NOTES

- 1 **Geological materials** are described in accordance with BS 5930:2015+A1:2020, which is compliant with BS EN ISO 14688-1:2018 and 14689-1:2018 for soils and rocks respectively.
- 2 The **consistency** determined during description for fine soils (clay and silt) is reported for strata where undisturbed samples are available. Where the logger considers that the samples may not be representative of the in situ condition, for whatever reason, the reported consistency may be omitted, or qualified using the terms *Probably*, where the logger is reasonably confident of the assessment, or *Possibly*, where there is less certainty.
- 3 The presence of **very coarse particles** (cobbles and boulders) is included in the stratum descriptions on logs using the proportional terminology of BS 5930 where possible. However, due to their relatively large size in relation to the diameter of boreholes, and volumes of samples recovered, these records may not be fully representative of their size and frequency in the ground. Where sample mass precludes a reliable estimate of the proportion of very coarse particles, their presence may be described using undefined qualitative terms, eg occasional, frequent, etc, or by noting the number of cobbles/boulders observed.
- 4 The **declination of bedding and joints** is given with respect to the normal to the core axis, ie perpendicular to the direction of drilling. In a vertical borehole this will therefore correspond to the dip.
- 5 The assessment of **SCR, RQD and Fracture Spacing** excludes all non-natural fractures (ie drilling induced) where these can be positively identified.
- 6 Observations of discernible **groundwater entries** during the advancement of the exploratory hole are given at the foot of the log and in the Legend column. The absence of a recorded groundwater entry should not, however, be interpreted as a groundwater level below the base of the borehole. Under certain conditions groundwater entry may not be observed, for instance, drilling with water flush or overwater, or boring at a rate faster than water can accumulate in the borehole. Similarly, where water entry observations do exist, groundwater may also be present at higher elevations in the ground than where recorded in the borehole. In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.
- 7 The borehole logs present the results of **Standard Penetration Tests** recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.
- 8

Date	Time
Casing	Water

 Overnight pauses in hole progress are shown by a horizontal line together with records of casing depth and water level at the start and end of shift, together with the corresponding date and time. Casing depths and water levels are also shown at the time of tube sampling and Standard Penetration Tests.

REFERENCES

- 1 BS EN ISO 14688-1:2018 : Geotechnical investigation and testing - Identification and classification of soil. Part 1 Identification and description. British Standards Institution
- 2 BS EN ISO 14689 : 2018 : Geotechnical investigation and testing - Identification and classification of rock. British Standards Institution
- 3 BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing. Part 3 Standard penetration test. British Standards Institution
- 4 BS 5930:2015+A1:2020 : Code of practice for ground investigations. British Standards Institution



SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Socotec uk
Progress close
Binley
Coventry
CV3 2TF

SPT Hammer Ref: LEGACYST
Test Date: 12/10/2023
Report Date: 12/10/2023
File Name: LEGACYST.spt
Test Operator: DP

Instrumented Rod Data

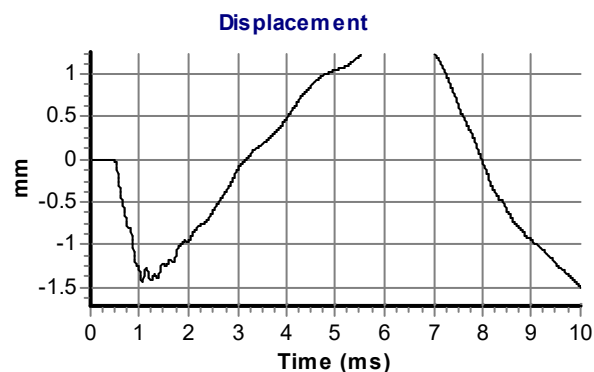
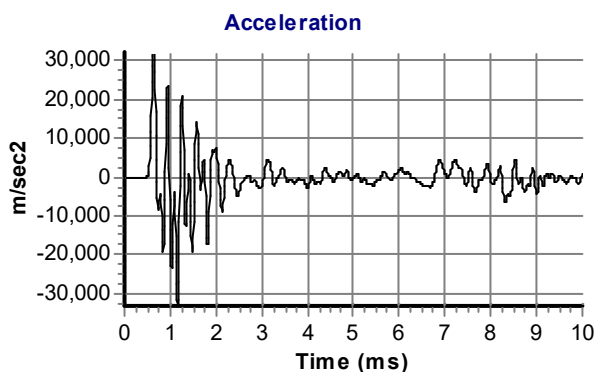
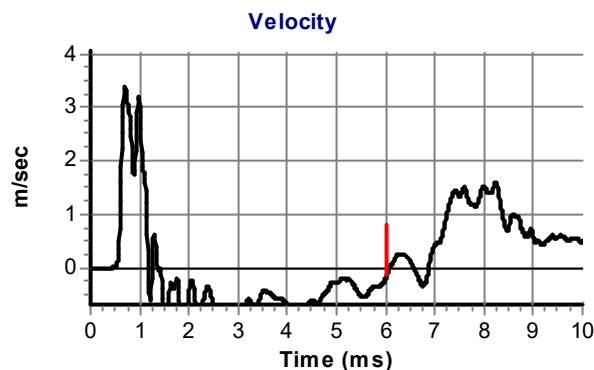
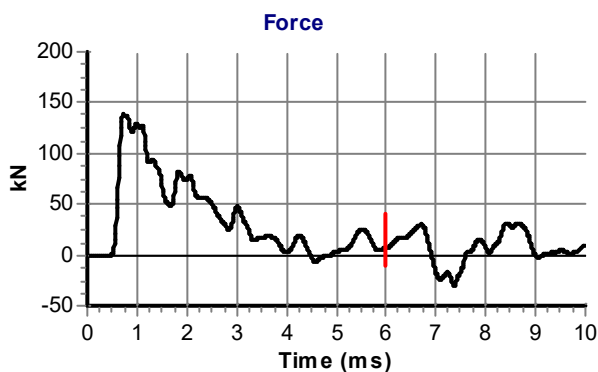
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.6
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 72570
Accelerometer No.2: 72571

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 15.0

Comments / Location

TEST



Calculations

Area of Rod A (mm²): 983
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 297

Energy Ratio E_r (%): **63**

Signed: D.Perrett
Title: Drilling Supervisor

22-24 Aaron Road
Whittlesey
Peterborough
PE7 2EX

SPT Hammer Ref: SAM1
Test Date: 06/05/2023
Report Date: 06/05/2023
File Name: SAM1.spt
Test Operator: NG

Instrumented Rod Data

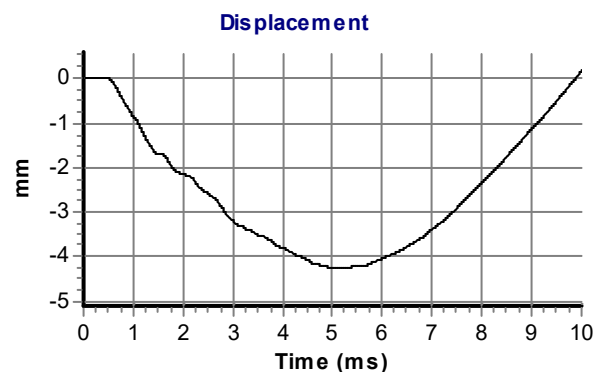
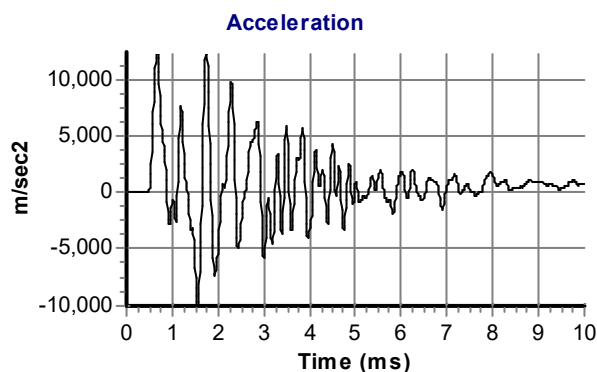
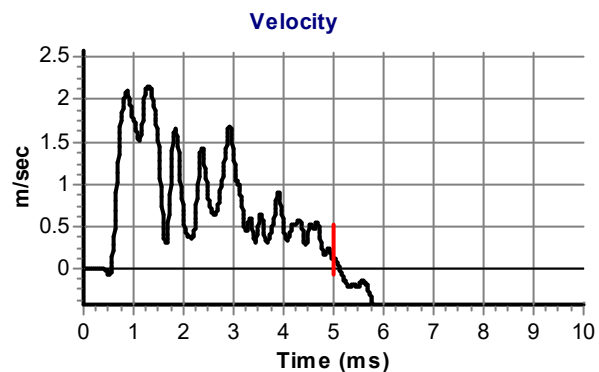
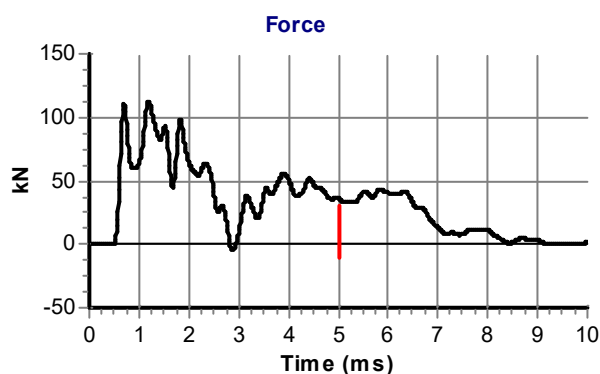
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.3
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 11853
Accelerometer No.2: 10332

SPT Hammer Information

Hammer Mass m (kg): 63.0
Falling Height h (mm): 760
SPT String Length L (m): 15.0

Comments / Location

Maximum calibration interval is 12 months

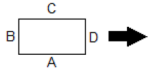


Calculations

Area of Rod A (mm^2): 944
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 342

Energy Ratio E_r (%): **72**

P. Rodgman
Signed: Phil Rodgman
Title: Mr

Checked M Wareing	Depth 0.00 - 0.30	Dates 14 Dec 23 - 14 Dec 23	Method Hand excavated inspection pit	Equipment Insulated Hand Tools	Crew DB/PB	Logger HP	Logged 14 Dec 23	Dimensions and Orientation Width 0.30 m Length 0.30 m 	Depth 0.00 - 0.30	Remarks No groundwater encountered during excavation.	Depth Related Remarks	Ground Level 209.44 mOD Coordinates E 287339.20 National Grid N 198519.96 System					
													Approved M Wareing				
Date 14 Dec 23 14 Dec 23	Time 1130 Dry 1100	Samples			Field Tests			Depth (Thickness)	Level	Legend	Strata Description		Water Entry	Backfill			
		Depth 0.00 - 0.30	Type & No. B 1	Records	Depth 0.30	Type ES 2	Records				Main	Detail					
0 1 2 3 4 5												Soft greyish black gravelly SILT. Gravel is angular to subangular fine to coarse of sandstone. Occasional rootlets. (MADE GROUND)					
												END OF EXPLORATORY HOLE					
General Remarks												Stability Shoring Weather		Groundwater Entries No. Depth Remarks Sealed			
Notes For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project Glyncorrwg Industrial Units Project No. H3091-23_G Carried out for Neath & Port Talbot County Council				Status FINAL		Scale 1:25 Printed 17 May 2024 08:55:57 © Copyright SOCOTEC UK Limited		Trial Pit BHG01 Sheet 1 of 1					

Trial Pit Log



Checked M Wareing	Depth 0.00 - 0.30	Dates 14 Dec 23 - 14 Dec 23	Method Hand excavated inspection pit	Equipment Insulated Hand Tools	Crew DB/PB	Logger HP	Logged 14 Dec 23	Dimensions and Orientation	Depth 0.00 - 0.30	Depth Related Remarks	Ground Level 209.48 mOD		
	Approved M Wareing							Width 0.30 m Length 0.30 m C B D A ➔	Remarks No groundwater encountered during excavation.	Coordinates E 287337.03 N 198512.50 System			
Date Time Water	Samples			Field Tests			Depth Level (Thickness)	Legend	Strata Description		Water Entry	Backfill	
	Depth	Type & No.	Records	Depth	Type	Records			Main	Detail			
0	14 Dec 23 14 Dec 23	1200 Dry 1130	0.00 - 0.30	B 1			(0.30)		Soft greyish black gravelly SILT. Gravel is angular to subangular fine to coarse of sandstone. Occasional rootlets. (MADE GROUND)				
			0.30	ES 2			0.30	+209.18	END OF EXPLORATORY HOLE				
1													
2													
3													
4													
5													
General Remarks									Stability Shoring Weather		Groundwater Entries No. Depth Remarks Sealed		
Notes For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project Glyncorrwg Industrial Units Project No. H3091-23_G Carried out for Neath & Port Talbot County Council				Status FINAL		Scale 1:25 Printed 17 May 2024 08:55:58 © Copyright SOCOTEC UK Limited		Trial Pit BHG01A Sheet 1 of 1	

Trial Pit Log

[illegible]

Trial Pit Log



Checked M Wareing	Depth 0.00 - 0.30	Dates 14 Dec 23 - 14 Dec 23	Method Hand excavated inspection pit	Equipment Insulated Hand Tools	Crew DB/PB	Logger HP	Logged 14 Dec 23	Dimensions and Orientation Width 0.30 m Length 0.30 m C B A D ➔	Depth	Remarks	Depth Related Remarks	Ground Level 209.59 mOD	Coordinates E 287350.46 N 198543.90	System		
															Approved M Wareing	
0	Date 14 Dec 23	Time 1315 Dry	Samples			Field Tests			Depth (Thickness)	Level	Legend	Strata Description		Water Entry	Backfill	
			Depth 0.00 - 0.30	Type & No. B 1	Records	Depth	Type	Records				Main	Detail			
			0.30	ES 2					(0.15) +209.44		Soft greyish black gravelly SILT. Gravel is angular to subangular fine to coarse of sandstone. Occasional rootlets. (MADE GROUND)					
									(0.15) +209.29		Dark grey sandy silty angular to subangular fine to coarse GRAVEL of mudstone and sandstone. (MADE GROUND)					
			END OF EXPLORATORY HOLE													
1																
2																
3																
4																
5																

General Remarks

Stability

Shoring

Weather

Groundwater Entries

No. Depth Remarks

Sealed

Notes

For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Project

Glyncorrwg Industrial Units

Project No.

H3091-23_G

Carried out for

Neath & Port Talbot County Council

Status

FINAL

Scale 1:25

Printed 17 May 2024 08:55:59

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AGS

Trial Pit

BHG01C

Sheet 1 of 1

Trial Pit Log



Checked M Wareing	Depth 0.00 - 0.50	Dates 14 Dec 23 - 14 Dec 23	Method Hand excavated inspectin pit	Equipment Insulated Hand Tools	Crew DB/PB	Logger HP	Logged 14 Dec 23	Dimensions and Orientation Width 0.30 m Length 0.30 m C B A D ➡	Depth 0.00 - 0.50	Depth Related Remarks Remarks No groundwater encountered during excavation.	Ground Level Coordinates National Grid System 209.73 mOD E 287355.10 N 198551.51				
												Approved M Wareing			
0 1 2 3 4 5	Date Time Water	Samples DepthType & No.Records			Field Tests DepthTypeRecords			Depth Level (Thickness)	Legend	Strata Description MainDetail		Water Entry	Backfill		
	14 Dec 23 1315							(0.20)		Soft greyish black gravelly SILT. Gravel is angular to subangular fine to coarse of sandstone. Occasional rootlets. (MADE GROUND)					
	14 Dec 23 1345 Dry	0.30 0.40	B 1 ES 2				0.20 (0.30)	+209.53	Dark grey sandy silty angular to subangular fine to coarse GRAVEL of mudstone and sandstone with occasional cobbles. (MADE GROUND)						
							0.50	+209.23	END OF EXPLORATORY HOLE						
General Remarks										Stability Shoring Weather		Groundwater Entries No. Depth RemarksSealed			
Notes For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project Project No. Carried out for Glyncorrwg Industrial Units H3091-23_G Neath & Port Talbot County Council						Status FINAL		Scale 1:25 Printed 17 May 2024 08:55:59 © Copyright SOCOTEC UK Limited		Trial Pit BHG01D Sheet 1 of 1	



Borehole Log

[illegible]

Checked	Depth	Dates	Method	Equipment	Rig Crew	Logger	Logged	Hole		Casing		Depth Related Remarks		Ground Level	Coordinates	
	M Wareing	0.00 - 1.20 1.20 - 6.30	31 Jan 24 - 31 Jan 24 21 Feb 24 - 22 Feb 24	Machine excavated trial pit/trench Cable percussion boring to 6.30m.	JCB 3CX Dando 2000	WO	CB CB	31 Jan 24 21 Feb 24	Depth 6.30	Dia. (mm) 200	Depth 6.00	Dia. (mm) 200	Depth	Remarks	209.72 mOD E 287343.84 N 198525.15 System	
Approved	M Wareing															

0	Date	Time	Samples			Field Tests			Samp / Test		Coring Depth (Diameter)	TCR % SCR % RQD %	Water added Flush details	Depth (Thickness)	Level	Legend	Strata Description		Chisel.	Water Entry	Backfill
	Casing	Water	Depth	Type & No.	Records	Depth	Type	Records	Casing	Water							Main	Detail			
			0.20	ES 1													Brown gravelly slightly silty SAND with abundant roots and rootlets (<50mm). Gravel is angular to subangular fine and medium of sandstone, ceramic and brick fragments. (MADE GROUND)				0.20
			0.50 - 1.00	B 2													Black sandy slightly silty angular to subangular fine to coarse GRAVEL of slag, sandstone, mudstone, brick fragments and ceramic fragments with a high cobble content. Sand is fine to coarse. Cobbles are subangular of mudstone and sandstone. (MADE GROUND)				
	21 Feb 24 0.00	0800	1.50 1.50 - 2.00	D 3 B 4		1.50 - 1.95	SPT C	N=9 (5,6/1,2,3,3) ID SAM1 Er 72%	1.50	Dry							Brownish black gravelly slightly clayey fine to coarse SAND. Gravel is subangular fine to coarse of mudstone. (MADE GROUND)				
			2.50 2.50 - 3.00	D 5 B 6		2.50 - 2.95	SPT C	N=14 (2,3/3,4,3,4) ID SAM1 Er 72%	2.50	Dry											
			3.50 3.50 - 4.00	D 7 B 8		3.50 - 3.95	SPT C	N=18 (2,3/5,4,5,4) ID SAM1 Er 72%	3.50	Dry											
			4.00	ES 9																	
			4.50 4.50 4.50 - 5.00	D 10 D 12 B 11		4.50 - 4.95	SPT C	N=14 (3,4/4,3,3,4) ID SAM1 Er 72%	4.50	Dry											
			5.00	ES 13																	
			5.50 5.50 5.70 - 6.00	D 14 D 15 B 16		5.50 - 5.95	SPT C	N=29 (3,4/4,7,9,9) ID SAM1 Er 72%	5.50	Dry											
	21 Feb 24 22 Feb 24 6.00 6.00 22 Feb 24 6.00	1000 1700 5.60 0800	6.00	D 17		6.00 - 6.27	SPT C	50 (10,13/19,31 for 40mm) ID SAM1 Er 72%	6.00	5.60							Medium dense becoming very dense brownish black sandy slightly silty subangular fine to coarse GRAVEL of mudstone and siltstone. Sand is fine to coarse. (BRITHDIR MEMBER)				5.80
																	END OF EXPLORATORY HOLE				6.30 SP

General Remarks												Hard Boring / Chiselling			Groundwater Entries			Sealed
												Depths	Duration (mins)	Tool	No.	Depth	Remarks	
												6.00 - 6.30	60	Chisel	1	5.70	Rose to 5.60 m after 20 minutes.	

Notes	Project	Project No.	Carried out for	Status	Scale	Printed	Borehole
For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Glyncorwg Industrial Units	H3091-23_G	Neath & Port Talbot County Council	FINAL	1:50	17 May 2024 08:56:02	CPG02
						© Copyright SOCOTEC UK Limited	

Trial Pit Log



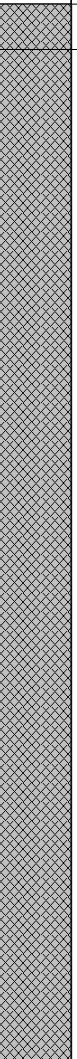
Checked M Wareing	Depth 0.00 - 3.50	Dates 31 Jan 24 - 31 Jan 24	Method Machine excavated trial pit/trench	Equipment JCB 3CX	Crew	Logger CB	Logged 31 Jan 24	Dimensions and Orientation Width 0.40 m Length 2.50 m C B A D ➡ 145 (Deg)	Depth	Depth Related Remarks	Ground Level 209.87 mOD		
	Approved M Wareing										Coordinates E 287354.21 National Grid N 198551.82 System		
Date Time Water	Samples Depth Type & No. Records	Field Tests Depth Type Records	Depth (Thickness)	Level	Legend	Strata Description		Water Entry	Backfill				
						Main	Detail						
0	0.00 - 0.30	B 1				Brown gravelly slightly silty SAND with abundant roots and rootlets (<35mm). Gravel is angular to subangular fine and medium of sandstone and brick fragments. (MADE GROUND)							
	0.20 0.20 0.30 - 1.30	D 3 ES 2 B 4				Black sandy slightly silty angular to subangular fine to coarse GRAVEL of slag, brick fragments, sandstone, mudstone and ceramic fragments. High cobble content. Cobbles are subangular of mudstone and sandstone. (MADE GROUND)							
	0.60	D 5											
	0.80	ES 6											
1	1.30 - 2.30	B 7											
	1.50	D 8											
	1.90	ES 9											
	2.30 - 3.30	B 10											
	2.50	D 11											
	3.00	ES 12											
3						END OF EXPLORATORY HOLE			3.50				
4													
5													
General Remarks						Stability Stable Shoring Not used Weather overcast cold			Groundwater Entries No. Depth Remarks Sealed				
Notes For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.		Project Glyncorwg Industrial Units Project No. H3091-23_G Carried out for Neath & Port Talbot County Council				Status FINAL		Scale 1:25 Printed 17 May 2024 08:56:02 © Copyright SOCOTEC UK Limited		Trial Pit TPG01 Sheet 1 of 1			

Checked M Wareing	Depth 0.00 - 3.00	Dates 31 Jan 24 - 31 Jan 24	Method Machine excavated trial pit/trench	Equipment JCB 3CX	Crew	Logger CB	Logged 31 Jan 24	Dimensions and Orientation	Depth	Remarks	Ground Level 209.83 mOD Coordinates E 287345.98 National Grid N 198535.42 System						
	Approved M Wareing																
Width Length C B D A ➡ 138 (Deg)																	
0	Date Time Water	Samples			Field Tests			Depth (Thickness)	Level	Legend	Strata Description		Water Entry	Backfill			
		Depth	Type & No.	Records	Depth	Type	Records				Main	Detail					
		0.00 - 0.15	D 1					(0.15)	+209.68		Brown gravelly slightly silty SAND with abundant roots and rootlets (<50mm). Gravel is angular to subangular fine and medium of sandstone and brick fragments. (MADE GROUND)						
		0.15 - 1.15	B 2					0.15			Black sandy slightly silty angular to subangular fine to coarse GRAVEL of slag, brick fragments, sandstone, mudstone and ceramic fragments with frequent cobbles. Cobbles are subangular of mudstone and sandstone. (MADE GROUND)						
		0.40	ES 3														
		0.50	D 4														
		0.80	D 5														
1		1.15 - 2.00	B 6														
		1.60	ES 7					(2.85)									
		1.80	D 8														
2		2.00 - 3.00	B 9														
		2.50	ES 10														
		2.80	D 11														
3								3.00	+206.83		END OF EXPLORATORY HOLE			3.00			
4																	
5																	
General Remarks											Stability Shoring Weather		Stable Not used slight precipitation		Groundwater Entries No. Depth Remarks 1 0.60 Slow inflow on face B		Sealed
Notes For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project Project No. Carried out for				Glyncorwg Industrial Units H3091-23_G Neath & Port Talbot County Council				Status FINAL		Scale 1:25 Printed 17 May 2024 08:56:02 © Copyright SOCOTEC UK Limited		Trial Pit TPG02 Sheet 1 of 1	

Trial Pit Log



Checked M Wareing	Depth	Dates	Method	Equipment	Crew	Logger	Logged	Dimensions and Orientation Width Length C B A D ➡ 153 (Deg)	Depth	Remarks	Ground Level Coordinates National Grid	209.65 mOD E 287337.15 N 198512.89 System
	0.00 - 3.50	31 Jan 24 - 31 Jan 24	Machine excavated trial pit/trench	JCB 3CX		CB	31 Jan 24					
Approved M Wareing												

0	Date	Time	Samples			Field Tests			Depth (Thickness)	Level	Legend	Strata Description		Water Entry	Backfill	
			Depth	Type & No.	Records	Depth	Type	Records				Main	Detail			
1			0.15 - 1.00	B 1				(0.15)	+209.50		Brown gravelly slightly silty SAND with abundant roots and rootlets (<50mm). Gravel is angular to subangular fine and medium of sandstone and brick fragments. (MADE GROUND)					
			0.25	ES 2				Black sandy slightly silty angular to subangular fine to coarse GRAVEL of slag, brick fragments, sandstone, mudstone and ceramic fragments with frequent cobbles. Cobbles are subangular of mudstone and sandstone. (MADE GROUND)								
			0.60	D 3												
			1.00 - 2.00	B 4												
			1.40	ES 5												
			1.80	D 6												
			2.00 - 3.00	B 7												
			2.50	ES 8												
			2.80	D 9												
3										END OF EXPLORATORY HOLE				3.50		
4																
5																

General Remarks										Stability Stable Shoring Not used Weather moderate precipitation			Groundwater Entries No. Depth Remarks 1 0.20 Slow inflow			Sealed
-----------------	--	--	--	--	--	--	--	--	--	---	--	--	--	--	--	--------

Notes For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project	Glyncorrgw Industrial Units	Status FINAL	Scale	1:25		Trial Pit TPG03
	Project No.	H3091-23_G		Printed	17 May 2024 08:56:03		
	Carried out for	Neath & Port Talbot County Council		© Copyright SOCOTEC UK Limited			

Trial Pit Log



Checked A Standen	Depth 0.00 - 3.00	Dates 09 May 24 - 09 May 24	Method Machine excavated trial pit/trench	Equipment Tracked 360 excavator	Crew M&J	Logger CB	Logged 09 May 24	Dimensions and Orientation Width 0.60 m Length 3.00 m C B A D ➡ 153 (Deg)	Depth 0.00 - 3.00	Remarks No groundwater encountered during excavation.	Depth Related Remarks	Ground Level 209.59 mOD	Coordinates E 287330.88 N 198503.00	System			
Approved A Standen																	
Date Time Water	Samples DepthType & No.Records			Field Tests DepthTypeRecords			Depth (Thickness)	Level	Legend	Strata Description		Water Entry	Backfill				
															Main	Detail	
0							(0.40)			Dark brown sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of brick, mudstone and slag with frequent roots. Sand is fine to coarse. (MADE GROUND)							
							0.40	+209.19		Black sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of mudstone and slag with frequent cobbles. Cobbles are angular to subrounded (<30cm) of sandstone. Sand is fine to coarse. (MADE GROUND)							
1																	
2																	
3																	
4																	
5																	
General Remarks Soakaway test undertaken.										Stability Shoring Weather		Stable Not used Hot and sunny		Groundwater Entries No. Depth Remarks		Sealed	
Notes For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.				Project Project No. Carried out for				Glyncorrwg Industrial Units H3091-23_G Neath & Port Talbot County Council				Status FINAL		Scale Printed © Copyright SOCOTEC UK Limited		Trial Pit SAG01 Sheet 1 of 1	

Trial Pit Log



Checked A Standen		Depth 0.00 - 3.00	Dates 09 May 24 - 09 May 24	Method Machine excavated trial pit/trench	Equipment Tracked 360 excavator	Crew M&J	Logger CB	Logged 09 May 24	Dimensions and Orientation Width 3.00 m Length 0.60 m C B D A ➡		Depth 0.00 - 3.00	Remarks No groundwater encountered during excavation.	Ground Level 209.50 mOD	
Approved A Standen													Coordinates E 287338.84	
													National Grid N 198519.59	System

0	Date	Time	Samples			Field Tests			Depth	Level	Legend	Strata Description		Water Entry	Backfill	
		Water	Depth	Type & No.	Records	Depth	Type	Records	(Thickness)			Main	Detail			
									(0.15)	+209.35		Dark brown sandy slightly clayey subangular to subrounded, fine to coarse GRAVEL of brick, mudstone and slag with frequent roots. Sand is fine to coarse. (MADE GROUND)				
									0.15			Black sandy slightly clayey subangular to subrounded fine to coarse GRAVEL of mudstone and slag with frequent cobbles. Cobbles are angular to subrounded (<30cm) of sandstone. Sand is fine to coarse. (MADE GROUND)				
1																
2																
3																
4																
5																

General Remarks Soakaway test undertaken.										Stability Stable Shoring Not used Weather Hot and sunny			Groundwater Entries No. Depth Remarks			Sealed		
Notes For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.										Project Glyncorrwg Industrial Units Project No. H3091-23_G Carried out for Neath & Port Talbot County Council			Status FINAL		Scale 1:25 Printed 17 May 2024 08:56:03 © Copyright SOCOTEC UK Limited		Trial Pit SAG02	

Borehole Log



Checked	Depth		Dates		Method		Equipment		Rig Crew	Logger	Logged	Hole		Casing		Depth Related Remarks				Ground Level	
	0.00 - 1.20 1.20 - 6.00		14 Dec 23 - 14 Dec 23 14 Dec 23 - 14 Dec 23		Insulated Hand Tools Dynamic windowless sampling		Insulated Hand Tools Dando Terrier Legacy		PB/DB PB/DB	HP HP	14 Dec 23 14 Dec 23	Depth 2.00 3.00 4.00 6.00	Dia. (mm) 102 87 75 65	Depth	Dia. (mm)	Depth	Remarks			209.78 mOD E 287355.64 N 198562.64 System	
Approved																					
M Wareing																					

0	Date	Time	Samples			Field Tests			Samp / Test		Coring		TCR % SCR % RQD %		Water added		Depth		Level	Legend	Strata Description				Chisel.	Water Entry	Backfill	
	Casing	Water	Depth	Type & No.	Records	Depth	Type	Records	Casing	Water	Depth (Diameter)				Flush details	(Thickness)			Main		Detail							
1	14 Dec 23	0915	0.00 0.00 - 0.30 0.20	D 2 B 1 ES 2												(0.30)	+209.48		Soft dark grey slightly gravelly clayey SILT. Gravel is angular to subangular fine to coarse of sandstone. Occasional rootlets. (MADE GROUND)				1 1		Flush cover 0.20			
			0.70 - 1.20	B 4												(0.50)			Soft dark grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone and plastic. (MADE GROUND)									
			1.00	ES 5												0.80	+208.98		Firm dark grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of mudstone and sandstone. (MADE GROUND)									
			1.20 - 1.65 1.20 1.20 - 2.00 1.20 - 2.00	D 7 D 6 B 8 DYS	100% rec, dia 102mm	1.20 - 1.65	SPT S	N=17 (4,5/6,5,3,3) ID Legacyst Er 63%		Damp																		
			2.00 - 2.45 2.00 2.00 - 3.00 2.00 - 3.00	D 12 D 9 ES 10 DYS	75% rec, dia 87mm	2.00 - 2.45	SPT S	N=7 (2,1/2,1,2,2) ID Legacyst Er 63%		Dry						(3.20)												
			3.00 3.00 - 3.45 3.00 - 4.00 3.00 - 4.00	D 11 D 13 B 14 DYS	90% rec, dia 75mm	3.00 - 3.45	SPT S	N=13 (1,2/3,3,4,3) ID Legacyst Er 63%		Dry																		
			4.00 4.00 - 4.40 4.00 - 5.00	D 15 D 18 DYS	80% rec, dia 65mm	4.00 - 4.45	SPT S	N=8 (2,3/2,2,2,2) ID Legacyst Er 63%		Dry						4.00 (0.40)	+205.78		Firm brownish orange sandy SILT. (TILL)									
			5.00 - 5.45 5.00 - 6.00 5.00 5.00 - 6.00	D 17 D 19 ES 16 DYS	Diameter 65mm	5.00 - 5.45	SPT S	N=17 (2,2/4,5,5,3) ID Legacyst Er 63%		Dry						(1.60)			Medium dense dark grey sandy slightly silty angular to subangular fine to medium GRAVEL of mudstone. (BRITHDIR MEMBER)									
	6	14 Dec 23	1500 Dry	6.00	D 20		6.00 - 6.32	SPT S	50 (7,15/18,25,7 for 20mm) ID Legacyst Er 63%		Dry						6.00	+203.78		END OF EXPLORATORY HOLE								
General Remarks																	Hard Boring / Chiselling			Groundwater Entries								
Termination Reason: Scheduled BH depth achieved																	Depths		Duration (mins)		Tool		No.	Depth	Remarks		Sealed	
																							1	1.20	Rose to 1.00 m after 20 minutes.			

Notes		Project		Glyncorrwg Industrial Units		Status		FINAL		Scale		1:50		Borehole		WSG01	
For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.		Project No.		H3091-23_G		Printed		17 May 2024 08:56:04		© Copyright SOCOTEC UK Limited		AGS					
		Carried out for		Neath & Port Talbot County Council												Sheet 1 of 1	

Level	Depth (m)	Blows per 100mm	Torque (Nm)	Description	Legend	Backfill/ Instruments
+203.48 +203.38		46 50				

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. © Copyright SOCOTEC UK Limited Scale 1:50 17/05/2024 08:56:05	Project Glyncorrwg Industrial Units Project No. H3091-23_G Carried out for Neath & Port Talbot County Council	Borehole WSG01-DP Sheet 1 of 1
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APPENDIX C
FIELD TESTING

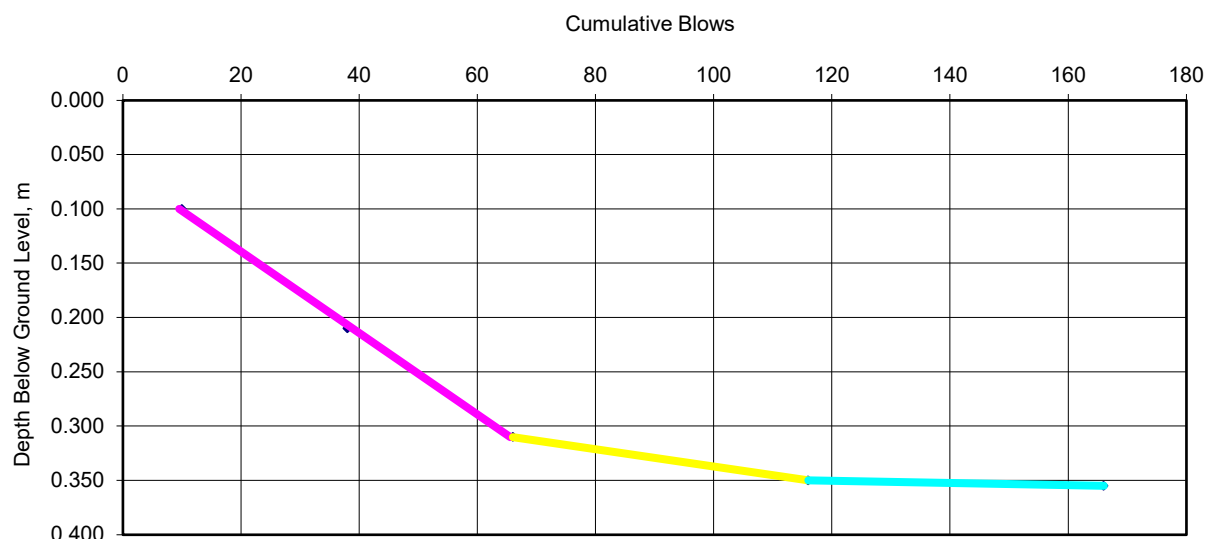
Dynamic Cone Penetrometer Tests
Soakaway Tests

DCPG01 and DCPG02
SKWY/SAG01/1 and SKWY/SAG02/1

SOCOTEC

0.00 mBGL

Remarks:

[illegible]

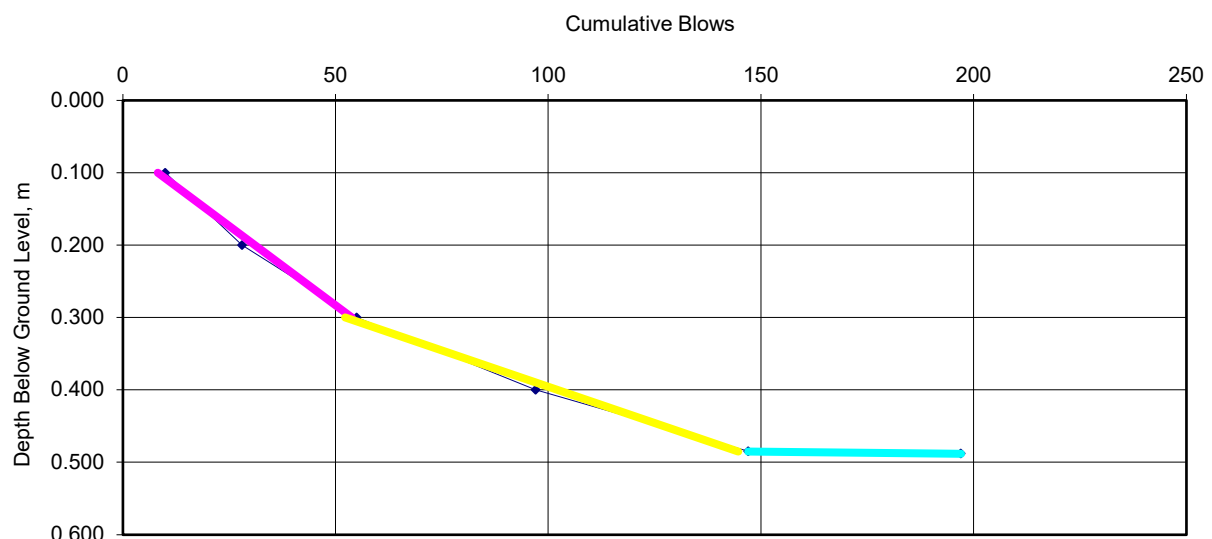
Top, mBGL	Base, mBGL	CBR, % ¹
0.10	0.31	74
0.31	0.35	380
0.35	0.36	3400

Hole **DCPG01**

SOCOTEC

0.00 mBGL

Remarks:

[illegible]

Top, mBGL	Base, mBGL	CBR, % ¹
0.10	0.30	63
0.30	0.49	140
0.49	0.49	5900

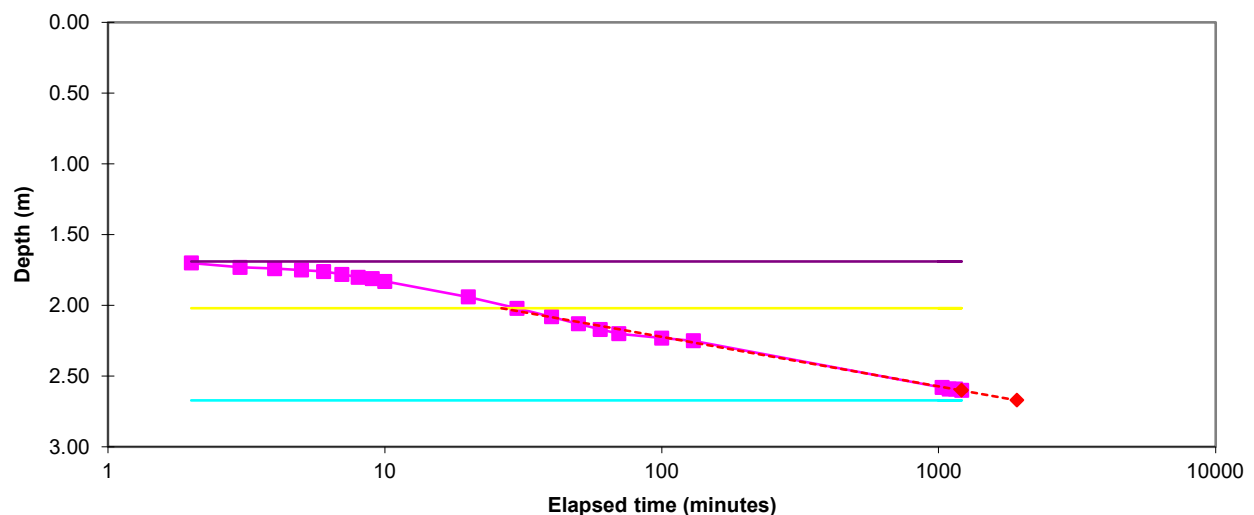
Hole **DCPG02**

Soakaway Test (Extrapolated)



Trial Pit No: SAG01 Test No: 1 Date: 09/05/2024
 Length (m): 3.00
 Width (m): 0.60 Granular infill: None
 Depth (m): 3.00

Elapsed time (minutes)	Water Depth (metres)	Elapsed time (minutes)	Water Depth (metres)
1	1.69	60	2.17
2	1.70	70	2.20
3	1.73	100	2.23
4	1.74	130	2.25
5	1.75	1030	2.58
6	1.76	1090	2.59
7	1.78	1150	2.59
8	1.80	1210	2.60
9	1.81		
10	1.83		
20	1.94		
30	2.02		
40	2.08		
50	2.13		



Start water depth for analysis (m): 1.69
 75% effective depth (m): 2.02 Elapsed time (mins): 30.0
 50% effective depth (m): 2.35 Elapsed time (mins): 402.7
 25% effective depth (m): 2.67 Interpreted elapsed time (mins): 1920.0
 Base of soakage zone (m): 3.00

Volume outflow between 75% and 25% effective depth (m³): 1.170
 Mean surface area of outflow (m²): 6.48
 (side area at 50% effective depth + base area)
 Time for outflow between 75% and 25% effective depth (mins): 1890.0

Estimated soil infiltration rate (m/s):

1.6E-6

Remarks Soil infiltration rate calculated from data extrapolated to 25% effective depth. The extrapolation method is not covered by BRE 365 (2016) which requires that the water level should fall below the 25% effective depth during the test.

Notes:
Water depths measured below ground level

Project Glyncoirwg Industrial Units
 Project No. H3091-23_G
 Carried out for Neath & Port Talbot County Council

Figure
SKWY/SAG01/1

Soakaway Test



Trial Pit No: SAG02

Test No: 1

Date: 09/05/2024

Length (m): 3.00

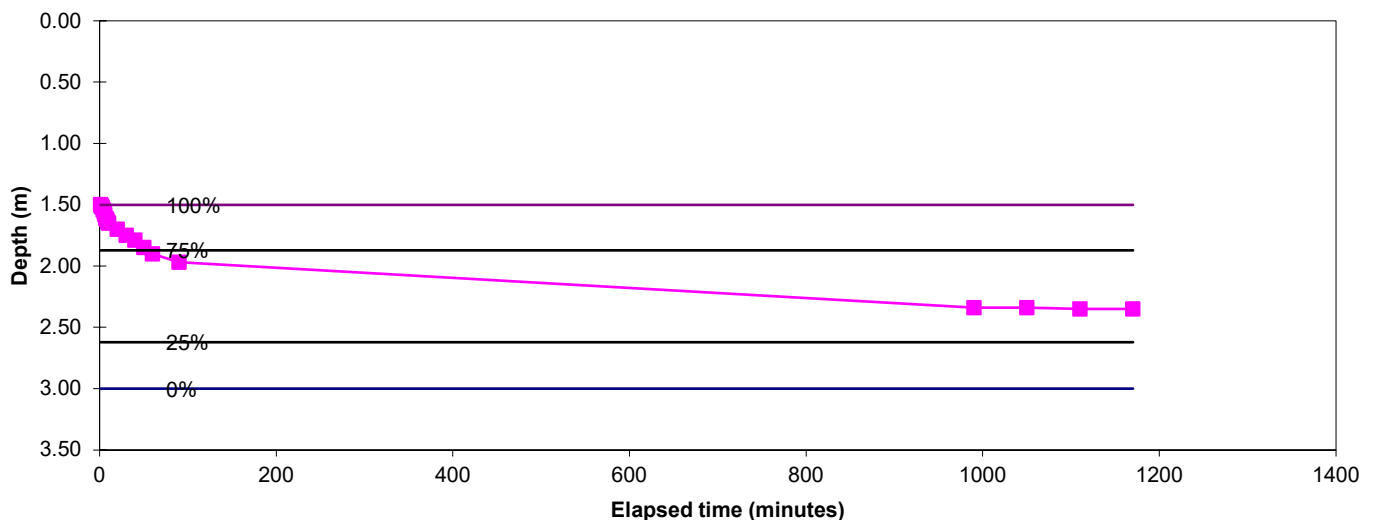
Datum height: 0.00 m agl

Width (m): 0.60

Granular infill: No

Depth (m): 3.00

Elapsed time (minutes)	Water Depth (mbgl)	Elapsed time (minutes)	Water Depth (mbgl)
1	1.50	60	1.90
2	1.51	90	1.97
3	1.52	990	2.34
4	1.54	1050	2.34
5	1.56	1110	2.35
6	1.58	1170	2.35
7	1.61		
8	1.62		
9	1.64		
10	1.65		
20	1.70		
30	1.75		
40	1.79		
50	1.85		



Start water depth for analysis (mbgl): 1.50

75% effective depth (mbgl): 1.87

Elapsed time (mins): 54.0

50% effective depth (mbgl): 2.25

25% effective depth (mbgl): 2.62

Base of soakage zone (mbgl): 3.00

Volume outflow between 75% and 25% effective depth (m³):

Mean surface area of outflow (m²): 7.20

(side area at 50% effective depth + base area)

Time for outflow between 75% and 25% effective depth (mins):

Soil infiltration rate:

Unable to reliably determine soil infiltration rate as 25% effective depth not achieved.

Remarks Results processed following BRE DG 365 (2016).

2000 litres of water added, unable to raise water level above 1.50m bgl. Test terminated after 19 hours 30 minutes.

Testing: SA
Checked: AST
Approved: AST

Notes:

Project

Glyncorrwg Industrial Units

Project No.

H3091-23_G

Carried out for

Neath & Port Talbot County Council

Figure

SKWY/SAG02/1



APPENDIX D

INSTRUMENTATION AND MONITORING

Monitoring Installations Summary

Table C1

Groundwater Monitoring

Table C2

Gas Monitoring

Table C3

Groundwater Depth

Figure C4

Monitoring Installations Summary

Instrument Reference	Instrument Type (See Notes)	Installation Date, dd/mm/yyyy	Pipe Diameter, mm	Instrument Base, mbgl	Response Zone Range, mbgl	Pipe Top Details	Headworks	Remarks
CPG01 (1)	SP	27/02/2024	50	4.00	1.00 to 4.00	Gas tap	Flush cover	
CPG01 (2)	SP	27/02/2024	50	10.00	6.50 to 10.00	Gas tap	Flush cover	
CPG02 (1)	SP	22/02/2024	50	6.30	5.80 to 6.30	Gas tap	Flush cover	
WSG01 (1)	SP	14/12/2023	50	1.50	0.50 to 1.50	Gas tap	Flush cover	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well



Project Glyncorrwg Industrial Units
Project No. H3091-23_G
Carried out for Neath & Port Talbot County Council

Table

C1

Groundwater Monitoring

Instrument Reference	Instrument Type	Instrument Base, mbgl	Date dd/mm/yyyy	Time hh:mm:ss	Result (mbgl)	Comments
CPG01 (1)	SP	4.00	29/02/2024	11:55:00	3.90	Headworks flooded. No gas readings.
CPG01 (1)	SP	4.00	06/03/2024	10:05:00	3.95	
CPG01 (1)	SP	4.00	13/03/2024	13:35:00	3.87	
CPG01 (1)	SP	4.00	20/03/2024	08:45:00	3.85	
CPG01 (2)	SP	10.00	29/02/2024	11:58:00	6.55	Headworks flooded. No gas readings.
CPG01 (2)	SP	10.00	06/03/2024	10:20:00	6.70	
CPG01 (2)	SP	10.00	13/03/2024	13:50:00	6.58	
CPG01 (2)	SP	10.00	20/03/2024	08:45:00	6.28	
CPG02 (1)	SP	6.30	29/02/2024	12:05:00	4.97	No gas tap.
CPG02 (1)	SP	6.30	06/03/2024	10:30:00	4.74	No gas tap.
CPG02 (1)	SP	6.30	13/03/2024	14:00:00	4.60	No gas tap.
CPG02 (1)	SP	6.30	20/03/2024	08:50:00	4.59	No gas tap.
WSG01 (1)	SP	1.50	05/01/2024	15:40:00	0.89	
WSG01 (1)	SP	1.50	12/01/2024	13:00:00	1.34	
WSG01 (1)	SP	1.50	24/01/2024	15:40:00	1.15	
WSG01 (1)	SP	1.50	12/02/2024	10:05:00	0.89	
WSG01 (1)	SP	1.50	29/02/2024	11:50:00	0.81	
WSG01 (1)	SP	1.50	06/03/2024	11:05:00	0.90	
WSG01 (1)	SP	1.50	13/03/2024	13:16:30	0.54	
WSG01 (1)	SP	1.50	20/03/2024	08:35:00	0.85	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well



Project Glyncorrwg Industrial Units
Project No. H3091-23_G
Carried out for Neath & Port Talbot County Council

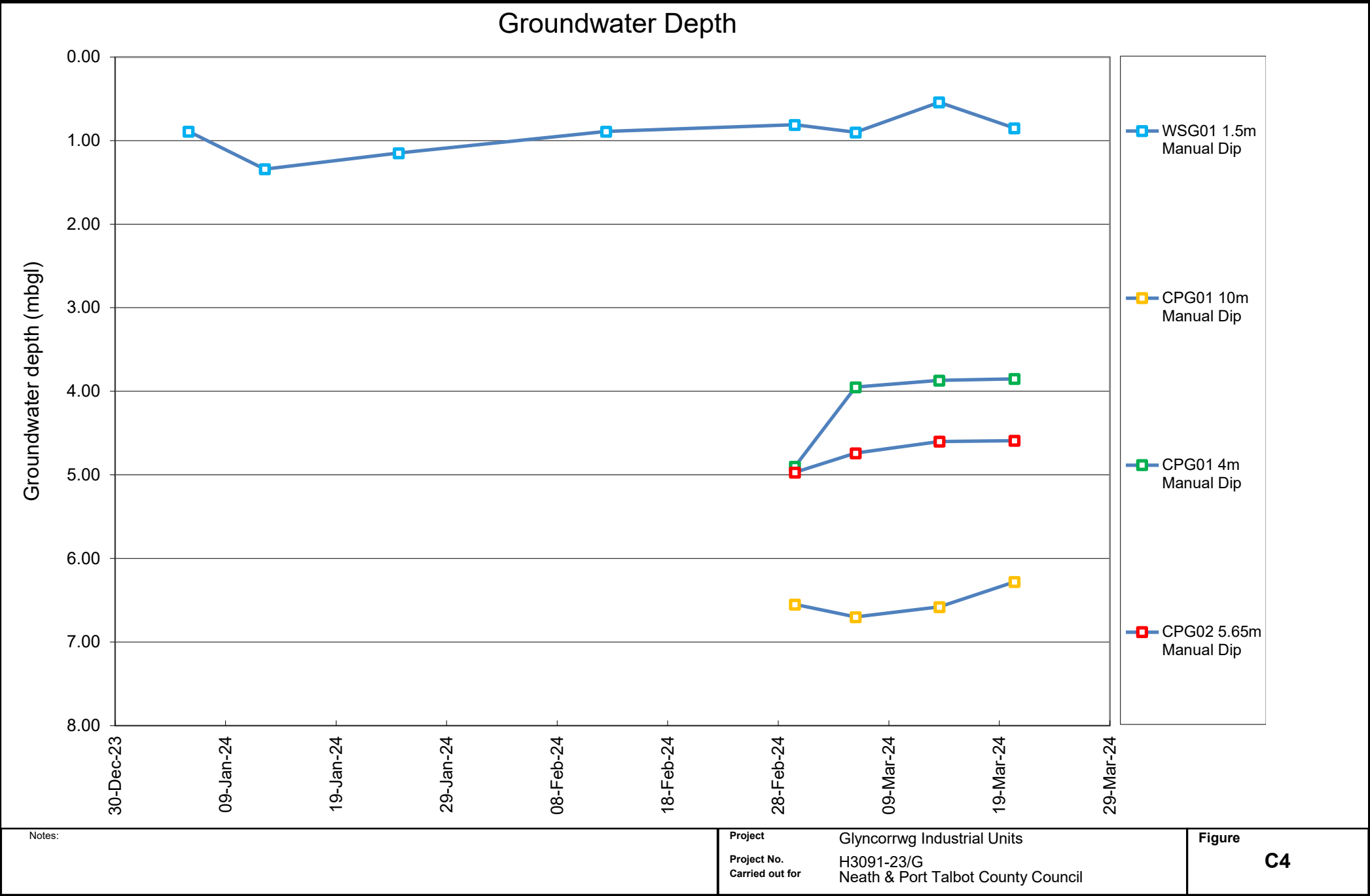
Table
C2

Gas Monitoring Summary



Notes: Peak gas concentrations, flow rates and differential pressures represent the interpreted highest values (or lowest gas concentration value for oxygen) recorded during the monitoring period. Steady state values are taken as the end of monitoring values. Values below the limit of detection (LoD) of the monitoring equipment are recorded as the LoD value preceded by '<' (eg <0.1).	Project	Glyncorrwg Industrial Units	Table C3
	Project No.	H3091-23_G	
	Carried out for	Neath & Port Talbot County Council	

Location	Date Time	Air Temp, oC	Baro Press, mbar	Gas Flow Rate (pk), l/hr	Gas Flow Rate (st), l/hr	CH4 (pk), %vol	CH4 (st), %vol	CO2 (pk), %vol	CO2 (st), %vol	O2 (min), %vol	O2 (st), %vol
CPG01 (1)											
	06 Mar 2024 10:05:00	10	995	0.1	0.1	<0.1	<0.1	0.1	<0.1	19.2	19.9
	13 Mar 2024 13:35:00	10	985	0.1	0.1	<0.1	<0.1	7.2	7.2	2.6	2.6
	20 Mar 2024 08:45:00	10	992	0.1	0.1	<0.1	<0.1	9	9	2.2	2.2
CPG01 (2)											
	06 Mar 2024 10:20:00	10	995	0.1	0.1	<0.1	<0.1	5.4	5.4	2.9	2.9
	13 Mar 2024 13:50:00	10	985	0.1	0.1	0.1	0.1	2.1	2.1	11.9	11.9
	20 Mar 2024 08:45:00	10	992	0.2	0.2	0.1	0.1	4.8	4.8	6.8	6.8
WSG01 (1)											
	05 Jan 2024 15:40:00	6	983	<0.1	<0.1	<0.1	<0.1	0.1	0.1	19.8	19.8
	24 Jan 2024 15:40:00	10	1007	0.1	0.1	<0.1	<0.1	0.1	<0.1	21.1	21.1
	12 Feb 2024 10:05:00	5	984	0.1	0.1	<0.1	<0.1	0.2	0.2	20.9	20.9
	06 Mar 2024 11:05:00	10	995	0.1	0.1	<0.1	<0.1	0.3	0.2	20.7	20.9
	13 Mar 2024 13:16:30	10	985	0.1	0.1	0.1	0.1	0.4	0.4	19.8	19.9
	20 Mar 2024 08:35:00	10	992	<0.1	<0.1	0.1	0.1	0.3	0.3	20.7	20.7





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APPENDIX E

GEOTECHNICAL LABORATORY TEST RESULTS

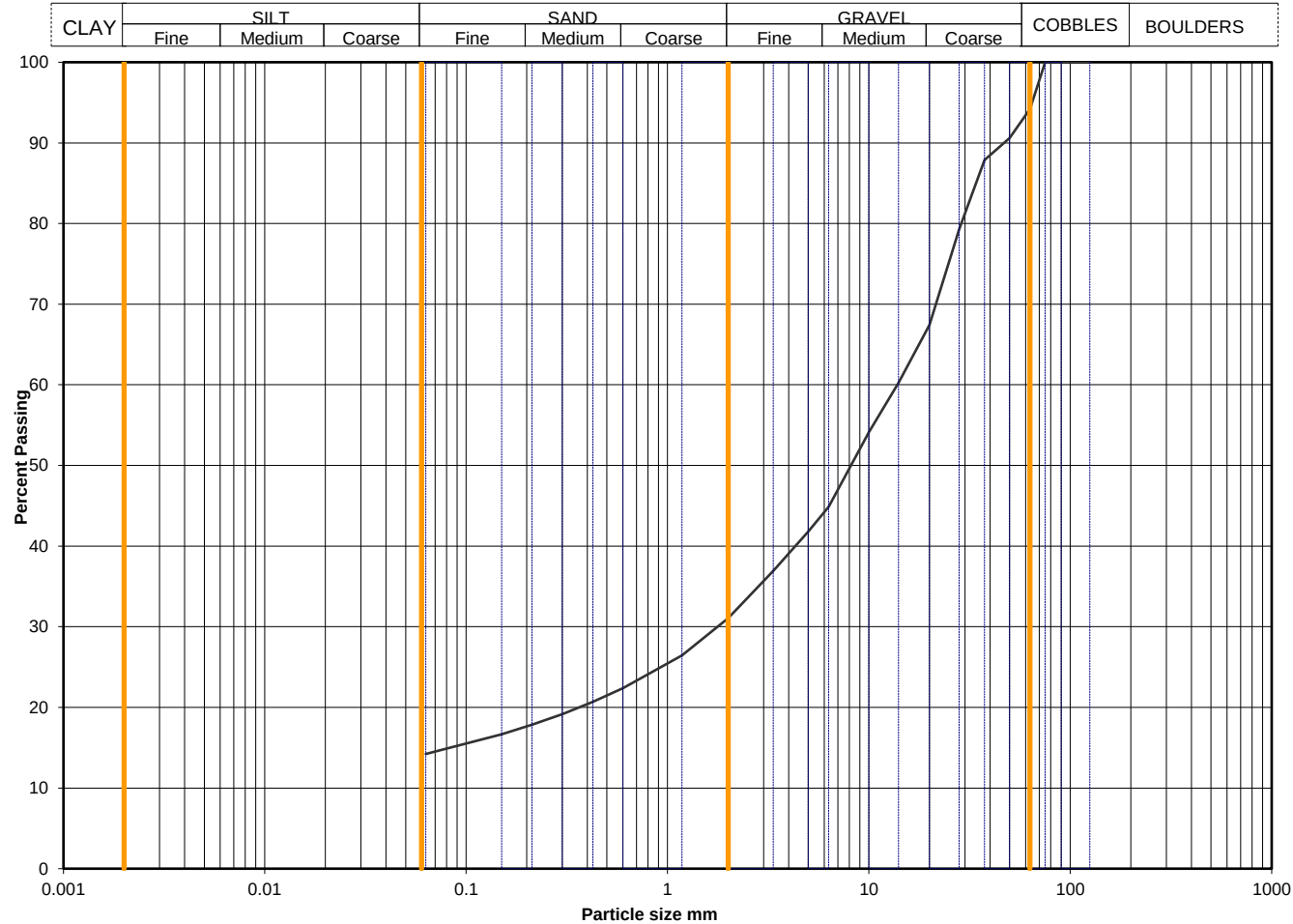
Index Properties – Summary of Results	INDX
Particle Size Distribution Analyses	PSD
Certificate of Analysis – Chemical Tests (pH and Sulphate Contents)	2700749
	2404881

INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample				Soil Description	ρ	ρ_d	W	< 425 μm sieve	W_L	W_P	I_P	ρ_s	Remarks
	No.	Depth (m)		type										
		from	to			Mg/m ³	%	%	%	%		Mg/m ³		
WSG01	6	1.20		D	Dark grey sandy gravelly silty CLAY.			12.0*	22 s*	37 a*	23*	14*		
WSG01	15	4.00	4.40	D	Brown slightly gravelly sandy silty CLAY.			33.4*	54 h*	47 a*	32*	15*		
WSG01	19	5.00	5.45	D	Brown slightly gravelly CLAY.			13.0*						
General notes: All above tests carried out to BS1377 : 1990 unless annotated otherwise. Cone type used 80g / 30 degrees. See Remarks for further details														
Key : ρ bulk density, linear W_L Liquid limit W_P Plastic limit <425um preparation ρ_s particle density														
ρ_d dry density a 4 point cone test NP non - plastic n from natural soil -g = gas jar														
w moisture content b 1 point cone test I_P Plasticity Index s sieved specimen -p = small pycnometer														
* test carried out to BS EN ISO 17892 ▲ Water content increased ▼ Water content decreased h removed by hand														
QA Ref SLR 1 Rev 2.96 Mar 17					Project No H3091-23_G							Figure		
					Project Name Glyncorwg Industrial Units							INDX		
					The results reported relate only to the samples tested; opinions and interpretations expressed herein are outside the scope of UKAS accreditation. © Copyright 2017 SOCOTEC UK Limited							Printed: 16/02/2024 14:06		

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BHG01D
	#3283915521240001	Sample Depth (m BGL)	0.30 - 0.50
		Sample Type and No	B1
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	94		
50	91		
37.5	88		
28	79		
20	67		
14	60		
10	54		
6.3	45		
5	42		
3.35	37		
2	31		
1.18	26		
0.6	22		
0.425	21		
0.3	19		
0.212	18		
0.15	17		
0.063	14		

Dry mass of sample, kg	
7.9	

Soil description	Brown slightly sandy very gravelly CLAY with medium cobble content.
Preparation / Pretreatment	Sieve: pre dried,
Remarks	

Sample Proportions *<63mm values to aid description only	Cobbles / boulders	Whole	*<63mm
	Gravel	6	0
	Sand	63	67
	Silt	17	18
	Clay	silt+clay =	
		14	15

Uniformity Coefficient		D60 / D10	Not applicable
Test Method		BS EN ISO 17892-4	
		Sieving	5.2 wet sieve
		Sedimentation	none

QA Ref
SLR 2.9
Rev 2.23
Jul 17



Project No H3091-23_G
Project Name Glyncorwg Industrial Units

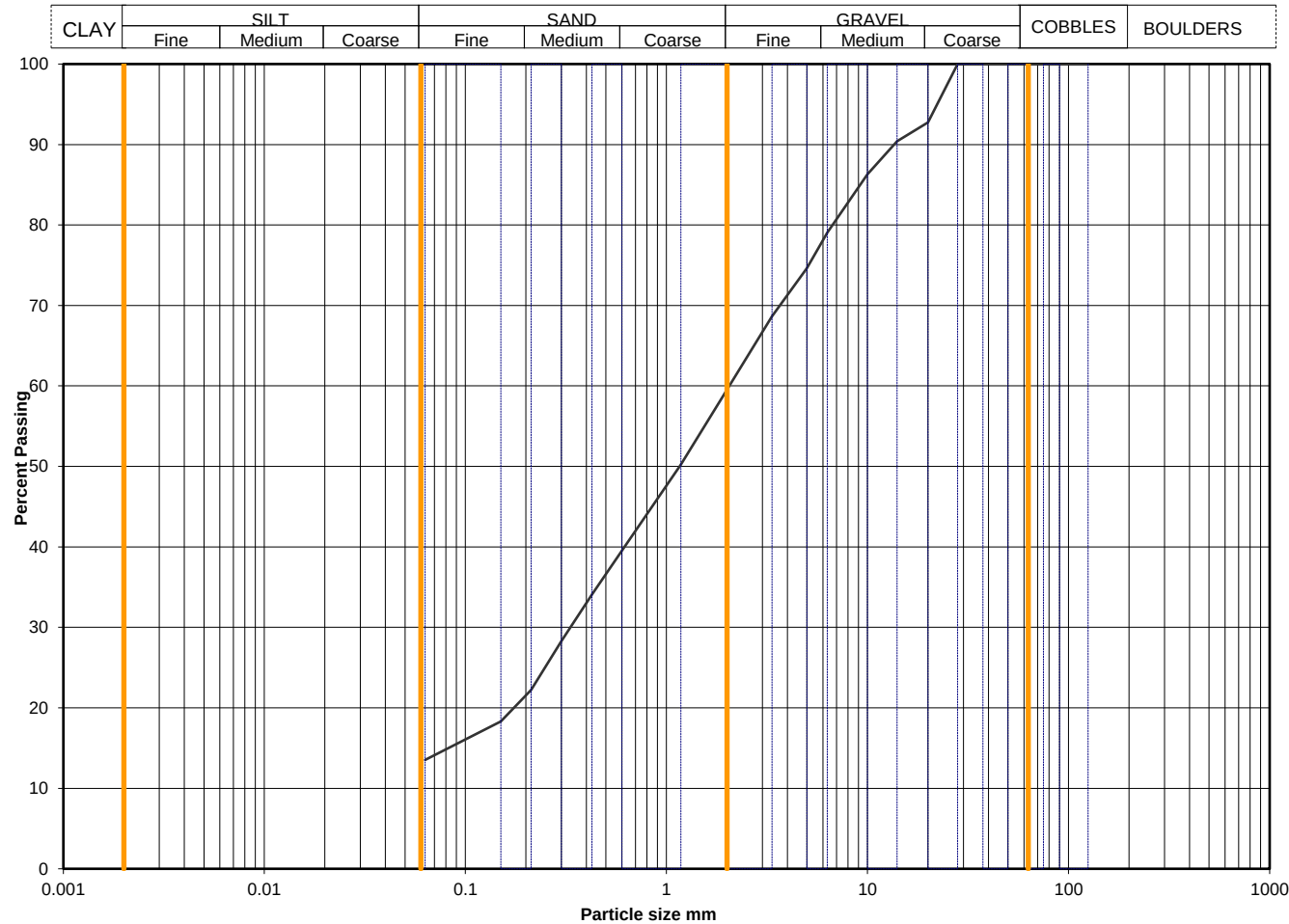
The results reported relate only to the samples tested; test carried out outside the scope of UKAS accreditation. © Copyright 2016 SOCOTEC UK Limited

Figure
PSD

Printed: 16/02/2024 14:07

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	WSG01
	#6818690186740014	Sample Depth (m BGL)	3.00 - 4.00
		Sample Type and No	B14
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	93		
14	90		
10	86		
6.3	79		
5	75		
3.35	69		
2	60		
1.18	50		
0.6	40		
0.425	34		
0.3	28		
0.212	22		
0.15	18		
0.063	14		

Dry mass of sample, kg	
1.1	

Soil description	Brown sandy gravelly CLAY.
Preparation / Pretreatment	Sieve: pre dried,
Remarks	

Sample Proportions *<63mm values to aid description only	Cobbles / boulders	Whole	*<63mm
	Gravel	0	0
	Sand	41	41
	Silt	46	46
	Clay	silt+clay = 14	14

Uniformity Coefficient		D60 / D10	Not applicable
Test Method		BS EN ISO 17892-4	
		Sieving	5.2 wet sieve
		Sedimentation	none

QA Ref
SLR 2.9
Rev 2.23
Jul 17



Project No H3091-23_G
Project Name Glyncorwg Industrial Units

The results reported relate only to the samples tested; test carried out outside the scope of UKAS accreditation. © Copyright 2016 SOCOTEC UK Limited

Figure
PSD

Printed: 16/02/2024 14:07



Certificate of Analysis

Certificate Number 24-00749

Issued: 18-Jan-24

Client SOCOTEC UK Ltd
INFRASTRUCTURE SERVICES
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Our Reference 24-00749

Client Reference H3091-23_G

Order No h/5895

Contract Title Glyncorrwg Industrial Units

Description 3 Soil samples.

Date Received 15-Jan-24

Date Started 15-Jan-24

Date Completed 18-Jan-24

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read "Kirk Bridgewood".

Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 24-00749

Client Ref H3091-23_G

Contract Title Glyncorwg Industrial Units

Lab No	2286278	2286279	2286280
Sample ID	BHG01D	WSG01	WSG01
Depth	0.30	3.00	4.00
Other ID	1	11	18
Sample Type	B	D	D
Sampling Date	n/s	n/s	n/s
Sampling Time	1328	1356	1415

Test	Method	LOD	Units			
Inorganics						
pH	DETSC 2008#		pH	8.4	7.4	7.5
Sulphate Aqueous Extract as SO ₄ (2:1)	DETSC 2076#	10	mg/l	45	54	50
Sulphur as S, Total	DETSC 2320	0.01	%	0.03	0.34	0.11
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.03	0.09	0.05

Information in Support of the Analytical Results

Our Ref 24-00749
 Client Ref H3091-23_G
 Contract Glyncorrwg Industrial Units

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2286278	BHG01D 0.30 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), Metals ICP Prep (182 days), pH + Conductivity (7 days)	
2286279	WSG01 3.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), Metals ICP Prep (182 days), pH + Conductivity (7 days)	
2286280	WSG01 4.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), Metals ICP Prep (182 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report



Certificate of Analysis

Certificate Number 24-04881

Issued: 12-Mar-24

Client SOCOTEC UK Ltd
INFRASTRUCTURE SERVICES
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Our Reference 24-04881

Client Reference ~ H3091-23_G

Order No ~ h/6029

Contract Title ~ H3091-23_G:Glyncorrwg Industrial Units

Description 7 Soil samples.

Date Received 07-Mar-24

Date Started 07-Mar-24

Date Completed 12-Mar-24

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By


Kirk Bridgewood
General Manager



Normec DETS Limited

Unit 2, Park Road Industrial Estate South, Consett, Co Durham, DH8 5PY

Tel: 01207 582333 • email: info@dets.co.uk • www.dets.co.uk

Page 1 of 3

Summary of Chemical Analysis Soil Samples

Our Ref 24-04881

Client Ref ~ H3091-23_G

Contract Title ~ H3091-23_G:Glyncorrwg Industrial Units

Lab No	2309029	2309030	2309031	2309032	2309033	2309034	2309035
Sample ID ~	CPG01	CPG01	CPG01	CPG02	CPG02	TPG03	TPG03
Depth ~	5.60	6.50	8.80	1.50	6.00	0.60	2.80
Other ID ~	9	11	16	3	17	3	9
Sample Type ~	B	B	D	D	D	D	D
Sampling Date ~	24/02/2024	24/02/2024	24/02/2024	24/02/2024	24/02/2024	24/02/2024	24/02/2024
Sampling Time ~	1642	1108	1610	1050	0912	1206	1208

Test	Method	LOD	Units							
Inorganics										
pH	DETSC 2008#		pH	6.6	6.6	6.6	7.7	7.1	8.2	7.9
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	38	27	13	27	57	21	230
Sulphur as S, Total	DETSC 2320	0.01	%	0.06	0.08	< 0.01	0.07	0.25	0.08	0.07
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.05	0.05	0.01	0.08	0.08	0.04	0.07

Information in Support of the Analytical Results

Our Ref 24-04881
 Client Ref ~ H3091-23_G
 Contract ~ H3091-23_G:Glyncorrwg Industrial Units

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2309029	CPG01 5.60 SOIL	24/02/24	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
2309030	CPG01 6.50 SOIL	24/02/24	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
2309031	CPG01 8.80 SOIL	24/02/24	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
2309032	CPG02 1.50 SOIL	24/02/24	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
2309033	CPG02 6.00 SOIL	24/02/24	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
2309034	TPG03 0.60 SOIL	24/02/24	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	
2309035	TPG03 2.80 SOIL	24/02/24	PT 1L	Total Sulphur ICP (7 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report



SOCOTEC

APPENDIX F
GEOENVIRONMENTAL LABORATORY TEST RESULTS

Certificate of Analysis – (Soil)	23122671
	24020349
	24023169
Certificate of Analysis – (Water)	24030087

Certificate of Analysis

Client: SOCOTEC Geotechnical

Project: 23122671

Quote: BEC231132559 V1.1

Project Ref: H3091-23-G

Site: Glyncorrwg

Contact: Amelia Jones

Address: Unit 15, Crosby Yard
Wildmill
Bridgend
Mid Glamorgan
CF31 1JZ

E-Mail: Amelia.Jones@socotec.com

Phone: 07810 180295

No. Samples Received: 5

Date Received: 23/12/2023

Analysis Date: 10/01/2024

Date Issued: 10/01/2024

Report Type: Final Version 02

This report supersedes any versions previously issued by the laboratory

Reported by Customer Service Co-Ordinator
Samantha Edwards



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 23122671
Date Issued: 10/01/2024

Samples Analysed

<u>Text ID</u>	<u>Sample Reference</u>	<u>Sampling Date</u>	<u>Sample Type</u>	<u>Sample Description</u>
23122671-001	BHG01 -2-ES-0.30	14/12/2023 19:24:00	SOLID	Soil Sample
23122671-002	BHG01A-2-ES-0.30	14/12/2023 19:24:00	SOLID	Soil Sample
23122671-003	BHG01C-2-ES-0.30	14/12/2023 19:24:00	SOLID	Soil Sample
23122671-004	WSG01-2-ES-0.20	14/12/2023 19:24:00	SOLID	Soil Sample
23122671-005	WSG01-5-ES-1.00	14/12/2023 19:24:00	SOLID	Soil Sample



Client: SOCOTEC Geotechnical
 Project Name: H3091-23-G-Glyncorwg
 Project No: 23122671
 Date Issued: 10/01/2024



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005
					Customer ID	BHG01 -2-ES-0.30	BHG01A-2-ES-0.30	BHG01C-2-ES-0.30	WSG01-2-ES-0.20	WSG01-5-ES-1.00
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	14/12/2023	14/12/2023	14/12/2023	14/12/2023	14/12/2023
>C6-C7 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.386	<0.377	<0.224	<0.225	<0.228
>C7-C8 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.386	<0.377	<0.224	<0.225	<0.228
>C7-C8 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg^	UM		<0.019	<0.019	<0.011	<0.011	<0.011
>C8-C10 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.386	<0.377	<0.224	<0.225	<0.228
>C8-C10 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.04	mg/kg^	UM		<0.077	<0.076	<0.045	<0.045	<0.046
C5-C6 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.386	<0.377	<0.224	<0.225	<0.228
C5-C7 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg^	UM		<0.019	<0.019	<0.011	<0.011	<0.011
Total GRO C5-C10 HS_1D_Total	GROHSA/BTEXHSA	0.2	mg/kg^	UM		<0.386	<0.377	<0.224	<0.225	<0.228
pH (2.5:1 extraction)	PHSOIL	1	pH units	UM		8.4	7.8	8.9	8.6	8.7
Total Cyanide	SFAPI	0.5	mg/kg^	UM		<1.0	<0.9	<0.6	<0.6	<0.6
Soil Organic Matter	WSLM59	0.04	% m/m^	U		24.2	26.9	15.0	23.3	22.0
Arsenic as As	ICPMSS	0.3	mg/kg^	UM		23.6	19.9	8.8	24.0	20.7
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM		0.8	0.6	0.4	1.0	0.7
Copper as Cu	ICPMSS	1.6	mg/kg^	UM		60.7	48.8	46.5	75.7	52.6
Lead as Pb	ICPMSS	0.7	mg/kg^	UM		97.6	70.3	50.2	182.7	124.9
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM		<0.5	<0.5	<0.5	<0.5	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM		29.5	31.0	33.4	22.8	22.1
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM		14.9	13.9	9.2	11.1	9.4
Zinc as Zn	ICPMSS	16	mg/kg^	UM		297.8	187.5	176.1	856.7	496.7

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005
					Customer ID	BHG01 -2-ES-0.30	BHG01A-2-ES-0.30	BHG01C-2-ES-0.30	WSG01-2-ES-0.20	WSG01-5-ES-1.00
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	14/12/2023	14/12/2023	14/12/2023	14/12/2023	14/12/2023
Boron as B	ICPSOIL	10	mg/kg^	N		11	13	<10	<10	<10
Water Soluble Sulphate as SO4 by Mass	ICPWSS	20	mg/kg^	UM		64	44	28	35	38
Benzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<19	<19	<11	<11	<11
Ethylbenzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<19	<19	<11	<11	<11
m/p-Xylene HS_1D_AR	BTEXHSA	20	µg/kg^	UM		<39	<38	<22	<23	<23
o-Xylene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<19	<19	<11	<11	<11
Toluene HS_1D_AR	BTEXHSA	10	µg/kg^	UM		<19	<19	<11	<11	<11
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM		<0.15	<0.15	<0.09	<0.09	<0.09
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U		<0.15	<0.15	<0.09	<0.09	<0.09
Anthracene	PAHMSUS	0.08	mg/kg^	U		<0.15	<0.15	<0.09	<0.09	<0.09
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM		0.49* _B	0.34* _B	0.15* _B	0.17* _B	<0.09* _B
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM		0.46	0.33	0.15	0.14	<0.09
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		0.92	0.68	0.30	0.30	0.14
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM		0.35	0.27	0.12	0.11	<0.09
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM		0.30	0.19	0.09	0.10	<0.09
Chrysene	PAHMSUS	0.08	mg/kg^	UM		0.70	0.53	0.27	0.28	0.19
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM		<0.15	<0.15	<0.09	<0.09	<0.09
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM		0.82	0.63	0.30	0.30	0.13
Fluorene	PAHMSUS	0.08	mg/kg^	UM		<0.15	<0.15	<0.09	<0.09	<0.09

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005
					Customer ID	BHG01 -2-ES-0.30	BHG01A-2-ES-0.30	BHG01C-2-ES-0.30	WSG01-2-ES-0.20	WSG01-5-ES-1.00
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	14/12/2023	14/12/2023	14/12/2023	14/12/2023	14/12/2023
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM		0.47	0.35	0.14	0.14	<0.09
Naphthalene	PAHMSUS	0.08	mg/kg^	UM		0.20	0.16	0.19	0.16	0.18
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM		0.93	0.58	0.56	0.42	0.38
Pyrene	PAHMSUS	0.08	mg/kg^	UM		0.56	0.43	0.22	0.21	0.10
Total PAH 16	PAHMSUS	1.28	mg/kg^	U		6.98	5.25	2.95	2.77	2.03
Dimethylphenols	PHEHPLCUV	0.1	mg/kg^	U		<0.18	<0.17	<0.10	<0.11	<0.11
Methylphenols	PHEHPLCUV	0.1	mg/kg^	U		0.25	0.64	0.12	<0.11	0.11
Phenol	PHEHPLCUV	0.1	mg/kg^	UM		0.23	1.72	<0.10	<0.11	<0.11
Total Phenols	PHEHPLCUV	0.4	mg/kg^	U		0.84	2.70	0.41	<0.44	0.45
Trimethylphenols	PHEHPLCUV	0.1	mg/kg^	U		<0.18	<0.17	<0.10	<0.11	<0.11
>C10-C12 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		<7.72	<7.55	<4.47	<4.50	<4.56
>C12-C16 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		<7.72	<7.55	6.12	4.73	<4.56
>C16-C21 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U		8.67	<7.55	9.95	8.85	7.97
>C21-C35 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	10	mg/kg^	U		28.9	24.9	18.4	39.1	20.0
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg^	U		47.1	43.5	42.5	64.5	37.8
>C10-C12 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		<7.72	8.39	<4.47	<4.50	<4.56
>C12-C16 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		<7.72	14.0	5.42	<4.50	5.45
>C16-C21 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg^	U		9.88	13.3	9.35	6.98	5.96
>C21-C35 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	10	mg/kg^	U		36.6	46.9	26.9	34.3	<11.4

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005
					Customer ID	BHG01 -2-ES-0.30	BHG01A-2-ES-0.30	BHG01C-2-ES-0.30	WSG01-2-ES-0.20	WSG01-5-ES-1.00
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	14/12/2023	14/12/2023	14/12/2023	14/12/2023	14/12/2023
Total TPH >C8-C40 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	20	mg/kg^	U		56.4	97.9	48.6	55.8	27.8
1,1,1,2-Tetrachloroethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,1,1-Trichloroethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,1,2,2-Tetrachloroethane	VOCHSAS	1	µg/kg^	N		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,1,2-Trichloroethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,1-Dichloroethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,1-Dichloroethene	VOCHSAS	1	µg/kg^	U		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,1-Dichloropropene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,2,3-Trichlorobenzene	VOCHSAS	3	µg/kg^	UM		<58 _D	<38 _D	<19 _{C,D}	<23 _{C,D}	<19 _{C,D}
1,2,3-Trichloropropane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,2,4-Trichlorobenzene	VOCHSAS	3	µg/kg^	N		<58 _D	<38 _D	<19 _{C,D}	<23 _{C,D}	<19 _{C,D}
1,2,4-Trimethylbenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	9 _C
1,2-Dibromo-3-chloropropane	VOCHSAS	1	µg/kg^	U		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,2-Dibromoethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,2-Dichlorobenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,2-Dichloroethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,2-Dichloropropane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,3,5-Trimethylbenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,3-Dichlorobenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005
					Customer ID	BHG01 -2-ES-0.30	BHG01A-2-ES-0.30	BHG01C-2-ES-0.30	WSG01-2-ES-0.20	WSG01-5-ES-1.00
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	14/12/2023	14/12/2023	14/12/2023	14/12/2023	14/12/2023
1,3-Dichloropropane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
1,4-Dichlorobenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
2,2-Dichloropropane	VOCHSAS	2	µg/kg^	UM		<39 _D	<25 _D	<12 _{C,D}	<15 _{C,D}	<13 _{C,D}
2-Chlorotoluene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
4-Chlorotoluene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Benzene	VOCHSAS	1	µg/kg^	UM		<19 _D	17	16 _C	<8 _{C,D}	12 _C
Bromobenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Bromochloromethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Bromodichloromethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Bromoform	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Bromomethane	VOCHSAS	1	µg/kg^	UM		<19* _{B,D}	<13* _{B,D}	<6* _{B,C,D}	<8* _{B,C,D}	<6* _{B,C,D}
Carbon Tetrachloride	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Chlorobenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Chloroethane	VOCHSAS	2	µg/kg^	UM		<39 _D	<25 _D	<12 _{C,D}	<15 _{C,D}	<13 _{C,D}
Chloroform	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Chloromethane	VOCHSAS	3	µg/kg^	U		<58 _D	<38 _D	<19 _{C,D}	<23 _{C,D}	<19 _{C,D}
cis 1,2-Dichloroethene	VOCHSAS	5	µg/kg^	UM		<97 _D	<63 _D	<31 _{C,D}	<38 _{C,D}	<32 _{C,D}
cis 1,3-Dichloropropene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Dibromochloromethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005
					Customer ID	BHG01 -2-ES-0.30	BHG01A-2-ES-0.30	BHG01C-2-ES-0.30	WSG01-2-ES-0.20	WSG01-5-ES-1.00
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	14/12/2023	14/12/2023	14/12/2023	14/12/2023	14/12/2023
Dibromomethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Dichlorodifluoromethane	VOCHSAS	1	µg/kg^	N		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Ethylbenzene	VOCHSAS	2	µg/kg^	UM		<39 _D	<25 _D	<12 _{C,D}	<15 _{C,D}	<13 _{C,D}
Hexachlorobutadiene	VOCHSAS	2	µg/kg^	N		<39 _D	<25 _D	<12 _{C,D}	<15 _{C,D}	<13 _{C,D}
iso-Propylbenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
m and p-Xylene	VOCHSAS	4	µg/kg^	UM		<77 _D	<50 _D	<25 _{C,D}	<30 _{C,D}	26 _C
MTBE	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Naphthalene	VOCHSAS	5	µg/kg^	UM		<97 _D	<63 _D	<31 _{C,D}	<38 _{C,D}	<32 _{C,D}
n-Butylbenzene	VOCHSAS	1	µg/kg^	U		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
o-Xylene	VOCHSAS	2	µg/kg^	UM		<39 _D	<25 _D	<12 _{C,D}	<15 _{C,D}	<13 _{C,D}
p-Isopropyltoluene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Propylbenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
sec-Butylbenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Styrene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
tert-Butylbenzene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Tetrachloroethene	VOCHSAS	3	µg/kg^	UM		<58 _D	<38 _D	<19 _{C,D}	<23 _{C,D}	<19 _{C,D}
Toluene	VOCHSAS	5	µg/kg^	UM		<97 _D	<63 _D	31 _C	<38 _{C,D}	<32 _{C,D}
trans 1,2-Dichloroethene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
trans 1,3-Dichloropropene	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 23122671
Date Issued: 10/01/2024



Analysis Results

					Sample ID	001	002	003	004	005
					Customer ID	BHG01 -2-ES-0.30	BHG01A-2-ES-0.30	BHG01C-2-ES-0.30	WSG01-2-ES-0.20	WSG01-5-ES-1.00
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	14/12/2023	14/12/2023	14/12/2023	14/12/2023	14/12/2023
Analysis	Method Code	MDL	Units	Accred.						
Trichloroethene	VOCHSAS	1	µg/kg^	U		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Trichlorofluoromethane	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Vinyl Chloride	VOCHSAS	1	µg/kg^	UM		<19 _D	<13 _D	<6 _{C,D}	<8 _{C,D}	<6 _{C,D}
Total Moisture at 35°C	CLANDPREP	0.1	%	N		48.2	47.0	10.6	11.2	12.3
Colour of Material	CLANDPREP		-	N		Black	Black	Black	Black	Black
Major Constituents	CLANDPREP		-	N		SILT	SILT	SILT	SILT	SILT
Minor Constituents	CLANDPREP		-	N		None	None	None	Gravel	Gravel
Miscellaneous Constituents	CLANDPREP		-	N		Organic Matter	Organic Matter	Organic Matter	na	Organic Matter
Asbestos Identification	SUB020		-	N		NAIIS	NAIIS	NAIIS	NAIIS	NAIIS

CERTIFICATE OF ANALYSIS

ANALYSIS REQUESTED BY: SOCOTEC UK Ltd
Environmental Chemistry
PO Box 100
Burton upon Trent
Staffordshire
DE15 0XD

CONTRACT NO: S38061-16

DATE OF ISSUE: 10.01.24

DATE SAMPLES RECEIVED: 03.01.24

DATE ANALYSIS COMPLETED: 10.01.24

DESCRIPTION: Five soil/loose aggregate samples each weighing approximately 0.4-1.2kg.

ANALYSIS REQUESTED: Qualitative and quantitative analysis of soil/loose aggregate samples for mass determination of asbestos.

METHODS:

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

Quantitative - The analysis was carried out using our documented in-house method based on HSE Contract Research Report No. 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies *et al*, 1996) and HSG 248. Our method includes initial examination of the entire sample, detailed analysis of a representative sub-sample and quantification by hand picking/weighing and/or fibre counting/sizing as appropriate.

RESULTS:

Initial Screening

No asbestos was detected in any of the soil samples by stereo-binocular and polarised light microscopy.

A summary of the results is given in Table 1.



CONTRACT NO: S38061-16
DATE OF ISSUE: 10.01.24

RESULTS: (cont.)

Table 1: Qualitative Results

SOCOTEC Job I.D: 23122671

IOM sample number	SOCOTEC Sample ID	Client Sample ID	ACM type detected	PLM result
S38061-51	23122671-001	BHG01-2-ES-0.30	-	No Asbestos Detected
S38061-52	23122671-002	BHG01A-2-ES-0.30	-	No Asbestos Detected
S38061-53	23122671-003	BHG01C-2-ES-0.30	-	No Asbestos Detected
S38061-54	23122671-004	WSG01-2-ES-0.20	-	No Asbestos Detected
S38061-55	23122671-005	WSG01-5-ES-1.00	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

COMMENTS:

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are out with the scope of our UKAS accreditation.

AUTHORISED BY:

D Third
Laboratory Analyst



Client: SOCOTEC Geotechnical
 Project Name: H3091-23-G-Glyncorrwg
 Project No: 23122671
 Date Issued: 10/01/2024

Deviating Sample Report

<u>Sample Reference</u>	<u>Text ID</u>	<u>Method Code</u>	Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time
BHG01 -2-ES-0.30	23122671-001	BTEXHSA						✓
BHG01 -2-ES-0.30	23122671-001	GROHSA/BTEXHSA						✓
BHG01 -2-ES-0.30	23122671-001	PHSOIL						✓
BHG01 -2-ES-0.30	23122671-001	VOCHSAS						✓
BHG01A-2-ES-0.30	23122671-002	BTEXHSA						✓
BHG01A-2-ES-0.30	23122671-002	GROHSA/BTEXHSA						✓
BHG01A-2-ES-0.30	23122671-002	PHSOIL						✓
BHG01A-2-ES-0.30	23122671-002	VOCHSAS						✓
BHG01C-2-ES-0.30	23122671-003	BTEXHSA						✓
BHG01C-2-ES-0.30	23122671-003	GROHSA/BTEXHSA						✓
BHG01C-2-ES-0.30	23122671-003	PHSOIL						✓
BHG01C-2-ES-0.30	23122671-003	VOCHSAS						✓
WSG01-2-ES-0.20	23122671-004	BTEXHSA						✓
WSG01-2-ES-0.20	23122671-004	GROHSA/BTEXHSA						✓
WSG01-2-ES-0.20	23122671-004	PHSOIL						✓
WSG01-2-ES-0.20	23122671-004	VOCHSAS						✓
WSG01-5-ES-1.00	23122671-005	BTEXHSA						✓
WSG01-5-ES-1.00	23122671-005	GROHSA/BTEXHSA						✓
WSG01-5-ES-1.00	23122671-005	PHSOIL						✓
WSG01-5-ES-1.00	23122671-005	VOCHSAS						✓



Client: SOCOTEC Geotechnical
 Project Name: H3091-23-G-Glyncorrwg
 Project No: 23122671
 Date Issued: 10/01/2024

Analysis Method

<u>Method Code</u>	<u>Method Description</u>	<u>Analysis Method</u>
BTEXHSA	BTEX by GCFID	As Received
CLANDPREP	DW35 - CLand Prep and Dry Weight Correction to 35°C	As Received
CLANDPREP	Solid Material Description	As Received
GROHSA/BTEXHSA	GRO CWG (C5-C10) Ali/Aro Split	As Received
ICPMSS	Arsenic in Solids by ICPMS	Air Dried & Ground
ICPMSS	Cadmium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Chromium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Copper in Solids by ICPMS	Air Dried & Ground
ICPMSS	Lead in Solids by ICPMS	Air Dried & Ground
ICPMSS	Mercury in Solids by ICPMS	Air Dried & Ground
ICPMSS	Nickel in Solids by ICPMS	Air Dried & Ground
ICPMSS	Zinc in Solids by ICPMS	Air Dried & Ground
ICPSOIL	Boron in Solids by ICPOES	Air Dried & Ground
ICPWSS	Sulphate as SO4 (Water Soluble)	Air Dried & Ground
PAHMSUS	16 PAHs by GCMS	As Received
PHEHPLCUV	Phenols Suite by HPLC UV	As Received
PHSOIL	pH (2.5:1)	As Received
SFAPI	Cyanide (Total) by SFA	As Received
SUB020	Asbestos Stage 1 (with Stage 2+3 Trigger)	
TPHFIDUS (Aliphatic)	TPH (CWG) Aliphatic Split with Carbon Banding	As Received
TPHFIDUS (Aromatic)	TPH (CWG) Aromatic Split with Carbon Banding	As Received
VOCHSAS	VOCs (Target List) by GCMS	As Received
WSLM59	SOM: Soil Organic Matter (%) (Calc)	Air Dried & Ground

Result Report Notes

Letters alongside results signify that the result has associated report notes.
 The report notes are as follows:

<u>Letter</u>	<u>Note</u>
A	Due to the matrix of the sample the laboratory has had to deviate from our standard protocols to be able to process the sample and provide a result. Where applicable the accreditation has been removed and this should be taken into consideration when utilising the data.
B	The QC associated with this result has not wholly met the QMS requirements, the accreditation has therefore been removed. However, the Laboratory has confidence in the performance of the method as a whole and that the integrity of the data has not been significantly compromised.
C	Due to matrix interference, the internal standard and/or surrogate has not met the QMS requirements. This should be taken into consideration when utilising the data.
D	A non-standard volume or mass has been used for this test which has resulted in a raised detection limit.
E	Due to the parameter value being beyond our calibration range (and following the maximum size of dilution allowed, where applicable), the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only.



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 23122671
Date Issued: 10/01/2024

- F Based on the sample history, appearance and smell a dilution was applied prior to testing. Unfortunately, the result is either above (>) or below (<) our calibration range. Results above our calibration range have accreditation removed. The data should be used for indicative purposes only.
- G The day 5 oxygen reading was below the capability of the instrument to detect, and therefore the calculated BOD has been reported unaccredited for guidance purposes only.

[HWOL Acronym Key](#)

<u>Acronym</u>	<u>Description</u>
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 23122671
Date Issued: 10/01/2024

Additional Information

This report refers to samples as received. SOCOTEC UK Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

The accreditation codes are as follows:

- U = UKAS accredited analysis
- M = MCERT accredited analysis
- N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 35 °C.

All Air Dried and Ground Samples (ADG) are oven dried at less than 35 °C.

This report shall not be reproduced except in full, without written approval of the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

- IS = Insufficient Sample to complete analysis
- NA = Sample is not amenable for the required analysis
- ND = Results cannot be determined

Items listed with a 'SUB' method code prefix have been carried out by an external subcontracted laboratory.

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the subcontracted lab for information regarding any deviancies for this analysis.

Summaries of analysis methods are available upon request.

End of Certificate of Analysis

Certificate of Analysis

Client: SOCOTEC Geotechnical

Project: 24020349

Quote: BEC231132559 V1.1

Project Ref: H3091-23-G

Site: H3091-23_G

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No. Samples Received: 4

Date Received: 03/02/2024

Analysis Date: 28/02/2024

Date Issued: 28/02/2024

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory

Reported by Customer Service Co-Ordinator
Julie Dickinson
01283 554496



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-H3091-23_G
Project No: 24020349
Date Issued: 28/02/2024

Samples Analysed

<u>Text ID</u>	<u>Sample Reference</u>	<u>Sampling Date</u>	<u>Sample Type</u>	<u>Sample Description</u>
24020349-001	TPG01-2-ES-0.20	31/01/2024 00:00:00	SOLID	Soil Sample
24020349-002	TPG01-6-ES-0.80	31/01/2024 00:00:00	SOLID	Soil Sample
24020349-003	TPG02-7-ES-1.60	31/01/2024 00:00:00	SOLID	Soil Sample
24020349-004	TPG03-2-ES-0.25	31/01/2024 00:00:00	SOLID	Soil Sample

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
>C6-C7 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM			<0.274	<0.219*	<0.222*		<0.222*
>C7-C8 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM			<0.274	<0.219*	<0.222*		<0.222*
>C7-C8 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg [^]	UM			<0.014	0.017*	<0.011*		<0.011*
>C8-C10 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM			<0.274	<0.219* c	<0.222* c		<0.222* c
>C8-C10 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.04	mg/kg [^]	UM			<0.055	0.064* c	<0.045* c		<0.045* c
C5-C6 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM			<0.274	<0.219*	<0.222*		<0.222*
C5-C7 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg [^]	UM			<0.014	0.029*	<0.011*		<0.011*
Total GRO C5-C10 HS_1D_Total	GROHSA/BTEXHSA	0.2	mg/kg [^]	UM			<0.274	<0.219*	<0.222*		<0.222*
Antimony as Sb	ICPMSW (Dissolved)	0.01	mg/kg [^]	N		<0.01				<0.01	
Arsenic as As	ICPMSW (Dissolved)	0.01	mg/kg [^]	N		<0.01				<0.01	
Barium as Ba	ICPWATVAR (Dissolved)	0.1	mg/kg [^]	N		0.2				0.3	
Cadmium as Cd	ICPMSW (Dissolved)	0.0002	mg/kg [^]	N		0.0006				<0.0002	
Chloride as Cl	KONENS	10	mg/kg [^]	N		20				<10	
Total Chromium as Cr	ICPMSW (Dissolved)	0.01	mg/kg [^]	N		<0.01				<0.01	
Copper as Cu	ICPMSW (Dissolved)	0.01	mg/kg [^]	N		0.04				<0.01	
Lead as Pb	ICPMSW (Dissolved)	0.01	mg/kg [^]	N		0.05				<0.01	
Mercury as Hg	ICPMSW (Dissolved)	0.0003	mg/kg [^]	N		<0.0003				<0.0003	
Molybdenum as Mo	ICPMSW (Dissolved)	0.01	mg/kg [^]	N		<0.01				<0.01	
Nickel as Ni	ICPMSW (Dissolved)	0.01	mg/kg [^]	N		<0.01				<0.01	



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-H3091-23_G
Project No: 24020349
Date Issued: 28/02/2024



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Phenol Index	SFAPI	0.5	mg/kg^	N		<0.5				<0.5	
Selenium as Se	ICPMSW (Dissolved)	0.01	mg/kg^	N		<0.01				0.04	
Total Sulphur as SO4	ICPWATVAR (Dissolved)	30	mg/kg^	N		59				390	
TDS as mg/kg	PHCONDW	700	mg/kg^	N		<700				949	
Leached Organic Carbon	WSLM13	2	mg/kg^	N		13.1				<4.0	
Fluoride as F	ISEF	1	mg/kg^	N		<1				2	
Zinc as Zn	ICPMSW (Dissolved)	0.02	mg/kg^	N		0.39				<0.02	
Conductivity at 25°C	PHCONDW	100	µS/cm	N		<100				147	
pH	PHCONDW	1	pH units	N		7.3				7.4	
TDS as mg/l	PHCONDW	70	mg/l	N		<70				95	
ANC	ANC	0.04	mol/kg^	N			0.16				0.80
pH (2.5:1 extraction)	PHSOIL	1	pH units	UM			7.2	4.9*	5.4*		6.9*
Chloride as Cl	KONENS	1	mg/l	U		2				<1	
Phenol Index	SFAPI	0.05	mg/l	U		<0.05				<0.05	
Total Cyanide	SFAPI	0.5	mg/kg^	UM			<0.7	<0.5*	<0.6*		<0.6*
Fluoride as F	ISEF	0.1	mg/l	U		<0.1				0.2	
Soil Organic Matter	WSLM59	0.04	% m/m^	U			31.5	>31.6* E	>31.6* E		>31.6* E
Total Organic Carbon	WSLM59	0.02	% m/m^	U			18.3				>21.3* E
LOI @ 450°C	LOI(%MM)	0.2	% m/m^	N			19.4				28.2

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Leached Organic Carbon	TOCW	0.4	mg/l	U		1.32				<0.40	
Arsenic as As	ICPMSS	0.3	mg/kg^	UM			44.6	18.7*	14.7*		7.6*
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM			1.0	<0.2*	<0.2*		<0.2*
Copper as Cu	ICPMSS	1.6	mg/kg^	UM			129.4	42.0*	37.8*		33.9*
Lead as Pb	ICPMSS	0.7	mg/kg^	UM			196.7	21.3*	15.3*		13.4*
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM			<0.5	<0.5*	<0.5*		<0.5*
Nickel as Ni	ICPMSS	2	mg/kg^	UM			30.3	15.4*	13.8*		25.1*
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM			14.9	6.6*	4.8*		5.8*
Zinc as Zn	ICPMSS	16	mg/kg^	UM			592.2	29.1*	25.7*		114.0*
Boron as B	ICPSOIL	10	mg/kg^	N			<10	<10	<10		<10
Water Soluble Sulphate as SO4 by Mass	ICPWSS	20	mg/kg^	UM			37	762*	224*		382*
Antimony as Sb	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001				<0.001	
Arsenic as As	ICPMSW (Dissolved)	0.001	mg/l	U		0.001				<0.001	
Cadmium as Cd	ICPMSW (Dissolved)	0.00002	mg/l	U		0.00006				<0.00002	
Total Chromium as Cr	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001				<0.001	
Copper as Cu	ICPMSW (Dissolved)	0.001	mg/l	U		0.004				<0.001	
Lead as Pb	ICPMSW (Dissolved)	0.001	mg/l	U		0.005				<0.001	
Mercury as Hg	ICPMSW (Dissolved)	0.00003	mg/l	U		<0.00003				<0.00003	
Molybdenum as Mo	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001				<0.001	

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Nickel as Ni	ICPMSW (Dissolved)	0.001	mg/l	U		0.001				<0.001	
Selenium as Se	ICPMSW (Dissolved)	0.001	mg/l	U		<0.001				0.004	
Zinc as Zn	ICPMSW (Dissolved)	0.002	mg/l	U		0.039				0.002	
Barium as Ba	ICPWATVAR (Dissolved)	0.01	mg/l	U		0.02				0.03	
Total Sulphur as SO4	ICPWATVAR (Dissolved)	3	mg/l	U		6				39	
Benzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM			<14	29*	<11*		<11*
Ethylbenzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM			<14	15* c	<11* c		<11* c
m/p-Xylene HS_1D_AR	BTEXHSA	20	µg/kg^	UM			<27	38* c	<22* c		<22* c
o-Xylene HS_1D_AR	BTEXHSA	10	µg/kg^	UM			<14	<11* c	<11* c		<11* c
Toluene HS_1D_AR	BTEXHSA	10	µg/kg^	UM			<14	17*	<11*		<11*
Benzene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM			<0.014				<0.011*
Ethylbenzene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM			<0.014				<0.011* c
m/p-Xylene HS_1D_AR	BTEXHSA	0.02	mg/kg^	UM			<0.027				<0.022* c
o-Xylene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM			<0.014				<0.011* c
Toluene HS_1D_AR	BTEXHSA	0.01	mg/kg^	UM			<0.014				<0.011*
Total BTEX HS_1D_AR	BTEXHSA	0.06	mg/kg^	UM			<0.082				<0.067*
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM			<0.55 D	<0.44* D	<0.09*		<0.09*
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U			<0.55 D	<0.44* D	<0.09*		<0.09*
Anthracene	PAHMSUS	0.08	mg/kg^	U			<0.55 D	<0.44* D	<0.09*		<0.09*

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM			2.01	<0.44* _D	<0.09*		0.12*
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM			2.13	<0.44* _D	<0.09*		<0.09*
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM			3.24	0.60*	0.12*		0.21*
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM			1.19	<0.44* _D	<0.09*		<0.09*
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM			1.41	<0.44* _D	<0.09*		<0.09*
Chrysene	PAHMSUS	0.08	mg/kg^	UM			2.32	0.89*	0.18*		0.28*
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM			<0.55 _D	<0.44* _D	<0.09*		<0.09*
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM			4.43	0.93*	0.25*		0.44*
Fluorene	PAHMSUS	0.08	mg/kg^	UM			<0.55 _D	0.64*	0.09*		<0.09*
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM			1.28	<0.44* _D	<0.09*		<0.09*
Naphthalene	PAHMSUS	0.08	mg/kg^	UM			<0.55 _D	1.37*	0.27*		0.33*
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM			1.90	2.72*	0.52*		0.76*
Pyrene	PAHMSUS	0.08	mg/kg^	UM			3.67	0.74*	0.18*		0.35*
Total PAH 16	PAHMSUS	1.28	mg/kg^	U			26.9	11.8*	2.40*		3.29*
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM			<0.55 _D				<0.09*
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U			<0.55 _D				<0.09*
Anthracene	PAHMSUS	0.08	mg/kg^	U			<0.55 _D				<0.09*
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM			2.01				0.12*
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM			2.13				<0.09*

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM			3.24				0.21*
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM			1.19				<0.09*
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM			1.41				<0.09*
Chrysene	PAHMSUS	0.08	mg/kg^	UM			2.32				0.28*
Coronene	PAHMSUS	0.08	mg/kg^	N			<0.55 D				<0.09
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM			<0.55 D				<0.09*
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM			4.43				0.44*
Fluorene	PAHMSUS	0.08	mg/kg^	UM			<0.55 D				<0.09*
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg^	UM			1.28				<0.09*
Naphthalene	PAHMSUS	0.08	mg/kg^	UM			<0.55 D				0.33*
Phenanthrene	PAHMSUS	0.08	mg/kg^	UM			1.90				0.76*
Pyrene	PAHMSUS	0.08	mg/kg^	UM			3.67				0.35*
Total PAH 16	PAHMSUS	1.28	mg/kg^	U			26.9				3.29*
Total PAH 17	PAHMSUS	1.36	mg/kg^	N			27.4				3.37
PCB 101	PCBECD	5	µg/kg^	UM			<6.85	<5.48*	<5.56*		<5.56*
PCB 118	PCBECD	5	µg/kg^	UM			<6.85	<5.48*	<5.56*		<5.56*
PCB 138	PCBECD	5	µg/kg^	UM			<6.85	<5.48*	<5.56*		<5.56*
PCB 153	PCBECD	5	µg/kg^	UM			<6.85	<5.48*	<5.56*		<5.56*
PCB 180	PCBECD	5	µg/kg^	UM			<6.85	<5.48*	<5.56*		<5.56*



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-H3091-23_G
Project No: 24020349
Date Issued: 28/02/2024



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
PCB 28	PCBECD	5	µg/kg^	UM			<6.85	<5.48*	<5.56*		<5.56*
PCB 52	PCBECD	5	µg/kg^	UM			<6.85	<5.48*	<5.56*		<5.56*
PCB 101	PCBECD	0.005	mg/kg^	UM			<0.007				<0.006*
PCB 118	PCBECD	0.005	mg/kg^	UM			<0.007				<0.006*
PCB 138	PCBECD	0.005	mg/kg^	UM			<0.007				<0.006*
PCB 153	PCBECD	0.005	mg/kg^	UM			<0.007				<0.006*
PCB 180	PCBECD	0.005	mg/kg^	UM			<0.007				<0.006*
PCB 28	PCBECD	0.005	mg/kg^	UM			<0.007				<0.006*
PCB 52	PCBECD	0.005	mg/kg^	UM			<0.007				<0.006*
Total PCB 7 Congeners	PCBECD	0.035	mg/kg^	UM			<0.048				<0.039*
Dimethylphenols	PHEHPLCUV	0.1	mg/kg^	U			<0.13	<0.10*	<0.10*		<0.10*
Methylphenols	PHEHPLCUV	0.1	mg/kg^	U			<0.13	0.16*	0.17*		0.11*
Phenol	PHEHPLCUV	0.1	mg/kg^	UM			<0.13	<0.10*	<0.10*		<0.10*
Total Phenols	PHEHPLCUV	0.4	mg/kg^	U			<0.51	0.45*	0.48*		0.41*
Trimethylphenols	PHEHPLCUV	0.1	mg/kg^	U			<0.13	<0.10*	<0.10*		<0.10*
>C10-C12 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U			<5.48	<4.38*	<4.45*		<4.45*
>C12-C16 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U			<5.48	<4.38*	5.77*		7.04*
>C16-C21 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg^	U			<5.48	7.00*	10.6*		12.6*
>C21-C35 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	10	mg/kg^	U			<13.7	27.4*	37.8*		26.5*



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-H3091-23_G
Project No: 24020349
Date Issued: 28/02/2024



Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg [^]	U			<27.4	39.7*	61.3*		51.5*
>C10-C12 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg [^]	U			<5.48	<4.38*	<4.45*		<4.45*
>C12-C16 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg [^]	U			<5.48	<4.38*	7.41*		8.78*
>C16-C21 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg [^]	U			<5.48	7.22*	30.0*		18.0*
>C21-C35 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	10	mg/kg [^]	U			30.7	33.5*	110*		53.8*
Total TPH >C8-C40 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	20	mg/kg [^]	U			37.8	59.3*	169*		93.2*
>C10-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg [^]	U			<27.4				50.8*
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg [^]	U			<27.4				51.5*
1,1,1,2-Tetrachloroethane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,1,1-Trichloroethane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,1,2,2-Tetrachloroethane	VOCHSAS	1	µg/kg [^]	N			<14 _D	<11 _D	<11 _D		<11 _D
1,1,2-Trichloroethane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,1-Dichloroethane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,1-Dichloroethene	VOCHSAS	1	µg/kg [^]	U			<14 _D	<11* _D	<11* _D		<11* _D
1,1-Dichloropropene	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,2,3-Trichlorobenzene	VOCHSAS	3	µg/kg [^]	UM			<41 _D	<33* _D	<33* _D		<33* _D
1,2,3-Trichloropropane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,2,4-Trichlorobenzene	VOCHSAS	3	µg/kg [^]	N			<41 _D	<33 _D	<33 _D		<33 _D
1,2,4-Trimethylbenzene	VOCHSAS	1	µg/kg [^]	UM			<14 _D	111*	128*		54*

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
1,2-Dibromo-3-chloropropane	VOCHSAS	1	µg/kg [^]	U			<14 _D	<11* _D	<11* _D		<11* _D
1,2-Dibromoethane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,2-Dichlorobenzene	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,2-Dichloroethane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,2-Dichloropropane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,3,5-Trimethylbenzene	VOCHSAS	1	µg/kg [^]	UM			19	229*	218*		108*
1,3-Dichlorobenzene	VOCHSAS	1	µg/kg [^]	UM			<14* _{B,D}	<11* _{B,D}	<11* _{B,D}		<11* _{B,D}
1,3-Dichloropropane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
1,4-Dichlorobenzene	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
2,2-Dichloropropane	VOCHSAS	2	µg/kg [^]	UM			<27 _D	<22* _D	<22* _D		<22* _D
2-Chlorotoluene	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
4-Chlorotoluene	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
Benzene	VOCHSAS	1	µg/kg [^]	UM			21	1050*	261*		161*
Bromobenzene	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
Bromochloromethane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
Bromodichloromethane	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
Bromoform	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D
Bromomethane	VOCHSAS	1	µg/kg [^]	UM			<14* _{B,D}	<11* _{B,D}	<11* _{B,D}		<11* _{B,D}
Carbon Tetrachloride	VOCHSAS	1	µg/kg [^]	UM			<14 _D	<11* _D	<11* _D		<11* _D

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Chlorobenzene	VOCHSAS	1	µg/kg^	UM			<14 D	<11* D	<11* D		<11* D
Chloroethane	VOCHSAS	2	µg/kg^	UM			<27 D	<22* D	<22* D		<22* D
Chloroform	VOCHSAS	1	µg/kg^	UM			65	60*	57*		57*
Chloromethane	VOCHSAS	3	µg/kg^	U			<41 D	<33* D	<33* D		<33* D
cis 1,2-Dichloroethene	VOCHSAS	5	µg/kg^	UM			<69 D	<55* D	<56* D		<56* D
cis 1,3-Dichloropropene	VOCHSAS	1	µg/kg^	UM			<14 D	<11* D	<11* D		<11* D
Dibromochloromethane	VOCHSAS	1	µg/kg^	UM			<14 D	<11* D	<11* D		<11* D
Dibromomethane	VOCHSAS	1	µg/kg^	UM			<14 D	<11* D	<11* D		<11* D
Dichlorodifluoromethane	VOCHSAS	1	µg/kg^	N			<14 D	<11 D	<11 D		<11 D
Ethylbenzene	VOCHSAS	2	µg/kg^	UM			<27 D	122*	119*		36*
Hexachlorobutadiene	VOCHSAS	2	µg/kg^	N			<27 D	<22 D	<22 D		<22 D
iso-Propylbenzene	VOCHSAS	1	µg/kg^	UM			<14 D	<11* D	<11* D		<11* D
m and p-Xylene	VOCHSAS	4	µg/kg^	UM			62	1140*	898*		334*
MTBE	VOCHSAS	1	µg/kg^	UM			<14 D	<11* D	<11* D		<11* D
Naphthalene	VOCHSAS	5	µg/kg^	UM			<69 D	300*	237*		186*
n-Butylbenzene	VOCHSAS	1	µg/kg^	U			<14 D	<11* D	<11* D		<11* D
o-Xylene	VOCHSAS	2	µg/kg^	UM			<27 D	118*	223*		46*
p-Isopropyltoluene	VOCHSAS	1	µg/kg^	UM			<14 D	96*	80*		172*
Propylbenzene	VOCHSAS	1	µg/kg^	UM			<14 D	<11* D	<11* D		<11* D

Analysis Results

					Sample ID	001	002	003	004			
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25		
						Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
						Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Analysis	Method Code	MDL	Units	Accred.								
sec-Butylbenzene	VOCHSAS	1	µg/kg^	UM		<14 _D	<11* _D	<11* _D		<11* _D		
Styrene	VOCHSAS	1	µg/kg^	UM		<14 _D	<11* _D	<11* _D		<11* _D		
tert-Butylbenzene	VOCHSAS	1	µg/kg^	UM		<14 _D	<11* _D	<11* _D		<11* _D		
Tetrachloroethene	VOCHSAS	3	µg/kg^	UM		<41 _D	<33* _D	<33* _D		<33* _D		
Toluene	VOCHSAS	5	µg/kg^	UM		94	1160*	534*		400*		
trans 1,2-Dichloroethene	VOCHSAS	1	µg/kg^	UM		<14 _D	<11* _D	<11* _D		<11* _D		
trans 1,3-Dichloropropene	VOCHSAS	1	µg/kg^	UM		<14 _D	<11* _D	<11* _D		<11* _D		
Trichloroethene	VOCHSAS	1	µg/kg^	U		<14 _D	<11* _D	<11* _D		<11* _D		
Trichlorofluoromethane	VOCHSAS	1	µg/kg^	UM		<14 _D	<11* _D	<11* _D		<11* _D		
Vinyl Chloride	VOCHSAS	1	µg/kg^	UM		<14 _D	<11* _D	<11* _D		<11* _D		
Total Moisture at 35°C	CLANDPREP	0.1	%	N		27.0	8.7	10.1		10.1		
Colour of Material	CLANDPREP		-	N		Brown	Black	Black		Black		
Major Constituents	CLANDPREP		-	N		SILT	GRAVEL	GRAVEL		GRAVEL		
Minor Constituents	CLANDPREP		-	N		Gravel	Silt	Silt		Silt		
Miscellaneous Constituents	CLANDPREP		-	N		Organic Matter	n/a	n/a		n/a		
Equivalent Weight of Dry Material (kg)	Leachate Prep CEN 10:1		kg	N		0.090				0.090		
Fraction above 4mm (%)	Leachate Prep CEN 10:1		%	N		44.8				80.6		
Fraction of non-crushable material (%)	Leachate Prep CEN 10:1		%	N		0				0		
Volume of Water for 10:1 Leach (ltr)	Leachate Prep CEN 10:1		l	N		0.868				0.889		



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-H3091-23_G
Project No: 24020349
Date Issued: 28/02/2024



Analysis Results

					Sample ID	001		002	003	004	
					Customer ID	TPG01-2-ES-0.20		TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	
					Sample Type	LPL	SOLID	SOLID	SOLID	LPL	SOLID
					Sampling Date	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024	31/01/2024
Analysis	Method Code	MDL	Units	Accred.							
Weight of Sample Leached (kg)	Leachate Prep CEN 10:1		kg	N		0.122					0.101
WAC Report	WAC		-	N		See Attached					See Attached
Asbestos Identification	SUB020		-	N		NAIIS	NAIIS	NAIIS			NAIIS

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	SOCOTEC Geotechnical	
Site	H3091-23_G	
Project	24020349	
Sample No	Sample Description	Issue Date
24020349-001	TPG01-2-ES-0.20	28/02/2024

Leaching Data	
Weight of Sample (kg)	0.122
Moisture content @ 105°C (% Wet Weight)	26.0
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (ltres)	0.868
Fraction of sample above 4mm %	44.8
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
U	WSLM59	Total Organic Carbon (% M/M)	18.3	3	5	6
N	LOI450	Loss on Ignition (%)	19.4			10
UM	BTEXHSA	Sum of BTEX (mg/kg)	<0.082	6		
UM	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.048	1		
U	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	<27.4	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	27.4	100		
UM	PHSOIL	pH (pH Units)	7.2		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg)	0.16		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
			mg/l except **	mg/kg (dry wt)	Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM3**	pH (pH Units)	7.3				
N	WSLM2**	Conductivity (µS/cm)	<100				
U	ICPMSW	Arsenic	0.001	<0.01	0.5	2	25
U	ICPWATVAR	Barium	0.02	0.2	20	100	300
U	ICPMSW	Cadmium	0.00006	0.0006	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	0.004	0.04	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	0.005	0.05	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.039	0.39	4	50	200
U	KONENS	Chloride	2	20	800	15000	25000
U	ISEF	Fluoride	<0.1	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	6	59	1000	20000	50000
N	WSLM27	Total Dissolved Solids	<70	<700	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
U	WSLM13	Dissolved Organic Carbon	1.32	13.1	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.

Calculated data is not UKAS accredited

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	SOCOTEC Geotechnical	
Site	H3091-23_G	
Project	24020349	
Sample No	Sample Description	Issue Date
24020349-004	TPG03-2-ES-0.25	28/02/2024

Leaching Data	
Weight of Sample (kg)	0.101
Moisture content @ 105°C (% Wet Weight)	11.0
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (litres)	0.889
Fraction of sample above 4mm %	80.6
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	>21.3	3	5	6
N	LOI450	Loss on Ignition (%)	28.2			10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.067	6		
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.039	1		
N	TPHFIDUS	>C10-C40 Aliphatic (mg/kg) EH_1D_AL	50.8	500		
N	PAHMSUS	Sum of 17 PAHs (mg/kg)	3.37	100		
N	PHSOIL	pH (pH Units)	6.9		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg)	0.80		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative Amount Leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
			mg/l except **	mg/kg (dry wt)	Inert Waste Landfill	Stable Non-Reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM3**	pH (pH Units)	7.4				
N	WSLM2**	Conductivity (µS/cm)	147				
U	ICPMSW	Arsenic	<0.001	<0.01	0.5	2	25
U	ICPWATVAR	Barium	0.03	0.3	20	100	300
U	ICPMSW	Cadmium	<0.00002	<0.0002	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.01	0.5	10	70
U	ICPMSW	Copper	<0.001	<0.01	2	50	100
U	ICPMSW	Mercury	<0.00003	<0.0003	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.01	0.5	10	30
U	ICPMSW	Nickel	<0.001	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.01	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.004	0.04	0.1	0.5	7
U	ICPMSW	Zinc	0.002	<0.02	4	50	200
U	KONENS	Chloride	<1	<10	800	15000	25000
U	ISEF	Fluoride	0.2	2	10	150	500
U	ICPWATVAR	Sulphate as SO4	39	390	1000	20000	50000
N	WSLM27	Total Dissolved Solids	95	949	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.5	1		
U	WSLM13	Dissolved Organic Carbon	<0.40	<4.0	500	800	1000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited.

Calculated data is not UKAS accredited

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

CERTIFICATE OF ANALYSIS

ANALYSIS REQUESTED BY: SOCOTEC UK Ltd
Environmental Chemistry
PO Box 100
Burton upon Trent
Staffordshire
DE15 0XD

CONTRACT NO: S38763-9

DATE OF ISSUE: 13.02.24

DATE SAMPLES RECEIVED: 06.02.24

DATE ANALYSIS COMPLETED: 13.02.24

DESCRIPTION: Four soil/loose aggregate samples each weighing approximately 0.9-1.3kg.

ANALYSIS REQUESTED: Qualitative and quantitative analysis of soil/loose aggregate samples for mass determination of asbestos.

METHODS:

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

Quantitative - The analysis was carried out using our documented in-house method based on HSE Contract Research Report No. 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies *et al*, 1996) and HSG 248. Our method includes initial examination of the entire sample, detailed analysis of a representative sub-sample and quantification by hand picking/weighing and/or fibre counting/sizing as appropriate.

RESULTS:

Initial Screening

No asbestos was detected in any of the soil samples by stereo-binocular and polarised light microscopy.

A summary of the results is given in Table 1.



CONTRACT NO: S38763-9
DATE OF ISSUE: 13.02.24

RESULTS: (cont.)

Table 1: Qualitative Results

SOCOTEC Job I.D: 24020349

IOM sample number	SOCOTEC Sample ID	Client Sample ID	ACM type detected	PLM result
S38763-15	24020349-001	TPG01-2-ES-0.20	-	No Asbestos Detected
S38763-16	24020349-002	TPG01-6-ES-0.80	-	No Asbestos Detected
S38763-17	24020349-003	TPG02-7-ES-1.60	-	No Asbestos Detected
S38763-18	24020349-004	TPG03-2-ES-0.25	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

COMMENTS:

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are out with the scope of our UKAS accreditation.

AUTHORISED BY:

D Third
Laboratory Analyst



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-H3091-23_G
Project No: 24020349
Date Issued: 28/02/2024

Deviating Sample Report

			Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time
<u>Sample Reference</u>	<u>Text ID</u>	<u>Method Code</u>						
TPG01-6-ES-0.80	24020349-002	GROHSA/BTEXHSA						✓



Client: SOCOTEC Geotechnical
 Project Name: H3091-23-G-H3091-23_G
 Project No: 24020349
 Date Issued: 28/02/2024

Analysis Method

<u>Method Code</u>	<u>Method Description</u>	<u>Analysis Method</u>
ANC	ANC: Acid Neutralisation Capacity (mol/kg)	Air Dried & Ground
BTEXHSA	BTEX by GCFID	As Received
BTEXHSA	BTEX for WAC by GCFID	As Received
CLANDPREP	DW35 - CLand Prep and Dry Weight Correction to 35°C	As Received
CLANDPREP	Solid Material Description	As Received
GROHSA/BTEXHSA	GRO CWG (C5-C10) Ali/Aro Split	As Received
ICPMSS	Arsenic in Solids by ICPMS	Air Dried & Ground
ICPMSS	Cadmium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Chromium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Copper in Solids by ICPMS	Air Dried & Ground
ICPMSS	Lead in Solids by ICPMS	Air Dried & Ground
ICPMSS	Mercury in Solids by ICPMS	Air Dried & Ground
ICPMSS	Nickel in Solids by ICPMS	Air Dried & Ground
ICPMSS	Zinc in Solids by ICPMS	Air Dried & Ground
ICPMSW (Dissolved)	Antimony (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Antimony in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Arsenic (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Arsenic in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Cadmium (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Cadmium in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Chromium (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Chromium in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Copper (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Copper in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Lead (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Lead in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Mercury (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Mercury in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Molybdenum (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Molybdenum in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Nickel (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Nickel in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Selenium (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Selenium in Solids (BSEN 12457-2)	Filtered
ICPMSW (Dissolved)	Zinc (Diss.) in Lab Leachate by ICPMS	Filtered
ICPMSW (Dissolved)	Zinc in Solids (BSEN 12457-2)	Filtered
ICPSOIL	Boron in Solids by ICPOES	Air Dried & Ground
ICPWATVAR (Dissolved)	Barium (Diss.) in Lab Leachate by ICPOES	Filtered
ICPWATVAR (Dissolved)	Barium in Solids (BSEN 12457-2)	Filtered
ICPWATVAR (Dissolved)	Total Sulphur as SO4 (Diss.) in Lab Leachate	Filtered
ICPWATVAR (Dissolved)	Total Sulphur as SO4 in Solids (BSEN 12457-2)	Filtered
ICPWSS	Sulphate as SO4 (Water Soluble)	Air Dried & Ground
ISEF	Fluoride by ISE	Filtered
ISEF	Fluoride in Solids (BSEN 12457-2)	Filtered
KONENS	Chloride by Colorimetry	Filtered
KONENS	Chloride in Solids (BSEN 12457-2)	Filtered
Leachate Prep CEN 10:1	WAC Leachate Prep, 1-Stage 10:1 (BSEN 12457-2)	As Received
LOI(%MM)	LOI: Loss on Ignition @ 450°C	Air Dried & Ground
PAHMSUS	16 PAHs by GCMS	As Received
PAHMSUS	17 PAHs (inc. Coronene) for WAC by GCMS	As Received



Client: SOCOTEC Geotechnical
 Project Name: H3091-23-G-H3091-23_G
 Project No: 24020349
 Date Issued: 28/02/2024

PCBECD	PCBs, ICES 7 Congeners	As Received
PCBECD	PCBs, ICES 7 Congeners inc. Total Calculation	As Received
PHCONDW	Electrical Conductivity @ 25°C	Filtered
PHCONDW	pH	Filtered
PHCONDW	TDS: Total Dissolved Solids (Calc)	Filtered
PHCONDW	Total Dissolved Solids in Solids (BSEN 12457-2)	Filtered
PHEHPLCUV	Phenols Suite by HPLC UV	As Received
PHSOIL	pH (2.5:1)	As Received
SFAPI	Cyanide (Total) by SFA	As Received
SFAPI	Phenol Index (Total) by SFA	Filtered
SFAPI	Phenol Index in Solids (BSEN 12457-2)	Filtered
SUB020	Asbestos Stage 1 (with Stage 2+3 Trigger)	
TOCW	LOC: Leached Organic Carbon	Filtered
TPHFIDUS (Aliphatic)	TPH (>C8-C40) Aliphatic and Carbon Band (>C10-C40)	As Received
TPHFIDUS (Aliphatic)	TPH (CWG) Aliphatic Split with Carbon Banding	As Received
TPHFIDUS (Aromatic)	TPH (CWG) Aromatic Split with Carbon Banding	As Received
VOCHSAS	VOCs (Target List) by GCMS	As Received
WAC	WAC Report	
WSLM13	Leached Organic Carbon in Solids (BSEN 12457-2)	Filtered
WSLM59	SOM: Soil Organic Matter (%) (Calc)	Air Dried & Ground
WSLM59	TOC: Total Organic Carbon	Air Dried & Ground

Result Report Notes

Letters alongside results signify that the result has associated report notes.

The report notes are as follows:

<u>Letter</u>	<u>Note</u>
A	Due to the matrix of the sample the laboratory has had to deviate from our standard protocols to be able to process the sample and provide a result. Where applicable the accreditation has been removed and this should be taken into consideration when utilising the data.
B	The QC associated with this result has not wholly met the QMS requirements, the accreditation has therefore been removed. However, the Laboratory has confidence in the performance of the method as a whole and that the integrity of the data has not been significantly compromised.
C	Due to matrix interference, the internal standard and/or surrogate has not met the QMS requirements. This should be taken into consideration when utilising the data.
D	A non-standard volume or mass has been used for this test which has resulted in a raised detection limit.
E	Due to the parameter value being beyond our calibration range (and following the maximum size of dilution allowed, where applicable), the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only.
F	Based on the sample history, appearance and smell a dilution was applied prior to testing. Unfortunately, the result is either above (>) or below (<) our calibration range. Results above our calibration range have accreditation removed. The data should be used for indicative purposes only.
G	The day 5 oxygen reading was below the capability of the instrument to detect, and therefore the calculated BOD has been reported unaccredited for guidance purposes only.



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-H3091-23_G
Project No: 24020349
Date Issued: 28/02/2024

HWOL Acronym Key

<u>Acronym</u>	<u>Description</u>
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total

Additional Information

This report refers to samples as received. SOCOTEC UK Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

The accreditation codes are as follows:

- U = UKAS accredited analysis
- M = MCERT accredited analysis
- N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 35 °C.

All Air Dried and Ground Samples (ADG) are oven dried at less than 35 °C.

This report shall not be reproduced except in full, without written approval of the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

- IS = Insufficient Sample to complete analysis
- NA = Sample is not amenable for the required analysis
- ND = Results cannot be determined

Items listed with a 'SUB' method code prefix have been carried out by an external subcontracted laboratory.

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the subcontracted lab for information regarding any deviancies for this analysis.

Summaries of analysis methods are available upon request.

End of Certificate of Analysis

Certificate of Analysis

Client: SOCOTEC Geotechnical

Project: 24023169

Quote: BEC231132559 V1.1

Project Ref: H3091-23-G

Site: Glyncorrwg

Contact: Amelia Gyngell-Jones

Address: Unit 15, Crosby Yard
Wildmill
Bridgend
Mid Glamorgan
CF31 1JZ

E-Mail: Amelia.Gyngell-Jones@socotec.com

Phone: 07810 180295

No. Samples Received: 1

Date Received: 27/02/2024

Analysis Completed: 12/03/2024

Date Issued: 12/03/2024

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory

Reported by Customer Service Co-Ordinator
Julie Dickinson
01283 554496
Julie.Dickinson@socotec.co.uk



Project Number: 24023169

Client: SOCOTEC Geotechnical

Date Issued: 12/03/2024

Project Name: H3091-23-G - Glyncorrwg

Samples Analysed

<u>Text ID</u>	<u>Sample Reference</u>	<u>Sampling Date</u>	<u>Sample Type</u>	<u>Sample Description</u>
24023169-001	CPG02-9-ES-4.00	21/02/2024 00:00:00	SOLID	Silt Sample



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 24023169
Date Issued: 12/03/2024



Analysis Results

					Sample ID
					001
					Customer ID
					CPG02-9-ES-4.00
					Sample Type
					SOLID
					Sampling Date
					21/02/2024
Analysis	Method Code	MDL	Units	Accred.	
>C6-C7 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.225 c
>C7-C8 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.225 c
>C7-C8 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg^	UM	0.066 c
>C8-C10 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.225 c
>C8-C10 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.04	mg/kg^	UM	0.187 c
C5-C6 Aliphatic HS_1D_AL	GROHSA/BTEXHSA	0.2	mg/kg^	UM	<0.225
C5-C7 Aromatic HS_1D_AR	GROHSA/BTEXHSA	0.01	mg/kg^	UM	0.111 c
Total GRO C5-C10 HS_1D_Total	GROHSA/BTEXHSA	0.2	mg/kg^	UM	2.42
pH (2.5:1 extraction)	PHSOIL	1	pH units	UM	8.0
Total Cyanide	SFAPI	0.5	mg/kg^	UM	<0.6
Soil Organic Matter	WSLM59	0.04	% m/m^	U	>31.6* E
Arsenic as As	ICPMSS	0.3	mg/kg^	UM	17.1
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM	0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM	43.2
Lead as Pb	ICPMSS	0.7	mg/kg^	UM	16.7
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM	16.9
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM	7.2
Zinc as Zn	ICPMSS	16	mg/kg^	UM	29.6



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 24023169
Date Issued: 12/03/2024



Analysis Results

					Sample ID
					001
					Customer ID
					CPG02-9-ES-4.00
					Sample Type
					SOLID
					Sampling Date
					21/02/2024
Analysis	Method Code	MDL	Units	Accred.	
Boron as B	ICPSOIL	10	mg/kg^	N	16
Water Soluble Sulphate as SO4 by Mass	ICPWSS	20	mg/kg^	UM	263
Benzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM	111 c
Ethylbenzene HS_1D_AR	BTEXHSA	10	µg/kg^	UM	<11 c
m/p-Xylene HS_1D_AR	BTEXHSA	20	µg/kg^	UM	165 c
o-Xylene HS_1D_AR	BTEXHSA	10	µg/kg^	UM	<11 c
Toluene HS_1D_AR	BTEXHSA	10	µg/kg^	UM	66 c
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM	<0.09
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U	<0.09
Anthracene	PAHMSUS	0.08	mg/kg^	U	<0.09
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.09
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.09
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.09
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM	<0.09
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.09
Chrysene	PAHMSUS	0.08	mg/kg^	UM	0.21
Dibenzo[a,h]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.09
Fluoranthene	PAHMSUS	0.08	mg/kg^	UM	0.24
Fluorene	PAHMSUS	0.08	mg/kg^	UM	0.11



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 24023169
Date Issued: 12/03/2024



Analysis Results

					Sample ID
					001
					Customer ID
					CPG02-9-ES-4.00
					Sample Type
					SOLID
					Sampling Date
					21/02/2024
Analysis	Method Code	MDL	Units	Accred.	
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg [^]	UM	<0.09
Naphthalene	PAHMSUS	0.08	mg/kg [^]	UM	0.29
Phenanthrene	PAHMSUS	0.08	mg/kg [^]	UM	0.56
Pyrene	PAHMSUS	0.08	mg/kg [^]	UM	0.17
Total PAH 16	PAHMSUS	1.28	mg/kg [^]	U	2.47
PCB 101	PCBECD	5	µg/kg [^]	UM	<5.62
PCB 118	PCBECD	5	µg/kg [^]	UM	<5.62
PCB 138	PCBECD	5	µg/kg [^]	UM	<5.62
PCB 153	PCBECD	5	µg/kg [^]	UM	<5.62
PCB 180	PCBECD	5	µg/kg [^]	UM	<5.62
PCB 28	PCBECD	5	µg/kg [^]	UM	<5.62
PCB 52	PCBECD	5	µg/kg [^]	UM	<5.62
Dimethylphenols	PHEHPLCUV	0.1	mg/kg [^]	U	<0.11
Methylphenols	PHEHPLCUV	0.1	mg/kg [^]	U	<0.11
Phenol	PHEHPLCUV	0.1	mg/kg [^]	UM	<0.11
Total Phenols	PHEHPLCUV	0.4	mg/kg [^]	U	<0.45
Trimethylphenols	PHEHPLCUV	0.1	mg/kg [^]	U	<0.11
>C10-C12 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg [^]	U	<4.49
>C12-C16 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg [^]	U	<4.49



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 24023169
Date Issued: 12/03/2024



Analysis Results

					Sample ID
					001
					Customer ID
					CPG02-9-ES-4.00
					Sample Type
					SOLID
					Sampling Date
					21/02/2024
Analysis	Method Code	MDL	Units	Accred.	
>C16-C21 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	4	mg/kg [^]	U	<4.49
>C21-C35 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	10	mg/kg [^]	U	13.7* _B
Total TPH >C8-C40 (Aliphatic) EH_CU_1D_AL	TPHFIDUS (Aliphatic)	20	mg/kg [^]	U	<22.5
>C10-C12 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg [^]	U	<4.49
>C12-C16 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg [^]	U	4.83
>C16-C21 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	4	mg/kg [^]	U	4.84
>C21-C35 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	10	mg/kg [^]	U	20.9
Total TPH >C8-C40 (Aromatic) EH_CU_1D_AR	TPHFIDUS (Aromatic)	20	mg/kg [^]	U	39.5
1,1,1,2-Tetrachloroethane	VOCHSAS	1	µg/kg [^]	UM	<12 _{C,D}
1,1,1-Trichloroethane	VOCHSAS	1	µg/kg [^]	UM	<12* _{B,C,D}
1,1,2,2-Tetrachloroethane	VOCHSAS	1	µg/kg [^]	N	<12 _{C,D}
1,1,2-Trichloroethane	VOCHSAS	1	µg/kg [^]	UM	<12 _{C,D}
1,1-Dichloroethane	VOCHSAS	1	µg/kg [^]	UM	<12 _{C,D}
1,1-Dichloroethene	VOCHSAS	1	µg/kg [^]	U	<12 _{C,D}
1,1-Dichloropropene	VOCHSAS	1	µg/kg [^]	UM	<12 _{C,D}
1,2,3-Trichlorobenzene	VOCHSAS	3	µg/kg [^]	UM	<36 _{C,D}
1,2,3-Trichloropropane	VOCHSAS	1	µg/kg [^]	UM	<12 _{C,D}
1,2,4-Trichlorobenzene	VOCHSAS	3	µg/kg [^]	N	<36 _{C,D}
1,2,4-Trimethylbenzene	VOCHSAS	1	µg/kg [^]	UM	81 _C



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 24023169
Date Issued: 12/03/2024



Analysis Results

					Sample ID
					001
					Customer ID
					CPG02-9-ES-4.00
					Sample Type
					SOLID
					Sampling Date
					21/02/2024
Analysis	Method Code	MDL	Units	Accred.	
1,2-Dibromo-3-chloropropane	VOCHSAS	1	µg/kg [^]	U	<12 c,D
1,2-Dibromoethane	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
1,2-Dichlorobenzene	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
1,2-Dichloroethane	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
1,2-Dichloropropane	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
1,3,5-Trimethylbenzene	VOCHSAS	1	µg/kg [^]	UM	138 c
1,3-Dichlorobenzene	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
1,3-Dichloropropane	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
1,4-Dichlorobenzene	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
2,2-Dichloropropane	VOCHSAS	2	µg/kg [^]	UM	<24* B,C,D
2-Chlorotoluene	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
4-Chlorotoluene	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
Benzene	VOCHSAS	1	µg/kg [^]	UM	1170 c
Bromobenzene	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
Bromochloromethane	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
Bromodichloromethane	VOCHSAS	1	µg/kg [^]	UM	<12* B,C,D
Bromoform	VOCHSAS	1	µg/kg [^]	UM	<12* B,C,D
Bromomethane	VOCHSAS	1	µg/kg [^]	UM	<12 c,D
Carbon Tetrachloride	VOCHSAS	1	µg/kg [^]	UM	<12 c,D



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 24023169
Date Issued: 12/03/2024



Analysis Results

					Sample ID
					001
					Customer ID
					CPG02-9-ES-4.00
					Sample Type
					SOLID
					Sampling Date
					21/02/2024
Analysis	Method Code	MDL	Units	Accred.	
Chlorobenzene	VOCHSAS	1	µg/kg [^]	UM	<12 C,D
Chloroethane	VOCHSAS	2	µg/kg [^]	UM	<24 C,D
Chloroform	VOCHSAS	1	µg/kg [^]	UM	61* B,C
Chloromethane	VOCHSAS	3	µg/kg [^]	U	<36 C,D
cis 1,2-Dichloroethene	VOCHSAS	5	µg/kg [^]	UM	<59 C,D
cis 1,3-Dichloropropene	VOCHSAS	1	µg/kg [^]	UM	<12 C,D
Dibromochloromethane	VOCHSAS	1	µg/kg [^]	UM	<12 C,D
Dibromomethane	VOCHSAS	1	µg/kg [^]	UM	<12 C,D
Dichlorodifluoromethane	VOCHSAS	1	µg/kg [^]	N	<12 C,D
Ethylbenzene	VOCHSAS	2	µg/kg [^]	UM	80 C
Hexachlorobutadiene	VOCHSAS	2	µg/kg [^]	N	<24 C,D
iso-Propylbenzene	VOCHSAS	1	µg/kg [^]	UM	<12 C,D
m and p-Xylene	VOCHSAS	4	µg/kg [^]	UM	745 C
MTBE	VOCHSAS	1	µg/kg [^]	UM	<12 C,D
Naphthalene	VOCHSAS	5	µg/kg [^]	UM	<59 C,D
n-Butylbenzene	VOCHSAS	1	µg/kg [^]	U	<12 D
o-Xylene	VOCHSAS	2	µg/kg [^]	UM	112 C
p-Isopropyltoluene	VOCHSAS	1	µg/kg [^]	UM	<12 C,D
Propylbenzene	VOCHSAS	1	µg/kg [^]	UM	<12 C,D



Client: SOCOTEC Geotechnical
Project Name: H3091-23-G-Glyncorrwg
Project No: 24023169
Date Issued: 12/03/2024



Analysis Results

					Sample ID
					001
					Customer ID
					CPG02-9-ES-4.00
					Sample Type
					SOLID
					Sampling Date
					21/02/2024
Analysis	Method Code	MDL	Units	Accred.	
sec-Butylbenzene	VOCHSAS	1	µg/kg^	UM	<12 c,d
Styrene	VOCHSAS	1	µg/kg^	UM	<12 c,d
tert-Butylbenzene	VOCHSAS	1	µg/kg^	UM	<12 c,d
Tetrachloroethene	VOCHSAS	3	µg/kg^	UM	<36 c,d
Toluene	VOCHSAS	5	µg/kg^	UM	2380 c
trans 1,2-Dichloroethene	VOCHSAS	1	µg/kg^	UM	<12 c,d
trans 1,3-Dichloropropene	VOCHSAS	1	µg/kg^	UM	<12 c,d
Trichloroethene	VOCHSAS	1	µg/kg^	U	<12 c,d
Trichlorofluoromethane	VOCHSAS	1	µg/kg^	UM	<12 c,d
Vinyl Chloride	VOCHSAS	1	µg/kg^	UM	<12 c,d
Total Moisture at 35°C	CLANDPREP	0.1	%	N	11.0
Colour of Material	CLANDPREP		-	N	Black
Major Constituents	CLANDPREP		-	N	SILT
Minor Constituents	CLANDPREP		-	N	Gravel
Miscellaneous Constituents	CLANDPREP		-	N	n/a
Asbestos Identification	SUB020		-	N	NAIIS

CERTIFICATE OF ANALYSIS

ANALYSIS REQUESTED BY: SOCOTEC UK Ltd
Environmental Chemistry
PO Box 100
Burton upon Trent
Staffordshire
DE15 0XD

CONTRACT NO: S39325-8

DATE OF ISSUE: 07.03.24

DATE SAMPLE RECEIVED: 29.02.24

DATE ANALYSIS COMPLETED: 07.03.24

DESCRIPTION: One soil/loose aggregate sample weighing approximately 1.3kg.

ANALYSIS REQUESTED: Qualitative and quantitative analysis of a soil/loose aggregate sample for mass determination of asbestos.

METHODS:

Qualitative - The sample was analysed qualitatively for asbestos by polarised light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative - The analysis was carried out using our documented in-house method based on HSE Contract Research Report No. 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies *et al*, 1996) and HSG 248. Our method includes initial examination of the entire sample, detailed analysis of a representative sub-sample and quantification by hand picking/weighing and/or fibre counting/sizing as appropriate.

RESULTS:

Initial Screening

No asbestos was detected in the soil sample by stereo-binocular and polarised light microscopy.

A summary of the results is given in Table 1.



CONTRACT NO: S39325-8
DATE OF ISSUE: 07.03.24

RESULTS: (cont.)

Table 1: Qualitative Results

SOCOTEC Job I.D: 24023169

IOM sample number	SOCOTEC Sample ID	Client Sample ID	ACM type detected	PLM result
S39325-15	24023169-001	CPG02-9-ES-4.00	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

COMMENTS:

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are out with the scope of our UKAS accreditation.

AUTHORISED BY:
D Third
Laboratory Analyst



Project Number: 24023169

Client: SOCOTEC Geotechnical

Date Issued: 12/03/2024

Project Name: H3091-23-G - Glyncorrwg

Deviating Sample Report

<u>Sample Reference</u>	<u>Text ID</u>	<u>Method Code</u>	Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time
CPG02-9-ES-4.00	24023169-001	BTEXHSA						✓
CPG02-9-ES-4.00	24023169-001	GROHSA/BTEXHSA						✓
CPG02-9-ES-4.00	24023169-001	VOCHSAS						✓

Analysis Method

Method Code

BTEXHSA

CLANDPREP

CLANDPREP

GROHSA/BTEXHSA

ICPMSS

ICPMSS

ICPMSS

ICPMSS

ICPMSS

ICPMSS

ICPMSS

ICPMSS

ICPMSS

ICPMSS

ICPSOIL

ICPWSS

PAHMSUS

PCBECD

PHEHPLCUV

PHSOIL

SFAPI

SUB020

TPHFIDUS (Aliphatic)

TPHFIDUS (Aromatic)

VOCHSAS

WSLM59

Method Description

BTEX by GCFID

DW35 - CLand Prep and Dry Weight Correction to 35°C

Solid Material Description

GRO CWG (C5-C10) Ali/Aro Split

Arsenic in Solids by ICPMS

Cadmium in Solids by ICPMS

Chromium in Solids by ICPMS

Copper in Solids by ICPMS

Lead in Solids by ICPMS

Mercury in Solids by ICPMS

Nickel in Solids by ICPMS

Zinc in Solids by ICPMS

Boron in Solids by ICPOES

Sulphate as SO4 (Water Soluble)

16 PAHs by GCMS

PCBs, ICES 7 Congeners

Phenols Suite by HPLC UV

pH (2.5:1)

Cyanide (Total) by SFA

Asbestos Stage 1 (with Stage 2+3 Trigger)

TPH (CWG) Aliphatic Split with Carbon Banding

TPH (CWG) Aromatic Split with Carbon Banding

VOCs (Target List) by GCMS

SOM: Soil Organic Matter (%) (Calc)

Analysis Method

As Received

As Received

As Received

As Received

Air Dried & Ground

Air Dried & Ground

Air Dried & Ground

Air Dried & Ground

Air Dried & Ground

Air Dried & Ground

Air Dried & Ground

Air Dried & Ground

Air Dried & Ground

As Received

As Received

As Received

As Received

As Received

As Received

As Received

As Received

As Received

As Received

As Received

As Received

Air Dried & Ground



Project Number: 24023169

Client: SOCOTEC Geotechnical

Date Issued: 12/03/2024

Project Name: H3091-23-G - Glynccorrwg

Result Report Notes

Letters alongside results signify that the result has associated report notes.

The report notes are as follows:

Letter

Note

- | | |
|---|--|
| A | Due to the matrix of the sample the laboratory has had to deviate from our standard protocols to be able to process the sample and provide a result. Where applicable the accreditation has been removed and this should be taken into consideration when utilising the data. |
| B | The QC associated with this result has not wholly met the QMS requirements, the accreditation has therefore been removed. However, the Laboratory has confidence in the performance of the method as a whole and that the integrity of the data has not been significantly compromised. |
| C | Due to matrix interference, the internal standard and/or surrogate has not met the QMS requirements. This should be taken into consideration when utilising the data. |
| D | A non-standard volume or mass has been used for this test which has resulted in a raised detection limit. |
| E | Due to the parameter value being beyond our calibration range (and following the maximum size of dilution allowed, where applicable), the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only. |
| F | Based on the sample history, appearance and smell a dilution was applied prior to testing. Unfortunately, the result is either above (>) or below (<) our calibration range. Results above our calibration range have accreditation removed. The data should be used for indicative purposes only. |
| G | The day 5 oxygen reading was below the capability of the instrument to detect, and therefore the calculated BOD has been reported unaccredited for guidance purposes only. |

HWOL Acronym Key

Acronym

Description

HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total



Project Number: 24023169

Client: SOCOTEC Geotechnical

Date Issued: 12/03/2024

Project Name: H3091-23-G - Glyncorrwg

Additional Information

This report refers to samples as received. SOCOTEC UK Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

The accreditation codes are as follows:

U = UKAS accredited analysis
M = MCERT accredited analysis
N = Unaccredited analysis

Any accreditation marked with ^ signify results are reported on a dry weight basis of 35° c.

All Air Dried and Ground Samples (ADG) are oven dried at less than 35° c.

This report shall not be reproduced except in full, without written approval of the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any results marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis
NA = Sample is not amenable for the required analysis
ND = Results cannot be determined

Items listed with a 'SUB' method code prefix have been carried out by another SOCOTEC department or by an external subcontracted laboratory.

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the subcontracted lab for information regarding any deviancies for this analysis.

Summaries of analysis methods are available upon request.

End of Certificate of Analysis

Certificate of Analysis

Client: SOCOTEC Geotechnical

Project: 24030087

Quote: BEC231132559 V1.1

Project Ref: H3091-23-G

Site: Glyncorrwg

Contact: Amelia Gyngell-Jones

Address: Unit 15, Crosby Yard
Wildmill
Bridgend
Mid Glamorgan
CF31 1JZ

E-Mail: Amelia.Gyngell-Jones@socotec.com

Phone: 07810 180295

No. Samples Received: 1

Date Received: 01/03/2024

Analysis Completed: 14/03/2024

Date Issued: 14/03/2024

Report Type: Version 01

This report supersedes any versions previously issued by the laboratory

Reported by Customer Service Co-Ordinator
Julie Dickinson
01283 554496
Julie.Dickinson@socotec.co.uk



Project Number: 24030087

Client: SOCOTEC Geotechnical

Date Issued: 14/03/2024

Project Name: H3091-23-G - Glyncorrwg

Samples Analysed

<u>Text ID</u>	<u>Sample Reference</u>	<u>Sampling Date</u>	<u>Sample Type</u>	<u>Sample Description</u>
24030087-001	CPG01-290224-EW-6.50-9.50	29/02/2024 12:30:00	WATER	Ground Water

Analysis Results

SOCOTEC Sample ID:	24030087-001
Sampling Date:	29/02/2024 12:30
Customer ID:	CPG01-290224-EW-
MDL	6.50-9.50
Accred.	

Method Code	Analysis	MDL	Accred.	
PHCONDW	pH	1 pH units	U	6.3
SFAPI	Total Cyanide	0.02 mg/l	U	<0.02
ICPMSW (Dissolved)	Arsenic as As	0.001 mg/l	U	0.001
ICPWATVAR (Dissolved)	Boron as B	0.01 mg/l	U	<0.01
ICPMSW (Dissolved)	Cadmium as Cd	0.00002 mg/l	U	0.00033
ICPMSW (Dissolved)	Total Chromium as Cr	0.001 mg/l	U	<0.001
ICPMSW (Dissolved)	Copper as Cu	0.001 mg/l	U	<0.001
ICPMSW (Dissolved)	Lead as Pb	0.001 mg/l	U	<0.001
ICPMSW (Dissolved)	Mercury as Hg	0.00003 mg/l	U	<0.00003
ICPMSW (Dissolved)	Nickel as Ni	0.001 mg/l	U	0.006
ICPWATVAR (Dissolved)	Total Sulphur as SO4	3 mg/l	U	22
ICPMSW (Dissolved)	Zinc as Zn	0.002 mg/l	U	0.026
BTEXHSA	Benzene (HS_1D_AR)	5 µg/l	U	<5
	Toluene (HS_1D_AR)	5 µg/l	U	<5
	Ethylbenzene (HS_1D_AR)	5 µg/l	U	<5
	m/p-Xylene (HS_1D_AR)	10 µg/l	U	<10
	o-Xylene (HS_1D_AR)	5 µg/l	U	<5
GROHSA/BTEXHSA	Total GRO C5-C10 (HS_1D_Total)	0.1 mg/l	U	<0.100
	C5-C6 Aliphatic (HS_1D_AL)	0.1 mg/l	N	<0.100
	>C6-C7 Aliphatic (HS_1D_AL)	0.1 mg/l	N	<0.100
	>C7-C8 Aliphatic (HS_1D_AL)	0.1 mg/l	N	<0.100
	>C8-C10 Aliphatic (HS_1D_AL)	0.1 mg/l	N	<0.100
	C5-C7 Aromatic (HS_1D_AR)	0.005 mg/l	U	<0.005
	>C7-C8 Aromatic (HS_1D_AR)	0.005 mg/l	U	<0.005
	>C8-C10 Aromatic (HS_1D_AR)	0.02 mg/l	U	<0.020
TPHFID (Aliphatic)	Total TPH >C8-C40 (Aliphatic) (EH_CU_1D_AL)	0.01 mg/l	U	0.19
	>C10-C12 (Aliphatic) (EH_CU_1D_AL)	0.01 mg/l	U	<0.10
	>C12-C16 (Aliphatic) (EH_CU_1D_AL)	0.01 mg/l	U	<0.10
	>C16-C21 (Aliphatic) (EH_CU_1D_AL)	0.01 mg/l	U	<0.10
	>C21-C35 (Aliphatic) (EH_CU_1D_AL)	0.01 mg/l	U	0.13
TPHFID (Aromatic)	Total TPH >C8-C40 (Aromatic) (EH_CU_1D_AR)	0.01 mg/l	U	0.14
	>C10-C12 (Aromatic) (EH_CU_1D_AR)	0.01 mg/l	U	<0.10
	>C12-C16 (Aromatic) (EH_CU_1D_AR)	0.01 mg/l	U	<0.10
	>C16-C21 (Aromatic) (EH_CU_1D_AR)	0.01 mg/l	U	<0.10
	>C21-C35 (Aromatic) (EH_CU_1D_AR)	0.01 mg/l	U	<0.10
PAHMSW	Acenaphthene	0.01 µg/l	U	<0.10
	Acenaphthylene	0.01 µg/l	U	<0.10
	Anthracene	0.01 µg/l	U	<0.10
	Benzo[a]anthracene	0.01 µg/l	U	<0.10
	Benzo[a]pyrene	0.01 µg/l	U	<0.10
	Benzo[b]fluoranthene	0.01 µg/l	U	<0.10
	Benzo[g,h,i]perylene	0.01 µg/l	U	<0.10
	Benzo[k]fluoranthene	0.01 µg/l	U	<0.10
	Chrysene	0.01 µg/l	U	<0.10
	Dibenzo[a,h]anthracene	0.01 µg/l	U	<0.10
	Fluoranthene	0.01 µg/l	U	0.13
	Fluorene	0.01 µg/l	U	<0.10
	Indeno[1,2,3-cd]pyrene	0.01 µg/l	U	0.11
	Naphthalene	0.01 µg/l	U	<0.10
	Phenanthrene	0.01 µg/l	U	0.18
	Pyrene	0.01 µg/l	U	<0.10
PHEHPLCUV	Total PAH 16	0.16 µg/l	U	1.73
	Phenol	0.05 mg/l	U	<0.05
	Methylphenols	0.05 mg/l	U	<0.05
	Dimethylphenols	0.05 mg/l	U	<0.05
	Trimethylphenols	0.05 mg/l	U	<0.05
VOCHSAW	Total Phenols	0.2 mg/l	U	<0.20
	1,1,1,2-Tetrachloroethane	1 µg/l	U	<1
	1,1,1-Trichloroethane	1 µg/l	U	<1
	1,1,2,2-Tetrachloroethane	1 µg/l	N	<1
	1,1,2-Trichloroethane	1 µg/l	U	<1
	1,1-Dichloroethane	1 µg/l	U	<1
	1,1-Dichloroethene	1 µg/l	U	<1
	1,1-Dichloropropene	1 µg/l	U	<1
	1,2,3-Trichlorobenzene	5 µg/l	U	<5
	1,2,3-Trichloropropane	1 µg/l	U	<1
	1,2,4-Trichlorobenzene	5 µg/l	U	<5
	1,2,4-Trimethylbenzene	1 µg/l	U	<1
	1,2-Dibromo-3-chloropropane	5 µg/l	U	<5
	1,2-Dibromoethane	1 µg/l	U	<1
	1,2-Dichlorobenzene	5 µg/l	U	<5
	1,2-Dichloroethane	1 µg/l	U	<1
	1,2-Dichloropropane	1 µg/l	U	<1
	1,3,5-Trimethylbenzene	0.6 µg/l	U	<0.6
	1,3-Dichlorobenzene	1 µg/l	U	<1
	1,3-Dichloropropane	1 µg/l	N	<1
	1,4-Dichlorobenzene	1 µg/l	U	<1
	2,2-Dichloropropane	1 µg/l	N	<1
	2-Chlorotoluene	1 µg/l	U	<1
	4-Chlorotoluene	1 µg/l	U	<1
	Benzene	1 µg/l	U	<1
	Bromobenzene	1 µg/l	U	<1

Analysis Results

SOCOTEC Sample ID:	24030087-001
Sampling Date:	29/02/2024 12:30
Customer ID:	CPG01-290224-EW-
MDL	Accred.
	6.50-9.50

Method Code	Analysis	MDL	Accred.	
VOCHSAW	Bromochloromethane	1 µg/l	U	<1
	Bromodichloromethane	1 µg/l	U	<1
	Bromoform	1 µg/l	U	<1
	Bromomethane	5 µg/l	N	<5
	Carbon Tetrachloride	1 µg/l	U	<1
	Chlorobenzene	1 µg/l	U	<1* _a
	Chloroethane	5 µg/l	U	<5
	Chloroform	5 µg/l	U	<5
	Chloromethane	1 µg/l	U	<1
	cis 1,2-Dichloroethene	1 µg/l	U	<1
	cis 1,3-Dichloropropene	1 µg/l	N	<1
	Dibromochloromethane	1 µg/l	U	<1
	Dibromomethane	1 µg/l	U	<1
	Dichlorodifluoromethane	1 µg/l	N	<1
	Ethylbenzene	0.5 µg/l	U	<0.5
	Hexachlorobutadiene	5 µg/l	U	<5
	iso-Propylbenzene	1 µg/l	U	<1
	m and p-Xylene	1 µg/l	U	<1
	MTBE	1 µg/l	N	<1
	Naphthalene	5 µg/l	U	<5
	n-Butylbenzene	1 µg/l	U	<1
	o-Xylene	1 µg/l	U	<1
	p-Isopropyltoluene	1 µg/l	U	<1* _a
	Propylbenzene	1 µg/l	U	<1
	sec-Butylbenzene	1 µg/l	U	<1
	Styrene	1 µg/l	U	<1
	tert-Butylbenzene	1 µg/l	U	<1
	Tetrachloroethene	5 µg/l	U	<5
	Toluene	1 µg/l	U	<1* _a
	trans 1,2-Dichloroethene	1 µg/l	U	<1* _a
	trans 1,3-Dichloropropene	1 µg/l	U	<1
	Trichloroethene	5 µg/l	U	<5
	Trichlorofluoromethane	1 µg/l	U	<1
	Vinyl Chloride	1 µg/l	U	<1



Project Number: 24030087

Client: SOCOTEC Geotechnical

Date Issued: 14/03/2024

Project Name: H3091-23-G - Glyncorrwg

Deviating Sample Report

All samples received in an appropriate condition with no deviancies noted with the samples.

Analysis Method

<u>Method Code</u>	<u>Method Description</u>	<u>Analysis Method</u>
BTEXHSA	BTEX by GCFID	Unfiltered
GROHSA/BTEXHSA	GRO CWG (C5-C10) Ali/Aro Split	Unfiltered
ICPMSW (Dissolved)	Arsenic (Diss.) in Water by ICPMS	Filtered
ICPMSW (Dissolved)	Cadmium (Diss.) in Water by ICPMS	Filtered
ICPMSW (Dissolved)	Chromium (Diss.) in Water by ICPMS	Filtered
ICPMSW (Dissolved)	Copper (Diss.) in Water by ICPMS	Filtered
ICPMSW (Dissolved)	Lead (Diss.) in Water by ICPMS	Filtered
ICPMSW (Dissolved)	Mercury (Diss.) in Water by ICPMS	Filtered
ICPMSW (Dissolved)	Nickel (Diss.) in Water by ICPMS	Filtered
ICPMSW (Dissolved)	Zinc (Diss.) in Water by ICPMS	Filtered
ICPWATVAR (Dissolved)	Boron (Diss.) in Water by ICPOES	Filtered
ICPWATVAR (Dissolved)	Total Sulphur as SO ₄ (Diss.) in Water	Filtered
PAHMSW	16 PAHs by GCMS	Unfiltered
PHCONDW	pH	Unfiltered
PHEHPLCUV	Phenols Suite by HPLC UV	Unfiltered
SFAPI	Cyanide (Total) by SFA	Unfiltered
TPHFID (Aliphatic)	TPH (CWG) Aliphatic Split with Carbon Banding	Unfiltered
TPHFID (Aromatic)	TPH (CWG) Aromatic Split with Carbon Banding	Unfiltered
VOCHSAW	VOCs (Target List) by GCMS	Unfiltered

Result Report Notes

Letters alongside results signify that the result has associated report notes.

The report notes are as follows:

<u>Letter</u>	<u>Note</u>
A	Due to the matrix of the sample the laboratory has had to deviate from our standard protocols to be able to process the sample and provide a result. Where applicable the accreditation has been removed and this should be taken into consideration when utilising the data.
B	The QC associated with this result has not wholly met the QMS requirements, the accreditation has therefore been removed. However, the Laboratory has confidence in the performance of the method as a whole and that the integrity of the data has not been significantly compromised.
C	Due to matrix interference, the internal standard and/or surrogate has not met the QMS requirements. This should be taken into consideration when utilising the data.
D	A non-standard volume or mass has been used for this test which has resulted in a raised detection limit.
E	Due to the parameter value being beyond our calibration range (and following the maximum size of dilution allowed, where applicable), the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only.



Project Number: 24030087

Client: SOCOTEC Geotechnical

Date Issued: 14/03/2024

Project Name: H3091-23-G - Glyncorrwg

- F Based on the sample history, appearance and smell a dilution was applied prior to testing. Unfortunately, the result is either above (>) or below (<) our calibration range. Results above our calibration range have accreditation removed. The data should be used for indicative purposes only.
- G The day 5 oxygen reading was below the capability of the instrument to detect, and therefore the calculated BOD has been reported unaccredited for guidance purposes only.

HWOL Acronym Key

<u>Acronym</u>	<u>Description</u>
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total

Additional Information

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Results within this report relate only to the samples tested.

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M = MCERT accredited analysis
N = Unaccredited analysis

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Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis
NA = Sample is not amenable for the required analysis
ND = Results cannot be determined

Items listed with a 'SUB' method code prefix have been carried out by another SOCOTEC department or by an external subcontracted laboratory.

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the subcontracted lab for information regarding any deviancies for this analysis.

Summaries of analysis methods are available upon request.



Project Number: 24030087

Client: SOCOTEC Geotechnical

Date Issued: 14/03/2024

Project Name: H3091-23-G - Glyncorrwg

End of Certificate of Analysis



SOCOTEC

APPENDIX G PHOTOGRAPHS

Dynamic Sample Liners
Trial Pits

1 to 3
4 to 18

Dynamic Sample Liner Photographs



WSG01 1.20m-3.00m

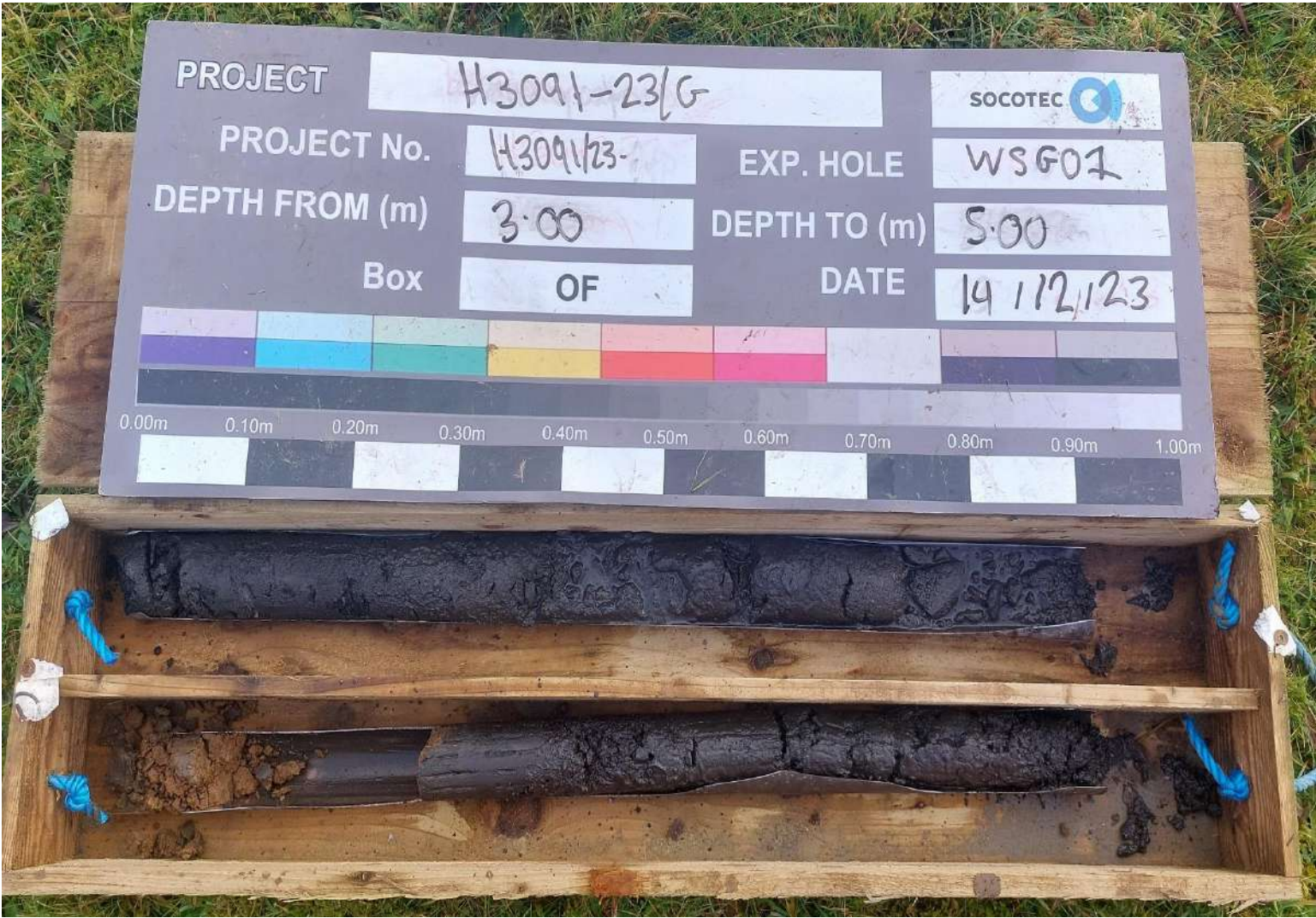
Notes:

Project A1278 Glyncorrwg Industrial Units
 Project No. H3091-23/G
 Carried out for Neath Port Talbot County Borough Council

Sheet

1

Dynamic Sample Liner Photographs



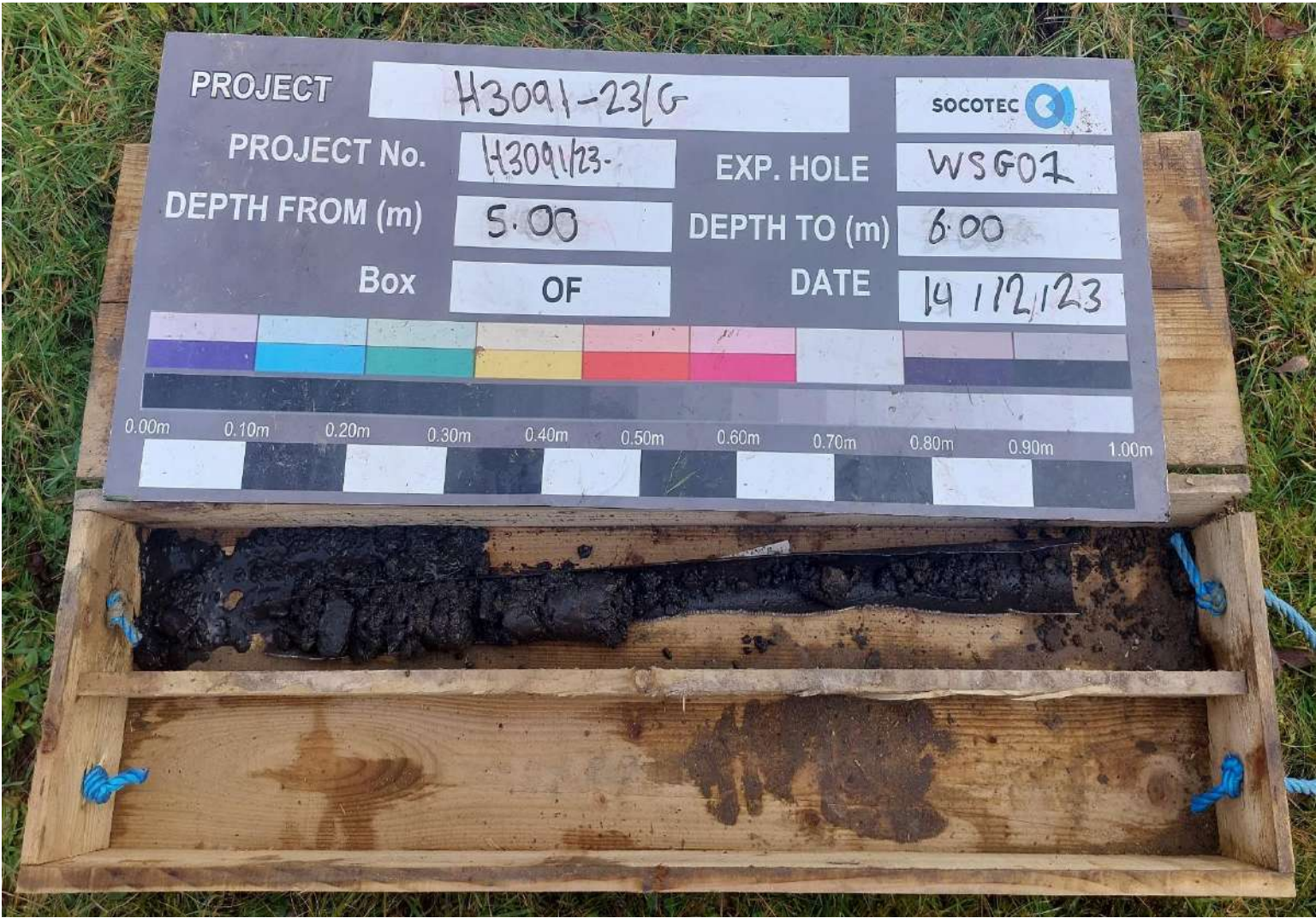
WSG01 3.00m-5.00m

Notes:

Project A1278 Glyncorrwg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet

Dynamic Sample Liner Photographs



WSG01 5.00m-6.00m

Notes:	Project A1278 Glyncorrwg Industrial Units		Sheet 3
	Project No.	H3091-23/G	
	Carried out for	Neath Port Talbot County Borough Council	

Trial Pit Photographs



CPG01 1.20m



CPG01 Open

Notes:

Project	A1278 Glyncorrgw Industrial Units
Project No.	H3091-23/G
Carried out for	Neath Port Talbot County Borough Council

Sheet

4

Trial Pit Photographs



CPG02 1.20m

Notes:

Project A1278 Glyncorrg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet



CPG02 Open



TPG01 Face A

Notes:

Project A1278 Glyncorrwg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet

Trial Pit Photographs



TPG01 Face B

Notes:

Project A1278 Glyncorwg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet



TPG01 Face C

Notes:

Project A1278 Glyncorrwg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet
8



TPG01 Face D

Notes:

Project A1278 Glyncorwg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet



TPG01 Spoil



TPG02 A

Notes:

Project A1278 Glyncorrgw Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet



TPG02 Face B

Notes:

Project A1278 Glyncorrg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet



TPG02 Face C

Notes:	<table><tr><td>Project</td><td>A1278 Glyncorrg Industrial Units</td></tr><tr><td>Project No.</td><td>H3091-23/G</td></tr><tr><td>Carried out for</td><td>Neath Port Talbot County Borough Council</td></tr></table>	Project	A1278 Glyncorrg Industrial Units	Project No.	H3091-23/G	Carried out for	Neath Port Talbot County Borough Council	Sheet 12
Project	A1278 Glyncorrg Industrial Units							
Project No.	H3091-23/G							
Carried out for	Neath Port Talbot County Borough Council							



TPG02 Face D

Trial Pit Photographs



TPG02 Spoil



TPG03 Face A

Notes:	Project A1278 Glynccorwg Industrial Units Project No. H3091-23/G Carried out for Neath Port Talbot County Borough Council	Sheet 14
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TPG03 Face B

Notes:

Project A1278 Glyncorrwg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet



TPG03 Face C

Notes:

Project A1278 Glyncorrwg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet



TPG03 Face D

Notes:

Project A1278 Glynceorwg Industrial Units
Project No. H3091-23/G
Carried out for Neath Port Talbot County Borough Council

Sheet



TPG03 Spoil

Notes:	Project	A1278 Glyncorwg Industrial Units	Sheet 18
	Project No.	H3091-23/G	
	Carried out for	Neath Port Talbot County Borough Council	



APPENDIX H

GEOENVIRONMENTAL ASSESSMENT

Data Summary and Analysis - Soil Sample Data vs GAC for Commercial use	Table G1
Data Summary and Analysis - Groundwater Test Data vs Assessment Criteria from Drinking Water Standards (DWS)	Table G2
Data Summary and Analysis - Groundwater Test Data vs Assessment Criteria from Environmental Quality Standards (EQS) for Fresh Water	Table G3
Key to Generic Quantitative Risk Assessment	
Source-Pathway-Receptors	Table G4
Generic Quantitative Risk Assessment	Table G5



Table G1 - Data Summary and Analysis - Soil Sample Data vs GAC for Commercial use

Site:	Glyncorwg	Project No:	H3091_G
Data Description:	Tier 2 GQRA	SOM (%):	1% ¹
Land Use:	Commercial	Completed By:	MW
Receptor:	Human Health	Checked By:	-

Key to Generic Assessment Criteria (GAC)

C4SL : CL:AIRE Category 4 Screening Levels

S4UL : LQM Suitable for Use Levels (S4UL)²

EIC GAC : Environmental Industries Commission GAC

Notes

¹ Assumed value

² Copyright Land Quality Management Limited, reproduced with permission, Publication Number S4UL3144. All rights reserved.

³ >C6-C8 Aliphatic, and >C16-C35 Aliphatic are determined as sums of measured value

⁴ Result reported on a dry weight basis of 35°C.

Laboratory Test Results			Assessment Criteria (AC)		Summary Statistics							Sample Identifiers (Ref, Type, Lab No, Sampling Date) and Analytical Data											
Contaminant	Test Method	Units	Units (Calculated equivalent units shown in italics)		Source (see key)	Number of Samples Tested	Results Above Detection Limit	Min Value	Max Value	Arithmetic Mean	Standard Deviation	Number of results >AC	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10	
			BHG01-2-ES-0.30	BHG01A-2-ES-0.30									BHG01C-2-ES-0.30	WSG01-2-ES-0.20	WSG01-5-ES-1.00	TPG01-2-ES-0.20	TPG01-6-ES-0.80	TPG02-7-ES-1.60	TPG03-2-ES-0.25	CPG02-9-ES-4.00			
			Soil Sample	Soil Sample									Soil Sample	Soil Sample	Soil Sample	Soil Sample	Soil Sample	Soil Sample	Soil Sample	Soil Sample			
													23122671-001	23122671-002	23122671-003	23122671-004	23122671-005	24020349-001	24020349-002	24020349-003	24020349-004	24023169-001	
													14/12/2023	14/12/2023	14/12/2023	14/12/2023	14/12/2023	31/01/2024	31/01/2024	31/01/2024	31/01/2024	21/02/2024	
Metals	Boron as B ^Δ	ICPBOR	mg/kg	240000000	240000	S4UL						0											
	Arsenic as As ^Δ	ICPMSS	mg/kg	640000	640	S4UL	10	10	7.6	44.6	20.0	10.3	0	23.6	19.9	8.8	24	20.7	44.6	18.7	14.7	7.6	17.1
	Cadmium as Cd ^Δ	ICPMSS	mg/kg	190000	190	S4UL	10	7	<0.2	1	0.5	0.3	0	0.8	0.6	0.4	1	0.7	1	<0.2	<0.2	<0.2	0.2
	Copper as Cu ^Δ	ICPMSS	mg/kg	68000000	68000	S4UL	10	10	33.9	129.4	57.1	28.1	0	60.7	48.8	46.5	75.7	52.6	129.4	42	37.8	33.9	43.2
	Lead as Pb ^Δ	ICPMSS	mg/kg	2330000	2330	C4SL	10	10	13.4	196.7	78.9	69.6	0	97.6	70.3	50.2	182.7	124.9	196.7	21.3	15.3	13.4	16.7
	Mercury as Hg ^Δ	ICPMSS	mg/kg	58000	58	S4UL	10	0	<0.5	<0.5	-	-	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Nickel as Ni ^Δ	ICPMSS	mg/kg	980000	980	S4UL	10	10	13.8	33.4	24.0	7.0	0	29.5	31	33.4	22.8	22.1	30.3	15.4	13.8	25.1	16.9
	Selenium as Se ^Δ	ICPMSS	mg/kg	12000000	12000	S4UL							0										
	Total Chromium as Cr ^Δ	ICPMSS	mg/kg	8600000	8600	S4UL	10	10	4.8	14.9	9.8	3.8	0	14.9	13.9	9.2	11.1	9.4	14.9	6.6	4.8	5.8	7.2
	Zinc as Zn ^Δ	ICPMSS	mg/kg	730000000	730000	S4UL	10	10	25.7	856.7	280.5	281.8	0	297.8	187.5	176.1	856.7	496.7	592.2	29.1	25.7	114	29.6
Misc	Chromium (VI) as Cr ^Δ	KONENS	mg/kg	33000	33	S4UL							0										
	pH (2.5:1 extraction) ^Δ	PHSOIL	pH units	-	-	-	10	10	4.9	8.9	7.5	1.4	-	8.4	7.8	8.9	8.6	8.7	7.2	4.9	5.4	6.9	8
	Free Cyanide ^Δ	SFAP1	mg/kg	157000	157	GAC _{C4SL}							0										
	Phenol Index ^Δ	SFAP1	mg/kg	760000	760	S4UL							0										
	Asbestos Identification	SUB020	-	-	-								0										
Polyyclic Aromatic Hydrocarbons (PAH)	Acenaphthene ^Δ	PAHMSUS	mg/kg	84000000	84000	S4UL	10	0	<0.09	<0.55	-	-	0	<0.15	<0.15	<0.09	<0.09	<0.09	<0.55	<0.44	<0.09	<0.09	<0.09
	Acenaphthylene ^Δ	PAHMSUS	mg/kg	83000000	83000	S4UL	10	0	<0.09	<0.55	-	-	0	<0.15	<0.15	<0.09	<0.09	<0.09	<0.55	<0.44	<0.09	<0.09	<0.09
	Anthracene ^Δ	PAHMSUS	mg/kg	520000000	520000	S4UL	10	0	<0.09	<0.55	-	-	0	<0.15	<0.15	<0.09	<0.09	<0.09	<0.55	<0.44	<0.09	<0.09	<0.09
	Benzo[a]anthracene ^Δ	PAHMSUS	mg/kg	170000	170	S4UL	10	6	<0.09	2.01	0.4	0.6	0	0.49	0.34	0.15	0.17	<0.09	2.01	<0.44	<0.09	0.12	<0.09
	Benzo[a]pyrene ^Δ	PAHMSUS	mg/kg	35000	35	S4UL	10	5	<0.09	2.13	0.4	0.6	0	0.46	0.33	0.15	0.14	<0.09	2.13	<0.44	<0.09	<0.09	<0.09
	Benzo[b]fluoranthene ^Δ	PAHMSUS	mg/kg	44000	44	S4UL	10	9	<0.09	3.24	0.7	0.9	0	0.92	0.68	0.3	0.3	0.14	3.24	0.6	0.12	0.21	<0.09
	Benzo[g,h,i]perylene ^Δ	PAHMSUS	mg/kg	39000000	3900	S4UL	10	5	<0.09	1.19	0.3	0.3	0	0.35	0.27	0.12	0.11	<0.09	1.19	<0.44	<0.09	<0.09	<0.09
	Benzo[k]fluoranthene ^Δ	PAHMSUS	mg/kg	1200000	1200	S4UL	10	5	<0.09	1.41	0.3	0.4	0	0.3	0.19	0.09	0.1	<0.09	1.41	<0.44	<0.09	<0.09	<0.09
	Chrysene ^Δ	PAHMSUS	mg/kg	350000	350	S4UL	10	10	0.18	2.32	0.6	0.7	0	0.7	0.53	0.27	0.28	0.19	2.32	0.89	0.18	0.28	0.21
	Dibenzo[a,h]anthracene ^Δ	PAHMSUS	mg/kg	3500	3.5	S4UL	10	0	<0.09	<0.55	-	-	0	<0.15	<0.15	<0.09	<0.09	<0.09	<0.55	<0.44	<0.09	<0.09	<0.09
	Fluoranthene ^Δ	PAHMSUS	mg/kg	23000000	23000	S4UL	10	10	0.13	4.43	0.8	1.3	0	0.82	0.63	0.3	0.3	0.13	4.43	0.93	0.25	0.44	0.24
	Fluorene ^Δ	PAHMSUS	mg/kg	63000000	63000	S4UL	10	3	<0.09	0.64	0.2	0.2	0	<0.15	<0.15	<0.09	<0.09	<0.09	<0.55	0.64	0.09	<0.09	0.11
	Indeno[1,2,3-cd]pyrene ^Δ	PAHMSUS	mg/kg	500000	500	S4UL	10	5	<0.09	1.28	0.3	0.4	0	0.47	0.35	0.14	0.14	<0.09	1.28	<0.44	<0.09	<0.09	<0.09
	Naphthalene ^Δ	PAHMSUS	mg/kg	190000	190	S4UL	10	9	<0.16	1.37	0.4	0.4	0	0.2	0.16	0.19	0.16	0.18	<0.55	1.37	0.27	0.33	0.29
	Phenanthrene ^Δ	PAHMSUS	mg/kg	22000000	22000	S4UL	10	10	0.38	2.72	0.9	0.8	0	0.93	0.58	0.56	0.42	0.38	1.9	2.72	0.52	0.76	0.56
	Pyrene ^Δ	PAHMSUS	mg/kg	54000000	54000	S4UL	10	10	0.1	3.67	0.7	1.1	0	0.56	0.43	0.22	0.21	0.1	3.67	0.74	0.18	0.35	0.17
BTX	Benzene ^Δ	BTEXHSA	µg/kg	27000	27	S4UL	10	2	<11	111	24.7	30.9	0	<19	<19	<11	<11	<11	<14	29	<11	<11	111
	Toluene ^Δ	BTEXHSA	mg/kg	56000000	56000	S4UL	2	0	<0.011	<0.014	-	-	0						<0.014		<0.011		
	Ethylbenzene ^Δ	BTEXHSA	mg/kg	5700000	5700	S4UL	2	0	<0.011	<0.014	-	-	0						<0.014		<0.011		
	m/p-Xylene ^Δ	BTEXHSA	mg/kg	5900000	5900	S4UL	2	0	<0.022	<0.027	-	-	0						<0.027		<0.022		
	o-Xylene ^Δ	BTEXHSA	mg/kg	6600000	6600	S4UL	2	0	<0.011	<0.014	-	-	0						<0.014		<0.011		
Total Petroleum Hydrocarbons (TPH)	C5-C6 Aliphatic ^Δ	GRGSA/BTEXHSA	mg/kg	32000000	3200	S4UL	10	0	<0.219	<0.386	-	-	0	<0.386	<0.377	<0.224	<0.225	<0.228	<0.274	<0.219	<0.222	<0.222	<0.225
	>C6-C7 Aliphatic ^Δ	GRGSA/BTEXHSA	mg/kg	-	-	-	10	0	<0.219	<0.386	-	-	0	<0.386	<0.377	<0.224	<0.225	<0.228	<0.274	<0.219	<0.222	<0.222	<0.225
	>C7-C8 Aliphatic ^Δ	GRGSA/BTEXHSA	mg/kg	-	-	-	10	0	<0.219	<0.386	-	-	0	<0.386	<0.377	<0.224	<0.225	<0.228	<0.274	<0.219	<0.222	<0.222	<0.225
	>C6-C8 Aliphatic ³	-	mg/kg	7800000	7800	S4UL	10	0	<0.438	<0.772	-	-	0	<0.772	<0.754	<0.448	<0.45	<0.456	<0.548	<0.438	<0.444	<0.444	<0.45
	>C8-C10 Aliphatic ^Δ	GRGSA/BTEXHSA	mg/kg	2000000	2000	S4UL	10	0	<0.219	<0.386	-	-	0	<0.386	<0.377	<0.224	<0.225	<0.228	<0.274	<0.219	<0.222	<0.222	<0.225
	C5-C7 Aromatic ^Δ	GRGSA/BTEXHSA	mg/kg	26000000	26000	S4UL	10	2	<0.011	0.111	0.0	0.0	0	<0.019	<0.019	<							

Table G2 - Data Summary and Analysis - Groundwater Test Data vs Assessment Criteria from Drinking Water Standards (DWS)



Site:	NPT - Glyncorrwg	Project No:	H3091_G
Data Description:	Tier 2 GQRA	Hardness	<40 mg
Sample Matrix:	Groundwater	Completed By:	MW
Receptor:	Groundwater (Potable - Consumers Tap)	Checked By:	-

Key to Assessment Criteria: UK DWS : UK Drinking Water Standards; WHO DWS : World Health Organisation Drinking Water Standards

- Notes on Calculated Values:
- Sum of results for Benzo[b]fluoranthene, Benzo[g,h,i]perylene, Benzo[k]fluoranthene and Indeno[1,2,3-cd]pyrene.
 - Sum of m/p-Xylene and O-Xylene; 3 - Sum of TPH results for >C6-C7 Aliphatic and >C7-C8 Aliphatic.
 - Sum of VOC results for Tetrachloroethane and Trichloroethane.
 - Sum of results for Trihalomethanes (Bromodichloromethane, Bromoform, Chloroform and Dibromochloromethane).
 - Sum of results for Tetrachloroethene and Trichloroethene.

Laboratory Test Results			Assessment Criteria (AC)			Summary Statistics							Sample Identifiers (Ref, Type, Lab No, Sampling Date) and Analytical Data																	
Contaminant	Test Method	Units	Units (Calculated equivalent units shown in italics)		Source (see key)	Number of Samples Tested	Results Above Detection Limit	Min Value	Max Value	Arithmetic Mean	Standard Deviation	Number of results >AC	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10								
													CPG01-EW-6-50																	
													Ground Water																	
			µg/l	mg/l									24030087-001																	
													29/02/2024																	
Metals	Boron as B	ICPMSW (Dissolved)	mg/l	1000	1	UK DWS						0																		
	Arsenic as As	ICPMSW (Dissolved)	mg/l	10	0.01	UK DWS	1	1	0.001	0.001	-	-	0	0.001																
	Cadmium as Cd	ICPMSW (Dissolved)	mg/l	5	0.005	UK DWS	1	1	0.00033	0.00033	-	-	0	0.00033																
	Copper as Cu	ICPMSW (Dissolved)	mg/l	2000	2	UK DWS	1	0	<0.001	<0.001	-	-	0	<0.001																
	Lead as Pb	ICPMSW (Dissolved)	mg/l	10	0.01	UK DWS	1	0	<0.001	<0.001	-	-	0	<0.001																
	Mercury as Hg	ICPMSW (Dissolved)	mg/l	1	0.001	UK DWS	1	0	<0.00003	<0.00003	-	-	0	<0.00003																
	Nickel as Ni	ICPMSW (Dissolved)	mg/l	20	0.02	UK DWS	1	1	0.006	0.006	-	-	0	0.006																
	Selenium as Se	ICPMSW (Dissolved)	mg/l	10	0.01	UK DWS							0																	
	Total Chromium as Cr	ICPMSW (Dissolved)	mg/l	50	0.05	UK DWS	1	0	<0.001	<0.001	-	-	0	<0.001																
	Zinc as Zn	ICPMSW (Dissolved)	mg/l	-	-	-	1	1	0.026	0.026	-	-	-	0.026																
Misc	Chromium (VI) as Cr	ICPMSW (Dissolved)	mg/l	-	-	-						-																		
	pH	PHCONDW	pH units	-	-	-	1	1	6.3	6.3	-	-	-	6.3																
	Total Sulphur as SO4	ICPMSW (Dissolved)	mg/l	250000	250	UK DWS	1	1	22	22	-	-	0	22																
	Fluoride as F	ISEF-LPL1	mg/l	-	-	-						-																		
	Chloride as Cl	KONENS-LPL1	mg/l	-	-	-						-																		
	Free Cyanide	SFAP1	mg/l	50	0.05	UK DWS						0																		
	Phenol Index	SFAP1-LPL1	mg/l	-	-	-						-																		
	Polycyclic Aromatic Hydrocarbons (PAH)	Acenaphthene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10															
		Acenaphthylene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10															
		Anthracene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10															
Benzo[a]anthracene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
Benzo[a]pyrene		PAHMSW	µg/l	0.01	0.00001	UK DWS	1	0	<0.1	<0.1	-	-	0	<0.10																
Benzo[b]fluoranthene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
Benzo[g,h,i]perylene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
Benzo[k]fluoranthene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
Indeno[1,2,3-cd]pyrene		PAHMSW	µg/l	-	-	-	1	1	0.11	0.11	-	-	-	0.11																
Sum of Selected PAH ¹		-	µg/l	0.1	0.0001	UK DWS	1	0	<0.41	<0.41	-	-	0	<0.41																
BTX	Chrysene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
	Dibenzo[a,h]anthracene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
	Fluoranthene	PAHMSW	µg/l	-	-	-	1	1	0.13	0.13	-	-	-	0.13																
	Fluorene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
	Naphthalene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
	Phenanthrene	PAHMSW	µg/l	-	-	-	1	1	0.18	0.18	-	-	-	0.18																
	Pyrene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
	Benzene	BTEXHSA	µg/l	10	0.01	WHO DWS	1	0	<5	<5	-	-	0	<5																
	Ethylbenzene	BTEXHSA	µg/l	300	0.3	WHO DWS	1	0	<5	<5	-	-	0	<5																
	m/p-Xylene	BTEXHSA	µg/l	-	-	-	1	0	<10	<10	-	-	-	<10																
Total Petroleum Hydrocarbons (TPH)	o-Xylene	BTEXHSA	µg/l	-	-	-	1	0	<5	<5	-	-	-	<5																
	Xylene ²	-	µg/l	500	0.5	WHO DWS	1	0	<15	<15	-	-	0	<15																
	Toluene	BTEXHSA	µg/l	700	0.7	WHO DWS	1	0	<5	<5	-	-	0	<5																
	C5-C6 Aliphatic	GC/MSA/BTEXHSA	mg/l	15000	15	WHO DWS	1	0	<0.1	<0.1	-	-	0	<0.100																
	>C6-C7 Aliphatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.100																
	>C7-C8 Aliphatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.100																
	>C8-C10 Aliphatic ³	-	mg/l	15000	15	WHO DWS	1	0	<0.2	<0.2	-	-	0	<0.2																
	>C8-C10 Aliphatic	GC/MSA/BTEXHSA	mg/l	300	0.3	WHO DWS	1	0	<0.1	<0.1	-	-	0	<0.100																
	C5-C7 Aromatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.005	<0.005	-	-	-	<0.005																
	>C7-C8 Aromatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.005	<0.005	-	-	-	<0.005																
Volatile Organic Compounds (VOC)	>C8-C10 Aromatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.02	<0.02	-	-	-	<0.020																
	Total GRO C5-C10	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.100																
	>C10-C12 (Aliphatic)	TPHFD (Aliphatic)	mg/l	300	0.3	WHO DWS	1	0	<0.1	<0.1	-	-	0	<0.10																
	>C12-C16 (Aliphatic)	TPHFD (Aliphatic)	mg/l	300	0.3	WHO DWS	1	0	<0.1	<0.1	-	-	0	<0.10																
	>C16-C21 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
	>C21-C35 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-	1	1	0.13	0.13	-	-	-	0.13																
	>C35-C44 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-						-																		
	Total TPH >C8-C40 (Aliphatic)	TPHFD (Aromatic)	mg/l	-	-	-	1	1	0.14	0.14	-	-	-	0.14																
	>C10-C12 (Aromatic)	TPHFD (Aromatic)	mg/l	90	0.09	WHO DWS	1	0	<0.1	<0.1	-	-	0	<0.10																
	>C12-C16 (Aromatic)	TPHFD (Aromatic)	mg/l	90	0.09	WHO DWS	1	0	<0.1	<0.1	-	-	0	<0.10																
>C16-C21 (Aromatic)	TPHFD (Aromatic)	mg/l	90	0.09	WHO DWS	1	0	<0.1	<0.1	-	-	0	<0.10																	
>C21-C35 (Aromatic)	TPHFD (Aromatic)	mg/l	90	0.09	WHO DWS	1	0	<0.1	<0.1	-	-	0	<0.10																	
>C35-C44 (Aromatic)	TPHFD (Aromatic)	mg/l	-	-	-						-																			
Trihalomethanes (THM)	Total TPH >C8-C40 (Aromatic)	TPHFD (Aromatic)	mg/l	-	-	-	1	1	0.14																					

Table G3 - Data Summary and Analysis - Groundwater Test Data vs Assessment Criteria from Environmental Quality Standards (EQS) for Fresh Water



Site:	NPT - Glyncorrwg	Project No:	H3091_G
Data Description:	Tier 2 GQRA		
Sample Matrix:	Groundwater	Completed By:	MW
Receptor:	Surface water (Fresh water)	Checked By:	-

Notes on

Calculated

Values:

1 - Sum of results for Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene and Indeno[1,2,3-cd]pyrene.
2 - Sum of m/p-Xylene and O-Xylene.

Key to EQS

Assessment

Values:

FW EQS_{pr}: Freshwater EQS Value (Priority Substance)
FW EQS_{sp}: Freshwater EQS Value (Specific Pollutant)
FW EQS_{hr}: Freshwater EQS Value (Priority Hazardous Substance)
FW EQS_{op}: Freshwater EQS Value (Other Pollutant)

Laboratory Test Results			Assessment Criteria (AC)		Summary Statistics							Sample Identifiers (Ref, Type, Lab No, Sampling Date) and Analytical Data																			
Contaminant	Test Method	Units	Units (Calculated equivalent units shown in <i>italics</i>)		Source (see key)	Number of Samples Tested	Results Above Detection Limit	Min Value	Max Value	Arithmetic Mean	Standard Deviation	Number of results >AC	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10									
			µg/l	mg/l									CP001-EW-6.50	Ground Water	24030087-001	29/02/2024															
Metals	Boron as B	ICPMSW (Dissolved)	mg/l	2000	2	FW EQS _{sp}						0																			
	Arsenic as As	ICPMSW (Dissolved)	mg/l	50	0.05	FW EQS _{sp}	1	1	0.001	0.001	-	-	0	0.001																	
	Cadmium as Cd	ICPMSW (Dissolved)	mg/l	0.08	0.00008	FW EQS _{sp}	1	1	0.00033	0.00033	-	-	1	0.00033																	
	Copper as Cu	ICPMSW (Dissolved)	mg/l	1	0.001	FW EQS _{sp}	1	0	<0.001	<0.001	-	-	0	<0.001																	
	Lead as Pb	ICPMSW (Dissolved)	mg/l	1.2	0.0012	FW EQS _{sp}	1	0	<0.001	<0.001	-	-	0	<0.001																	
	Mercury as Hg	ICPMSW (Dissolved)	mg/l	0.07	0.00007	FW EQS _{sp}	1	0	<0.00003	<0.00003	-	-	0	<0.00003																	
	Nickel as Ni	ICPMSW (Dissolved)	mg/l	4	0.004	FW EQS _{sp}	1	1	0.006	0.006	-	-	1	0.006																	
	Selenium as Se	ICPMSW (Dissolved)	mg/l	-	-	-							-																		
	Total Chromium as Cr	ICPMSW (Dissolved)	mg/l	4.7	0.0047	FW EQS _{sp}	1	0	<0.001	<0.001	-	-	0	<0.001																	
	Zinc as Zn	ICPMSW (Dissolved)	mg/l	10.9	0.0109	FW EQS _{sp}	1	1	0.026	0.026	-	-	1	0.026																	
Misc	Chromium (VI) as Cr	ICPMSW (Dissolved)	mg/l	3.4	0.0034	FW EQS _{sp}						0																			
	pH	PHCONDW	pH units	-	-	-	1	1	6.3	6.3	-	-	-	6.3																	
	Total Sulphur as SO4	ICPMSW (Dissolved)	mg/l	400000	400	FW EQS _{sp}	1	1	22	22	-	-	0	22																	
	Fluoride as F	ISEF-LPL1	mg/l	1000	1	FW EQS _{sp}						0																			
	Chloride as Cl	KONENS-LPL1	mg/l	250000	250	FW EQS _{sp}						0																			
	Free Cyanide	SFAP1	mg/l	1	0.001	FW EQS _{sp}						0																			
	Phenol Index	SFAP1-LPL1	mg/l	7.7	0.0077	FW EQS _{sp}						0																			
	Polycyclic Aromatic Hydrocarbons (PAH)	Acenaphthene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
		Acenaphthylene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																
		Anthracene	PAHMSW	µg/l	0.1	0.0001	FW EQS _{sp}	1	0	<0.1	<0.1	-	-	0	<0.10																
Benzo[a]anthracene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
Benzo[a]pyrene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
Benzo[b]fluoranthene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
Benzo[g,h,i]perylene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
Benzo[k]fluoranthene		PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
Indeno[1,2,3-cd]pyrene		PAHMSW	µg/l	-	-	-	1	1	0.11	0.11	-	-	-	0.11																	
Sum of Selected PAH ¹		-	µg/l	0.00017	0.00000017	FW EQS _{sp}	1	0	<0.51	<0.51	-	-	0	<0.51																	
BTX	Chrysene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	Dibenzo[a,h]anthracene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	Fluoranthene	PAHMSW	µg/l	0.0063	0.00000063	FW EQS _{sp}	1	1	0.13	0.13	-	-	1	0.13																	
	Fluorene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	Naphthalene	PAHMSW	µg/l	2	0.002	FW EQS _{sp}	1	0	<0.1	<0.1	-	-	0	<0.10																	
	Phenanthrene	PAHMSW	µg/l	-	-	-	1	1	0.18	0.18	-	-	-	0.18																	
	Pyrene	PAHMSW	µg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	Benzene	BTEXHSA	µg/l	10	0.01	FW EQS _{sp}	1	0	<5	<5	-	-	0	<5																	
	Ethylbenzene	BTEXHSA	µg/l	-	-	-	1	0	<5	<5	-	-	-	<5																	
	m/p-Xylene	BTEXHSA	µg/l	-	-	-	1	0	<10	<10	-	-	-	<10																	
Total Petroleum Hydrocarbons (TPH)	o-Xylene	BTEXHSA	µg/l	-	-	-	1	0	<5	<5	-	-	-	<5																	
	Xylene ²	-	µg/l	30	0.03	FW EQS _{sp}	1	0	<15	<15	-	-	0	<15																	
	Toluene	BTEXHSA	µg/l	-	-	-	1	0	<5	<5	-	-	-	<5																	
	C5-C6 Aliphatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.100																	
	>C6-C7 Aliphatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.100																	
	>C7-C8 Aliphatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.100																	
	>C8-C10 Aliphatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.100																	
	C5-C7 Aromatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.005	<0.005	-	-	-	<0.005																	
	>C7-C8 Aromatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.005	<0.005	-	-	-	<0.005																	
	>C8-C10 Aromatic	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.02	<0.02	-	-	-	<0.020																	
Volatile Organic Compounds (VOC)	Total GRO C5-C10	GC/MSA/BTEXHSA	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.100																	
	>C10-C12 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	>C12-C16 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	>C16-C21 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	>C21-C35 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-	1	1	0.13	0.13	-	-	-	0.13																	
	>C35-C44 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-						-																			
	Total TPH >C8-C40 (Aliphatic)	TPHFD (Aliphatic)	mg/l	-	-	-						-																			
	>C10-C12 (Aromatic)	TPHFD (Aromatic)	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	>C12-C16 (Aromatic)	TPHFD (Aromatic)	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	>C16-C21 (Aromatic)	TPHFD (Aromatic)	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
Semi-Volatile Organic Compounds (SVOC)	>C21-C35 (Aromatic)	TPHFD (Aromatic)	mg/l	-	-	-	1	0	<0.1	<0.1	-	-	-	<0.10																	
	>C35-C44 (Aromatic)	TPHFD (Aromatic)	mg/l	-	-	-						-																			
	Total TPH >C8-C40 (Aromatic)	TPHFD (Aromatic)	mg/l	-	-	-	1	1	0.14	0.14	-	-	-	0.14																	
	1,1,1,2-Tetrachloroethane	VOCHSAW	µg/l	-	-	-	1	0	<1	<1	-	-	-	<1																	
	1,1,1-Trichloroethane	VOCHSAW	µg/l	100	0.1	FW EQS _{sp}	1	0	<1	<1	-	-	0	<1																	
	1,1,2,2-Tetrachloroethane	VOCHSAW	µg/l	-	-	-	1	0	<1	<1	-	-	-	<1																	
	1,1,2-Trichloroethane																														

KEY TO CONCEPTUAL SITE MODEL AND GENERIC QUANTITATIVE RISK ASSESSMENT (GQRA)

CLASSIFICATION OF SEVERITY	
SEVERITY	DEFINITION AND EXAMPLES
Severe	Acute risk to human health, resulting in significant harm, or short-term pollution risk; eg high concentration of contaminants, major spillage to controlled water, explosion.
Medium	Chronic (long-term) risk to human health, or pollution of controlled waters; eg Contamination exceeding assessment criteria, leaching of contaminant to aquifer.
Mild	Damage to non-sensitive species or ecosystems, buildings or services; eg. pollution of non-classified groundwater, or damage to building making it unsafe.
Minor	Non-permanent health effects, or repairable damage to buildings; eg. Contamination at levels requiring PPE, the loss of plants in landscaping, or discolouration of concrete.

CLASSIFICATION OF LIKELIHOOD	
LIKELIHOOD	TYPICAL EXAMPLES
High Likelihood	Pollutant linkage may be present, and risk is almost certain to occur in the long term, or there is evidence of existing harm to the receptor.
Likely	Pollutant linkage is present, and it is probable that the risk will occur over the long term.
Low Likelihood	Pollutant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Pollutant linkage may be present but the circumstances under which harm would occur are improbable , even in the very long term.

Definition of Terms:

1. SEVERITY: The potential consequence of a risk, should it occur.
2. LIKELIHOOD: The probability of the risk occurring
3. RISK RATING: An expression of the combination of severity and likelihood.
(here assessed by multiplying severity and likelihood expressed numerically)

Note:

Severity, likelihood and risk classifications based on CIRIA C552.

RISK RATING MATRIX						
LIKELIHOOD	4	High likelihood	4	8	12	16
	3	Likely	3	6	9	12
	2	Low likelihood	2	4	6	8
	1	Unlikely	1	2	3	4
			Minor	Mild	Medium	Severe
			1	2	3	4
SEVERITY						

RISK CLASSIFICATION	
Risk Scoring	Risk level and recommended action
1 / 2	VERY LOW RISK: There is a low possibility of harm to a receptor which, if it occurs, would not be severe.
3	LOW RISK: There is a possibility of harm to the receptor, but such harm would be mild.
4 / 6	LOW / MODERATE RISK: Should harm arise it is most likely to be mild. Investigation would be beneficial.
8 / 9	MODERATE RISK: Severe harm is possible but is unlikely. Investigation normally required to confirm the risk.
12	HIGH RISK: Harm to the receptor is likely. Urgent investigation is required, and probable remediation.
16	VERY HIGH RISK: A high probability of severe harm arising (or evidence of existing severe harm). Urgent investigation and remediation is required.

KEY

**Neath Port Talbot County
Borough Council**

G4

[illegible]

CONCEPTUAL SITE MODEL (CSM)							GQRA				
POTENTIAL SOURCES OF CONTAMINATION					POTENTIAL MIGRATION PATHWAYS	POTENTIAL RECEPTORS	SEVERITY OF RISK	LIKELIHOOD OF RISK	RISK SCORE & CATEGORY		REMARKS
REF	LOC	SITE USE / ACTIVITY	CONTAMINATION MECHANISM	POSSIBLE CONTAMINANTS							
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	INGESTION (Soil, soil dust and/or water).	Future site users	2 (Mild)	1 (Unlikely)	2	V Low	Colliery spoil identified on site but soil results from chemical analysis all below commercial GAC. Moderate gas risk identified present to future users. Assessment of the preliminary ground gas monitoring data indicates the gas regime to be equivalent to Characteristic Situation 2 (Made Ground) and further control measures i.e. gas protection measures for a Type D building are required to mitigate the potential risk. The slightly elevated concentrations of ground gas were recorded in the response zone recorded in the Made Ground which was not in continuity with alluvium or the deeper bedrock at this position. A peak carbon dioxide concentration of 9%, above the Work Exposure Limits in HSE EH40, indicates ground gases present a potential high risk to construction workers particularly in confined spaces such as open excavations through the Made Ground. The potential risks presented to construction workers are an occupational hygiene matter and should be assessed and controlled as part of the contractor's risk assessment for the construction phase works
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	INHALATION (Soil dust, soil vapour and/or water vapour)	Future site users	2 (Mild)	1 (Unlikely)	2	V Low	
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	DERMAL CONTACT (Soil, soil dust and/or water)	Future site users	2 (Mild)	1 (Unlikely)	2	V Low	
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	INGESTION (Soil, soil dust and/or water)	Construction workers	3 (Medium)	1 (Unlikely)	3	Low	
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	INHALATION (Soil dust, soil vapour and/or water vapour)	Construction workers	3 (Medium)	1 (Unlikely)	3	Low	
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	DERMAL CONTACT (Soil, soil dust and/or water)	Construction workers	2 (Mild)	1 (Unlikely)	2	V Low	
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	MIGRATION AND INHALATION (Gases and/or vapours in permeable strata)	Future site users	3 (Medium)	3 (Likely)	9	Mod	
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	MIGRATION AND INHALATION (Gases and/or vapours in permeable strata)	Construction workers	4 (Severe)	3 (Likely)	12	High	

Site Name:

A1278 Glyncorrwg Industrial Units

Job No:

H3091-23/G

Carried out For: Neath Port Talbot County Borough Council

Table

G5



CONCEPTUAL SITE MODEL (CSM)							GQRA				
POTENTIAL SOURCES OF CONTAMINATION					POTENTIAL MIGRATION PATHWAYS	POTENTIAL RECEPTORS	SEVERITY OF RISK	LIKELIHOOD OF RISK	RISK SCORE & CATEGORY		REMARKS
REF	LOC	SITE USE / ACTIVITY	CONTAMINATION MECHANISM	POSSIBLE CONTAMINANTS							
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	INHALATION (Soil dust, soil vapour and/or water vapour).	Neighbouring site users	3 (Medium)	1 (Unlikely)	3	Low	
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Groundwater (GW)	3 (Medium)	1 (Unlikely)	3	Low	Assessment of the groundwater data against the EQS values and Drinkwater Standards records minor exceedances of the respective values. However, the risk to groundwater and surface water receptors is considered to be low given that elevated concentration are likely to be representative of the wider groundwater conditions surrounding the site due to its small size and that the developed site will provide hardstanding cover which will limit leaching and sever the plausible pathway.
1	On site	Made Ground used to create a raised development platform in the 1960's.	Imported material of unknown origin used to raise site levels. Potential to comprise uncontrolled / unregulated waste materials.	Heavy metals, PAHs, aliphatic and aromatic hydrocarbons, volatile organic compounds, cyanide, phenols, asbestos and acidic and alkaine soil conditions. Ground gases inc. methane and carbon dioxide.	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Surface water (SW)	3 (Medium)	1 (Unlikely)	3	Low	
2	On site	Potential natural organic soils (eg. Alluvium)	Possible on site Alluvium. Degradation of organic content and release of ground gases trapped in pore spaces	Carbon dioxide and methane	MIGRATION AND INHALATION (Gases and/or vapours in permeable strata)	Future site users	4 (Severe)	1 (Unlikely)	4	Low/Mod	
2	On site	Potential natural organic soils (eg. Alluvium)	Possible on site Alluvium. Degradation of organic content and release of ground gases trapped in pore spaces	Carbon dioxide and methane	MIGRATION AND INHALATION (Gases and/or vapours in permeable strata)	Construction workers	4 (Severe)	1 (Unlikely)	4	Low/Mod	Potential risks presented to construction workers during the Construction Phase is an occupational hygiene matter. The potential risk presented by ground gases should be assessed and controlled as part of the contractor's risk assessment for the construction phase works.
3	On site	Historical deep coal mine workings (270 and 445m beneath the site).	Migration of coal mine gas emissions from worked seams through permeable ground, faults, deep drainage systems, geothermal loops, piled foundations and ingress into buildings and excavations during construction.	Ground gases inc. methane and carbon dioxide	MIGRATION AND INHALATION (Gases and/or vapours in permeable strata)	Future site users	4 (Severe)	2 (Low likelihood)	8	Mod	Assessment of the preliminary ground gas monitoring data indicates the gas regime to be equivalent to Characteristic Situation 2 and further control measures i.e. gas protection measures for a Type D building are required to mitigate the potential risk. Foundation options may require a piled solution which may open pathways between the bedrock and receptors in the built environment.
3	On site	Historical deep coal mine workings (270 and 445m beneath the site).	Migration of coal mine gas emissions from worked seams through permeable ground, faults, deep drainage systems, geothermal loops, piled foundations and ingress into buildings and excavations during construction.	Ground gases inc. methane and carbon dioxide	MIGRATION AND INHALATION (Gases and/or vapours in permeable strata)	Construction workers	4 (Severe)	3 (Likely)	12	High	Elevated concentrations of carbon dioxide 5.4% above the Work Exposure Limits, indicates that inhalation of ground gases present a potential risk to construction workers particularly in confined spaces such as open excavations in the underlying bedrock. The potential risk presented to construction workers during the construction phase works is an occupational hygiene matter and should be assessed and controlled as part of the contractor's risk assessment for the construction phase works.
4	On site	Naturally occurring radon gases from underlying geology	Migration of radon gas through permeable ground, faults, deep drainage systems, geothermal loops, piled foundations and ingress into buildings where no Glacial Till is present	Radon	MIGRATION AND INHALATION (Gases and/or vapours in permeable strata)	Future site users	3 (Medium)	3 (Likely)	9	Mod	Basic radon protection measures required. However ground gas protection measures required to mitigate the potential risk presented by ground gases in the Made Ground and potentially coal measures.

CONCEPTUAL SITE MODEL (CSM)							GQRA				
POTENTIAL SOURCES OF CONTAMINATION					POTENTIAL MIGRATION PATHWAYS	POTENTIAL RECEPTORS	SEVERITY OF RISK	LIKELIHOOD OF RISK	RISK SCORE & CATEGORY		REMARKS
REF	LOC	SITE USE / ACTIVITY	CONTAMINATION MECHANISM	POSSIBLE CONTAMINANTS							
5	Off site	Electricity substation	Leaking of cooling oils	Polychlorinated biphenyls	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Future site users	3 (Medium)	1 (Unlikely)	3	Low	Site potentially located up gradient of groundwater flow, unlikely to influence groundwater on site. Presence of low permeability cohesive superficial deposits with no continuous groundwater unit is likely to restrict lateral migration onto the site. No PCBs identified above GAC on site or Non-aqueous phase liquids observed in the groundwater Polythene bag manufacture usually comprises blow film extrusion by heating plastic pellets and no chemical liquids are normally used. Concentrations of VOCs were recorded in the groundwater below the GACs and limits of detection. Non-aqueous phase liquids were not observed during groundwater sampling.
5	Off site	Electricity substation	Leaking of cooling oils	Polychlorinated biphenyls	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Construction workers	3 (Medium)	1 (Unlikely)	3	Low	
4	On site	Naturally occurring radon gases from underlying geology	Migration of radon gas through permable ground, faults, deep drainage systems, geothermal loops, piled foundations and ingress into buildings where no Glacial Till s present	Radon	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Groundwater (GW)	3 (Medium)	1 (Unlikely)	3	Low	
5	Off site	Electricity substation	Leaking of cooling oils	Polychlorinated biphenyls	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Future site users	3 (Medium)	1 (Unlikely)	3	Low	
5	Off site	Electricity substation	Leaking of cooling oils	Polychlorinated biphenyls	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Construction workers	3 (Medium)	1 (Unlikely)	3	Low	
5	Off site	Electricity substation	Leaking of cooling oils	Polychlorinated biphenyls	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Groundwater (GW)	3 (Medium)	1 (Unlikely)	3	Low	
5	Off site	Electricity substation	Leaking of cooling oils	Polychlorinated biphenyls	SURFACE FLOW (Contaminated runoff)	Groundwater (GW)	3 (Medium)	1 (Unlikely)	3	Low	
6	Off site	Packaging industry - polythene manufacturing	Spills and leaks of substances stored and used in the production / process and release to ground and groundwater.	Volatile Organic Compounds	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Future site users	2 (Mild)	1 (Unlikely)	2	V Low	

CONCEPTUAL SITE MODEL (CSM)							GQRA				
POTENTIAL SOURCES OF CONTAMINATION					POTENTIAL MIGRATION PATHWAYS	POTENTIAL RECEPTORS	SEVERITY OF RISK	LIKELIHOOD OF RISK	RISK SCORE & CATEGORY		REMARKS
REF	LOC	SITE USE / ACTIVITY	CONTAMINATION MECHANISM	POSSIBLE CONTAMINANTS							
6	Off site	Packaging industry - polythene manufacturing	Spills and leaks of substances stored and used in the production / process and release to ground and groundwater.	Volatile Organic Compounds	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Construction workers	2 (Mild)	1 (Unlikely)	2	V Low	Volatile hydrocarbons (C6-C16 range) and VOC concentrations were recorded in the groundwater below the GACs and limits of detection. Non-aqueous phase liquids were not observed during groundwater sampling.
6	Off site	Packaging industry - polythene manufacturing	Spills and leaks of substances stored and used in the production / process and release to ground and groundwater.	Volatile Organic Compounds	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Groundwater (GW)	2 (Mild)	1 (Unlikely)	2	V Low	
6	Off site	Packaging industry - polythene manufacturing	Spills and leaks of substances stored and used in the production / process and release to ground and groundwater.	Volatile Organic Compounds	SURFACE FLOW (Contaminated runoff)	Groundwater (GW)	2 (Mild)	1 (Unlikely)	2	V Low	
7	Off site	Historical unspecified Above Ground Storage tank	Content unknown - anecdotal evidence suggests water tank associated with former furniture manufacturing. Possible heating oil or process chemical storage.	Aliphatic and aromatic hydrocarbons and / or VOCs	LATERAL MIGRATION AND VOLATILISATION (Contaminated groundwater in permeable strata)	Future site users	3 (Medium)	1 (Unlikely)	3		Volatile hydrocarbons (C6-C16 range) and VOC concentrations were recorded in the groundwater below the GACs and limits of detection. Non-aqueous phase liquids were not observed during groundwater sampling.
7	Off site	Historical unspecified Above Ground Storage tank	Content unknown - anecdotal evidence suggests water tank associated with former furniture manufacturing. Possible heating oil or process chemical storage.	Aliphatic and aromatic hydrocarbons and / or VOCs	LATERAL MIGRATION AND VOLATILISATION (Contaminated groundwater in permeable strata)	Construction workers	3 (Medium)	1 (Unlikely)	3		
7	Off site	Historical unspecified Above Ground Storage tank	Content unknown - anecdotal evidence suggests water tank associated with former furniture manufacturing. Possible heating oil or process chemical storage.	Aliphatic and aromatic hydrocarbons and / or VOCs	LEACHING AND MIGRATION (Soil contaminants into groundwater)	Groundwater (GW)	3 (Medium)	1 (Unlikely)	3		